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A Bibliometric Analysis of the Academic Influences of and on Evaluation Theorists' Published Works

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Abstract

As is the case with other fields, there is motivation for studying the impact that the body of evaluation theory literature has within and outside the field. The authors used journal articles written by theorists included on the evaluation theory tree by Alkin and Christie (2004; Christie & Alkin, 2008) and published in the Web of Science, an online academic database, as a data source to address the questions: "What fields of knowledge do evaluation theorists draw upon in their publications?" and "What fields draw upon the published articles of evaluation theorists in their work?" The bibliometric analysis of 731 journal articles published by evaluation theorists shows that evaluation is an intellectual field that is strongly informed by psychology and education, as well as a range of other subjects. There are some consistencies in the publishing patterns of the theorists across the three branches of the theory tree (methods, use, and valuing), but multidimensional scaling maps show that each branch also exhibits a distinctive character of its own. References to a random sample of 500 articles from a subset of 9 theorists indicate that these theorists were cited not only in the areas that they themselves cite, but also in areas beyond where they routinely publish.

Keywords

evaluation theory, bibliometric analysis, citation analysis, research on evaluation

Introduction

Evaluation has been described as a transdiscipline (Scriven, 2003), that is, a discipline that serves other disciplines while also having an autonomous status of its own. If we accept this definition of evaluation at least in part, then we also accept the notion that evaluation offers knowledge to other fields and in turn that evaluation draws upon the knowledge offered by other fields.

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Cross-disciplinary exchanges, which could be thought of as academic influence, often warrant some examination. In an inquiry into the status of evaluation as a discipline, Jacob (2008) states that, "evaluation attracts people from a variety of disciplinary fields, including economics, sociology, political science and psychology" (p. 175) and reminds us that we are enriched by the diversity of disciplinary perspectives represented by those practicing our profession. Of course, it is very difficult to identify the direction of a given influence, that is, whether it is the evaluation itself that has been inspired by other fields or the reverse. In trying to understand the academic influence of one field on another or attempting to discover connections between fields, it is extremely difficult to do a comprehensive analysis of research in the field. We propose that a measure of knowledge exchange between disciplines and fields can be used as an indicator of such exchanges. Bibliometric analysis is one way to empirically identify the fields that evaluation draws upon and those that draw upon our evaluation literature most heavily.

Bibliometric analysis is a methodology that documents the publication patterns of authors in terms of the citations they receive as well as whom they cite in their own published work. Describing the application of bibliometric methods on the evaluation of large research initiatives, Quinlan, Kane, and Trochim (2008) state, "[i]n the past few decades bibliometric analysis has emerged as an important way of illuminating scientific influence and impact. Bibliometrics involves quantitative assessment of scientific publications, the works they cite, and citations of them" (p. 68). Because bibliometric data are citations, such analyses provide an *indicator* of the academic influence of a field. For practical fields such as evaluation, this type of analysis offers a particular perspective on the influence of evaluation. When attempting to understand the academic influence of a practical field, it is reasonable to use the writings of theorists as the focus of the analysis. Examining the influence of evaluation theorists' published work on other fields as well as the fields from which our theorists draw upon to inform their work helps to better understand the influence of evaluation literature on other fields as well as the fields that have influenced evaluation.

Doing these examinations is important to a variety of audiences. It is important to examine how evaluation theory influences other theories (within and outside of evaluation). Doing so, emphasizes the role of evaluation as a transdiscipline. Moreover, there is an important role for evaluation theory in affecting practice. The theoretical literature, although not a total guide to what practitioners do, is nonetheless an important influence (Christie, 2003).

Using a sample of evaluation theorists, this study examined the academic influences of evaluation, and on evaluation, by analyzing the citations of the theorists' writings included in the Web of Science. Specifically, we use the citations of theorists included on the evaluation theory tree by Alkin and Christie (2004; Christie & Alkin, 2008) to address the questions: What fields of knowledge do evaluation theorists draw upon in their publications? and What fields draw upon the published works of evaluation theorists in their work?

Relevant Literature

Mark (2007) argues that there are four modes of inquiry and research on evaluation: classification, description, causal, and values. Much of the research on evaluation focuses on classification and description. Given how few empirical reviews of evaluation exist in the literature, studies that systematically describe evaluation have an important contribution to make to increase the understanding of evaluation as a field.

Bibliometric data are one source for describing the influence of published evaluation literature on other theoretical fields, on evaluation authors, and on evaluation practice. Bibliometrics can be thought of as research involving physical units of publications, bibliographic citations, and surrogates for them (Broadus, 1987). Explaining further, physical units of publications may include peer-reviewed journal articles, letters to the editor, book reviews, and other documents. Bibliographic citations can be thought of simply as reference lists. Research in this area is generally,

though not always, quantitative in nature. Bibliometric studies can be either evaluative or descriptive and can be used in multiple levels of analyses from, on one hand, examining publishing patterns of a single author, to mapping all of a field or science. Bibliometric studies have been conducted in many fields and in many countries to better understand the influence of their scholars' work. In fact, the earliest systematic work in this area was conducted on the publications of psychologists, in part with the goal of establishing psychology as a science (Godin, 2006).

Bibliometric analysis is an accepted method for evaluating the impact of a field's academic publications. Stokols et al. (2003) used bibliometric analysis as part of a multimethod evaluation of the National Institute of Health's Transdisciplinary Tobacco Use Research Centers, intended to promote cross-disciplinary collaboration among researchers investigating this complex issue. Evaluations of published work can help practitioners frame pertinent published work for use in their own contexts. This "putting publications to use" is a neglected part of the traditional academic publishing equation. The discussion presented here can help practitioners examine the development and concentration of publications for specific areas of evaluation, including fields of interest as well as highlight relevant gaps in the literature.

It can be difficult to determine how to best sample a set of citations for a bibliometric analysis. The theorists on evaluation theory tree by Alkin and Christie (2004) represent a subset of the past and present state of evaluation knowledge, which were selected for inclusion in their framework after engaging in an extensive content analysis of theorists' writings that identified the key author whose work had the greatest influence on the development of a particular approach. Frameworks such as the theory tree offer comparative, relational depictions of evaluation approaches.

Alkin and Christie (2004) argue that there are three basic elements of evaluation theories: use, methods, and valuing. Thus, all prescriptive theories of evaluation much consider issues related to (a) the *methods* used in an evaluation, including the study design; (b) the manner in which data are to be judged and valued and by whom, and the underlying *values* used to accomplish this, and (c) the *use* of the evaluation effort. The authors argue that theorists differ in the particular emphasis they place on one or another of these dimensions, which are referred to as "branches" of the evaluation theory tree. Theorists were categorized on the branch that best reflects their primary emphasis, and in a manner that reflects some combination of history and/or the influence of a particular approach on another (either building upon, or in response to the tenets of a particular approach).

The first theory tree is presented and described in great detail in chapter 2 of Alkin's (2004) *Evaluation Roots* book. In this chapter, Alkin and Christie discuss 26 different evaluation approaches and classify each by their primary focus on one of three essential elements of evaluation, *methods, values*, and *use*. In 2008, Christie and Alkin published a revised version of the tree that included 24 different approaches. It is this revised version of the framework that was used for the analysis in the current study and is presented in the Methods section of this article (see Table 1). We believe that the theorists included in the theory tree represent a reasonable and appropriate sample of prominent evaluation theorists over time and that an analysis of their citations would serve as a reasonable indicator of the academic influences of and on evaluation. By querying Thompson Scientific's ISI Web of Science databases, it is possible to learn more about the work of this sample of evaluation authors and how others reference their publications.

Method

Research Question 1: What Fields of Knowledge do Evaluation Theorists Draw Upon in Their Publications?

Data collection. Bibliometric data can be used in a relatively straightforward manner to access, collect, and analyze. Many universities have subscriptions to databases that are common sources for

Table 1. Alphabetical Listing of Theory Tree Theorists, by Category

Use	Methods	Valuing
Marvin C. Alkin	Robert F. Boruch	Elliott W. Eisner
J. Bradley Cousins	Donald T. Campbell	Jennifer C. Greene
David M. Fetterman	Huey-Tsyh Chen	Egon G. Guba/Yvonna S. Lincoln
Jean A. King	Thomas D. Cook	Donna Mertens
Michael Quinn Patton	Lee J. Cronbach	Ernest R. House
Hallie Preskill	Mel M. Mark/Gary T. Henry	Michael Scriven
Daniel L. Stufflebeam	Peter H. Rossi	Robert Stake
Joseph S. Wholey	Ralph W. Tyler	
	Carol H. Weiss	

these studies. The source for this study was Thompson Scientific's ISI Web of Science that indexes more than 8,700 journals. In examining and interpreting these data, it is very important to note that samples from ISI Web of Science data only represent articles published in journals indexed by the Web of Science, and the Web of Science does not cover all subject categories equally. The Web of Science includes the Science Citation Index Expanded, Social Sciences Citation Index, and Arts & Humanities Citation Index.

Text mining software makes it easier to analyze data from the Web of Science. Like the statistical or qualitative software familiar to many social scientists, text mining software allows researchers to clean, validate, combine, subset, and analyze bibliometric data. It is possible to create new variables, perform calculations, and produce graphs and other visual representations of the data from within the software, or by exporting data in other formats (e.g., Excel). The text mining software used in this study, VantagePoint (www.thevantagepoint.com), is one example of such software.

To answer the first research question, data were downloaded from the Thompson Scientific ISI Web of Science database in February 2009 for each theorist on the revised evaluation theory tree by Christie and Alkin (2008). Table 1 shows how the theorists have been classified in the most recent revision of the theory tree (Christie & Alkin, 2008), which is restricted to North American theorists and includes some authors not placed on the original tree.

A general search in the Web of Science retrieves summary information on articles by an author including affiliation, coauthors, coauthor affiliations, journal, subject category, publication year, and references. If searching for Peter Rossi, all documents on which Rossi is listed as an author or coauthor will be returned. Reference lists from published articles can be used to determine the bodies of knowledge authors draw upon to inform their work. The Web of Science captures these data in its database and text mining software allows researchers to analyze these data.

The bodies of knowledge that authors reference in their work are called subject categories. In the Web of Science, each journal is assigned to one or more of 248 subject categories based on an objective and subjective process. Journals indexed in the Web of Science are thought to be the most well-respected, high-impact journals available (Porter, Roessner, & Heberger, 2008).

For each author in Table 1, a general search was conducted in the Web of Science using the author's last name and initials. Within the application, results were screened to ensure that the records represented the correct author. It can be difficult to confidently locate articles for authors with more common names (e.g., King, Cook, and Greene). Having access to additional information about authors such as institutional affiliation, country, and likely and unlikely areas of interest can help narrow the results.

It is important to note that only those documents indexed in the Web of Science database are retrieved in the results of a general search. For example, the journal *New Directions in Evaluation*

is not included in the Web of Science; thus, no articles published in this journal are part of this data set. Books are also excluded from this data collection and we recognize this limitation. Van Leeuwen (2006), in an article which applies bibliometric techniques to examine 10 disciplines in the social sciences accepts this limitation as ''fact'' and urges that these limitations should not lead us to completely reject bibliometric analyses, because, ''one is also running the risk to ignore at least some quantitative insight in the situation of the social sciences'' (p. 139). However, records in the Web of Science contain information on the author, journal, subject category, and all cited references (see Appendix A). Therefore, references to any source, including non–Web of Science journals, books, monographs, magazine articles, etc., are available for analysis. Consequently, the publication data for each evaluation theorist presented in the article represent only a sample of the author's published works, but we can examine references from articles published in the Web of Science to other sources.

Data cleaning. The results from the general search were downloaded and saved for each author. Data files for all theorists in a theory tree category were imported into VantagePoint and cleaned. The Web of Science includes a field that indicates the type of document in a record (e.g., article, book review, letter, editorial, etc.). Although all document types were included in the downloaded files, only articles were used in this analysis. In VantagePoint, thesauri are used to help in data cleaning. Thesauri used by the software perform a function conceptually similar to a book (or online thesaurus). For example, one article written by Daniel Stufflebeam displayed the author name as ''STUFFLEB.'' By including this variation of the author name in a thesaurus, the article can be included with Stufflebeam's other works rather than showing up incorrectly as a separate author. Similar thesauri were created to capture variants in spellings for journal titles.

The National Academies Keck *Futures Initiative*[1] has created a thesaurus that associates various spellings of source titles (e.g., journals, books) with the appropriate Web of Science subject category or subject categories (Porter, et al., 2006; Porter, et al, 2007). The journal-to-subject category thesaurus was applied to this data set and, as discovered through data cleaning, additional journal-to-subject category associations were appended to the thesaurus. Typically, any journal that is present three or more times in a data set and not captured by the journal-to-subject category thesaurus is investigated to determine whether the journal is linked with a subject category, but the spelling variant of the title is not included in the thesaurus or the journal is not included in the Web of Science and therefore a subject category cannot be determined. Another necessary step in the data cleaning process is to remove duplicate records.

Research Question 2: What Fields Draw Upon the Published Works of Evaluation Theorists in Their Work?

Data collection. Data collection for Question 2 used a cited reference search in the Web of Science to gather similar data to what was used to address the first question (author information, coauthors, affiliations, etc.), however, here data are from articles that reference evaluation authors. This analysis can show the fields that draw upon the knowledge generated by evaluation theorists. Any source cited by an author publishing in a Web of Science journal is retrieved in the cited reference search. For example, even though books are not indexed in the Web of Science, citations to books can be captured in a cited reference analysis.

Analyzing the full set of cited references for all authors would have resulted in a data set so large that it would have been impractical to clean and prepare for analysis. To extract a manageable yet still representative data set, we focused on a random sample of 500 articles for 9 theorists, 3 from each category of the theory tree (one positioned at bottom, middle, and top of each of the category). This approach also has the advantage of limiting the impact that any highly cited theorist would have on the analyses. The nine

Table 2. Cited References to Evaluation Theorists

Author	Category and Location	No. of Records Citing Each Author	Instances Citing Author in Merged File
Campbell	Methods, lower	716	972
Rossi	Methods, middle	647	821
Weiss	Methods, upper	654	938
Stufflebeam	Use, lower	463	570
Patton	Use, middle	789	938
Preskill	Use, upper	103	139
Scriven	Valuing, lower	659	857
House	Valuing, middle	495	609
Eisner	Valuing, upper	476	601

authors chosen for this sample are Campbell, Rossi, and Weiss from the methods category; Stufflebeam, Patton, and Preskill from the use category; and Scriven, House, and Eisner from the valuing category. A cited reference search was performed separately for each author. All of the references were downloaded and 500 references were extracted from these files using a random number generator.

The random sample of 500 cited references may represent a smaller proportion of the cited references to a highly referenced theorist such as Michael Quinn Patton (500 of more than 5,000) but will include all of the cited references for a theorist with 500 or fewer citations (e.g., Stufflebeam with 442 citations to his publications). For authors with fewer than 500 citations, all records were included in the sample. As seen in Table 2, cited references to the methods category theorists accounted for 1,500 (3 theorists, 500 cited references each) articles in the sample. An equal number of cited reference articles were included for the valuing category. As the use theorists were less cited, the total number of records for this category is 27% smaller than either of the other categories.

Articles citing each theorist were gathered in separate searches, which may result in a article appearing more than once in the merged file. Duplicate records were removed during the data cleaning process previously described above, which results in 3,791 total records. The cited reference data cleaning is made slightly easier because all of the thesauri developed in answering research Question 1 were applied to these data. Particular attention was paid to ensure that the author and cited author data were accurate for all of the authors on the evaluation theory tree. Figure 1 shows the distribution of the publication years for the 3,791 records. The data set is skewed toward more recently published articles. Older works are less likely to be electronically archived and indexed by online databases than more recent publications. Additionally, some of the articles in this sample would have originally appeared in the Social Science Citation Index (now included in the Web of Knowledge) which only dates back to 1965. More than half of these articles (57%) were published after 1990.

Results

Research Question 1: What Fields of Knowledge Do Evaluation Theorists Draw Upon in Their Publications?

To address this research question, we first present a description of the fields of interest in Table 3. Displayed is the number of published articles found for each author and details about those articles and their references. The same data elements are also summarized for each category of the theory tree. Note that the methods, use, values category summary data are not an arithmetic sum of the data for the individual theorists but rather an unduplicated count of the data in each category.
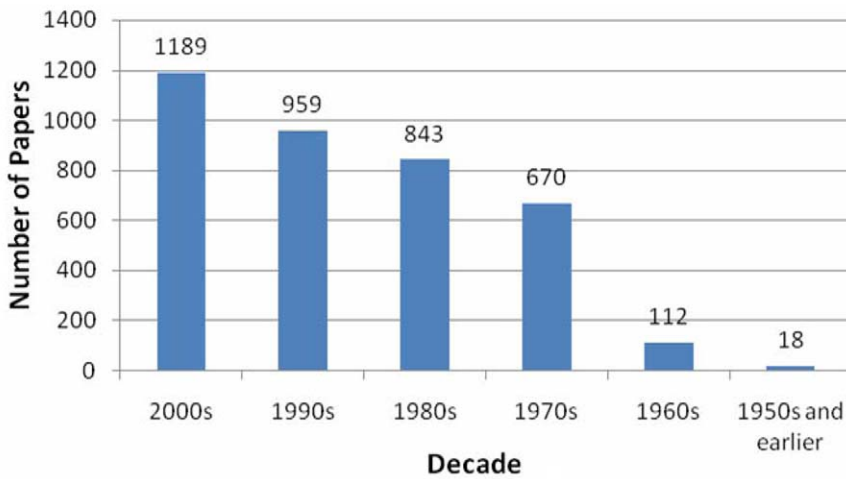
Figure 1. Publication years of articles referencing evaluation authors.

To orient the reader to Table 3, we examine the data for one author, Peter Rossi. The Web of Science general search for articles by Rossi resulted in 53 articles. Rossi published these articles in 24 different journals. These 24 journals are associated with 23 different subject categories. Rossi's articles referenced a total of 653 journals, books, and other documents (an average of about 12 references per article in the sample) written by 728 distinct authors. The cited author column counts the first author as well as additional authors on an article. The works cited by Rossi were published in journals related to 36 subject categories. It is also possible to compare Rossi to other researchers in the methods category. For example, we can see that while the sample of articles written by Boruch was somewhat smaller than the sample of Rossi articles, Boruch published in and cited a wider range of subject categories.

Journals in which theorists publish. Table 4 lists the top 10 journals in which theorists published, by theory tree category. Three journals, *American Journal of Evaluation, Evaluation Practice*[2], and *Evaluation and Program Planning* are on the top 10 list for all 3 categories.

Subject categories theorists cite. The data most useful in understanding the academic fields from which evaluation theorists draw upon in their work are cited references data, specifically, the subject categories of the journals cited in evaluation theorists' publications. Table 5 displays the top 10 cited subject categories when looking at the data set in its entirety, and whether the subject category was on the top 10 list when data were examined by theory tree category (because the methods category has the largest proportion of files related to it in the data set, we see that it is included in each of the subject categories). For each subject category, we include the number of journals in our data set appearing in that subject category and an example of a journal from that category. For example, there were 38 journals from the Education & Educational Research subject category in our sample, including the journal *Review of Educational Research*.

Education & Educational Research, Social Sciences—Interdisciplinary, Psychology—Educational, Psychology—Multidisciplinary, and Mathematics—Interdisciplinary Applications were among the top 10 subject categories for all 3 theory tree categories. To those familiar with evaluation, it is not surprising that evaluation theorists would draw heavily upon these areas in their

Table 3. Summary of Selected Data about Sample Theorists' Publications

Theory Tree Category	Author	No. of Articles	No. of Journals	No. of Subject Categories	No. of Cited Publications	Cited Works per Article	No. of Cited Authors	No. of Cited Subject Categories
Methods	Rossi, P. H.	53	24	23	653	12.32	728	36
	Cronbach, L. J.	52	21	18	391	7.52	521	29
	Boruch, R. F.	49	29	30	964	19.67	521	61
	Tyler, R. W.	48	14	21	34	9.6	31	5
	Cook, T. D.	43	27	24	751	17.47	944	49
	Campbell, D. T.	39	18	24	662	16.97	601	55
	Mark, M. M.	38	24	19	443	11.66	736	45
	Weiss, C. H.	32	19	11	373	11.66	435	27
	Henry, G. T.	27	15	11	419	15.52	537	31
	Chen, H. T.	25	18	19	308	12.32	382	35
	Methods category	*381*	*136*	*54*	*4,062*	*10.26*	*4,919*	*118*
Use	Cousins, J. B.	20	14	5	407	20.35	576	37
	Patton, M. Q.	19	10	11	142	7.47	126	8
	Alkin, M. C.	16	7	19	163	10.19	194	22
	Stufflebeam, D. L.	15	7	6	134	8.93	118	7
	King, J. A.	12	5	3	142	11.83	137	8
	Wholey, J. S.	12	78	9	106	8.83	70	2
	Preskill, H.	10	5	5	115	11.50	117	6
	Fetterman, D.	3	2	3	80	26.67	82	10
	Use category	*107*	*35*	*30*	*1,047*	*9.77*	*1,251*	*47*
Valuing	Eisner, E. W.	65	24	5	317	4.88	248	10
	Scriven, M.	42	6	17	198	4.71	181	21
	House, E. R.	30	17	9	249	8.30	244	15
	Stake, R. E.	26	15	14	375	14.42	342	15
	Mertens, D. M.	18	7	8	204	11.33	275	20
	Guba, E. G. and Lincoln, Y. S.	32	15	11	303	18.94	283	19
	Howe, K. R.	15	13	8	220	14.67	237	21
	Greene, J. C.	12	6	2	134	11.17	143	10
	Wolf, R. L.	4	3	2	14	3.50	3	1
	Valuing category	*244*	*70*	*37*	*1,721*	*7.05*	*1,623*	*58*
	Unduplicated total	731	195	65	5,326	7.28	4,919	114

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Table 4. Top 10 Journals in Which Evaluation Theorists Publish, in Descending Order

Methods	Use	Valuing
Evaluation Review	American Journal of Evaluation	American Journal of Evaluation
American Journal of Evaluation	Evaluation and Program Planning	Educational Leadership
Phi Delta Kappan	Evaluation Practice	Phi Delta Kappan
American Sociological Review	Journal of Teacher Education	Evaluation Practice
Educational and Psychological Measurement	Public Administration Review	American Annals of the Deaf
Psychological Bulletin	Cancer Practice	Evaluation and Program Planning
Annals of the American Academy of Political and Social Sciences	Educational Administration Quarterly	Qualitative Inquiry
Evaluation Practice	Educational Leadership	Teachers College Record
Evaluation and Program Planning	Journal of Educational Measurement	Curriculum Inquiry
Journal of Social Issues	Alberta Journal of Educational Research	Journal of Aesthetic Education

Table 5. Top 10 Subject Categories Cited by Evaluation Theorists

Top 10 Subject Category (No. of Journals Included in the Category)	Methods	Use	Valuing
a. Education & Educational Research (n = 38) (e.g., Review of Educational Research)	x	x	x
b. Social Sciences, Interdisciplinary (n = 17) (e.g., American Journal of Evaluation)	x	x	x
c. Sociology (n = 15) (e.g., American Journal of Sociology)	x	x	
d. Psychology, Educational (n = 7) (e.g., Child Development)	x	x	x
e. Psychology, Multidisciplinary (n = 12) (e.g., American Journal of Psychology)	x	x	x
f. Mathematics, Interdisciplinary Applications (n = 4) (e.g. Journal of Econometrics)	x	x	x
g. Psychology, Mathematical (n = 3) (e.g., Psychometrika)	x		
h. Psychology, Social (n = 12) (e.g., Journal of Personality and Social Psychology)	x		
i. Public Administration (n = 7) (e.g., Journal of Policy Analysis and Management)	x	x	
j. Public, Environmental & Occupational Health (n = 15) (e.g., American Journal of Public Health)	x		

work; evaluation has strong ties to education and psychology. The Social Sciences—Interdisciplinary subject category ranks second or third for each theory tree category; this is also the subject category with which the journals *American Journal of Evaluation* and *Evaluation Review* are associated. Authors in the valuing category draw heavily upon the Education & Educational Research and Social Sciences—Interdisciplinary subject categories; 72% of the articles valuing authors cite in their work are in these subject categories.

Evaluation theorists, like other researchers, build upon their past work and are likely to reference their own work in subsequent articles. Self-citation, however, can skew an analysis aimed to describe cited reference data. In our sample, self-citation was not an issue; less than 5% of the total citations for this group of authors were self-citations, suggesting that it has not considerably impacted our analysis.

Table 6. Citations to Evaluation Titled Sources

Theory Tree Category	Author	No. of cited works	No. of Cites to Evaluation Titles	Proportion of Evaluation Titles Citations to all Cites
	Rossi, P. H.	653	86	13.17%
	Cronbach, L. J.	391	2	0.51%
	Boruch, R. F.	964	101	10.48%
	Tyler, R. W.	34	2	5.88%
	Cook, T. D.	751	71	9.45%
	Campbell, D. T.	662	29	4.38%
	Mark, M. M.	443	82	18.51%
	Weiss, C. H.	373	40	10.72%
	Henry, G. T.	419	76	18.14%
	Chen, H. T.	308	92	29.87%
	Methods category	*4,062*	*581*	*14.30%*
	Cousins, J. B.	407	44	10.81%
	Patton, M. Q.	142	37	26.06%
	Alkin, M. C.	163	22	13.50%
	Stufflebeam, D. L.	134	35	26.12%
	King, J. A.	142	21	14.79%
	Wholey, J. S.	78	17	21.79%
	Preskill, H.	115	29	25.22%
	Use category	*1,084*	*205*	*17.36%*
	Eisner, E. W.	317	6	1.89%
	Scriven, M.	198	29	14.65%
	House, E. R.	249	27	10.84%
	Stake, R. E.	375	42	11.20%
	Mertens, D. M.	204	12	5.88%
	Guba, E. G. and Lincoln, Y. S.	303	20	6.60%
	Howe, K. R.	220	7	3.18%
	Greene, J C	134	50	37.31%
	Valuing category	*1,571*	*193*	*9.65%*

Citations to "evaluation sources". We recognize that important sources of knowledge in the field of evaluation are not represented in the Web of Science. Although these works are not the focus of this study, it is possible to provide some measure of the citations that evaluation authors made to sources with variations of the word "evaluation" in the title. Doing so allows for an estimation of the proportion of references that evaluation theorists made to books, journals, and other sources focused specifically on evaluation. For example, references to the journal *New Directions in Evaluation*, and books such as *Utilization Focused Evaluation* and *Foundations of Program Evaluation* are captured in the calculation.

As shown in Table 6, this set of authors varies considerably in the amount of referencing they do to works with variations of the word "evaluation" in the title. Jennifer Greene's articles had the highest proportion of citations to evaluation sources (37.31%) followed by Huey Chen (29.87%), Daniel Stufflebeam (26.12%), Michael Quinn Patton (26.06%), and Hallie Preskill (25.22%). Three of these authors are classified in the use category. As a group, the use category authors cite evaluation titled works in the Web of Science publications to a greater extent than valuing or methods authors.

Mapping the subject categories evaluation theorists draw upon in their work. An examination of cited subject categories provides insight into the references evaluators draw upon in their
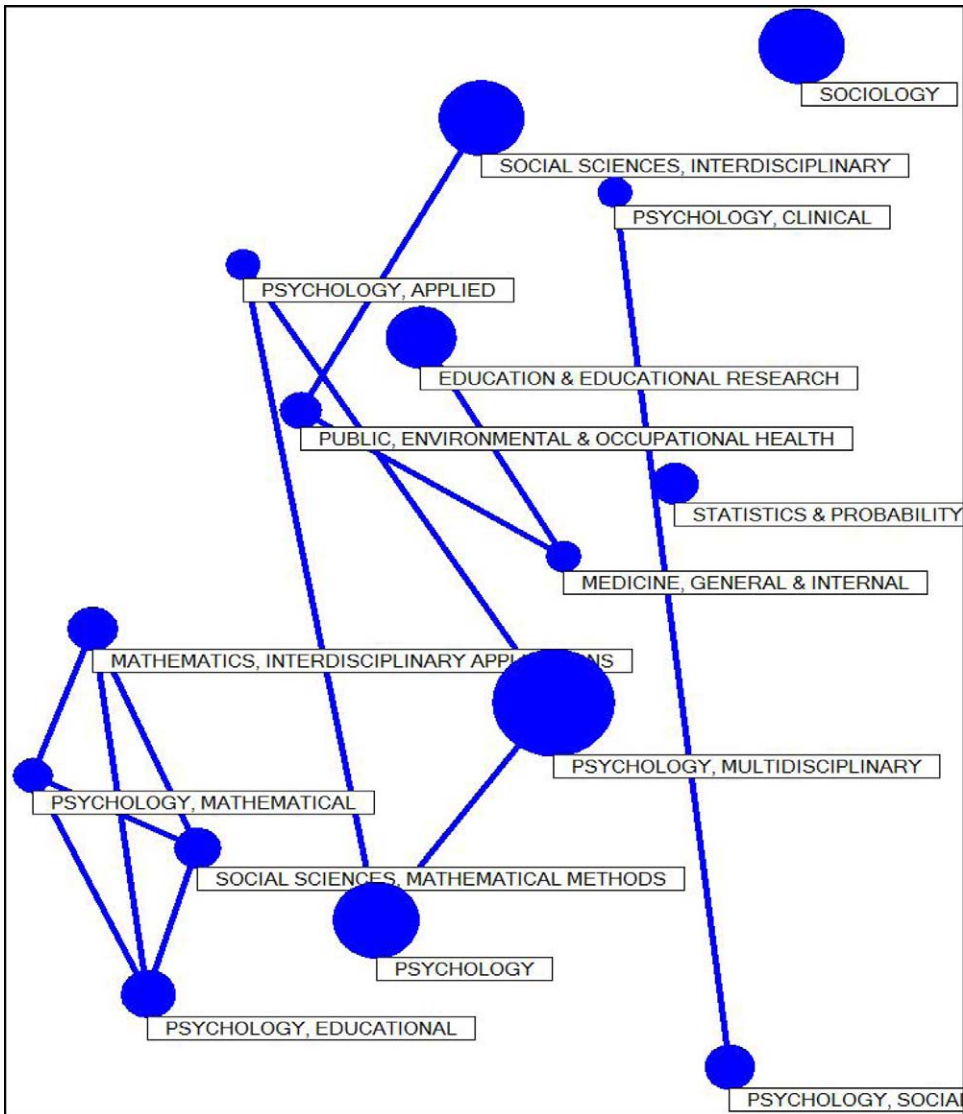
Figure 2. Map of top 15 subject categories cited by methods theorists.

work. Citing a journal article, book, or other document generally indicates that an author finds the work relevant to his or her own. One way to examine cited subject category data is with multidimensional maps. These maps present data as a series of nodes and connections. The links (lines) represent records shared by the nodes. Stronger lines represent more records shared between nodes. Scaling algorithms attempt to place similar nodes near each other. For ease of display, these maps are limited to a maximum of 15 nodes.

Figure 2 displays the map of the top 15 subject categories cited by methods category theorists. The largest node is for the Psychology—Multidisciplinary subject category, which is the most frequently cited subject category for this set of theorists. In the lower left-hand corner of the map is a cluster of four related subject categories: Psychology—Educational, Mathematics—Interdisciplinary Applications, Psychology—Mathematical and Social Sciences, and Mathematical Methods.
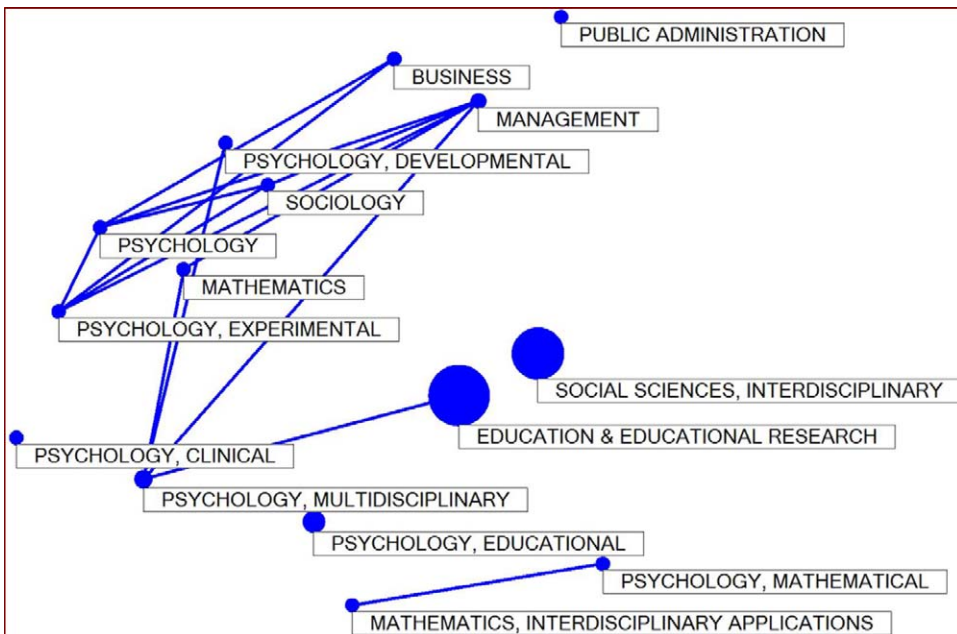
Figure 3. Map of top 15 subject categories cited by use theorists.

Cronbach cited these subject categories extensively in his work and it is largely his use of these subject categories that account for their presence on the map. There is also a distinctive triangle of linked subject categories related to psychology.

Figure 3 displays the top15 subject categories cited by use category theorists. This map shows evidence of significant links among many cited subject categories including a handful of psychology-related subject categories, Sociology, Business, and Management for use category theorists. However, Psychology—Mathematical and Mathematics—Interdisciplinary Applications and Public Administration are not linked to the larger group and Public Administration is off on its own.

Examining the map of the valuing category theorists depicted in Figure 4, Education & Educational Research appears again as an important source of knowledge for theorists. However, due to the high frequency of referencing to this category, no other subject category appears with a large node and fewer connections are available to be made to the other subject categories. As with the methods theorists map (Figure 2), a cluster of subject categories appears that is not connected to the most connected part of the map. On the use theorists' map (Figure 3), Psychology—Developmental was tied to number of other interconnected subject categories. On the valuing map, this subject category only has connections to Rehabilitation and Education—Special.

Research Question 2: What Fields Draw Upon the Published Works of Evaluation Theorists in Their Work?

Because the data set of the full set of cited references for all authors would be extremely large and thus difficult to clean and prepare for analysis, to address this research question we chose to focus on a random sample of 500 articles for 9 theorists, 3 from each category of the theory tree. The nine authors chosen for this analysis include Campbell, Rossi, Weiss, Stufflebeam, Patton, Preskill, Scriven, House, and Eisner. The articles that referenced this subset of evaluation theorists were published in a large number of subject categories, 191 of the 248 subject categories indexed by the
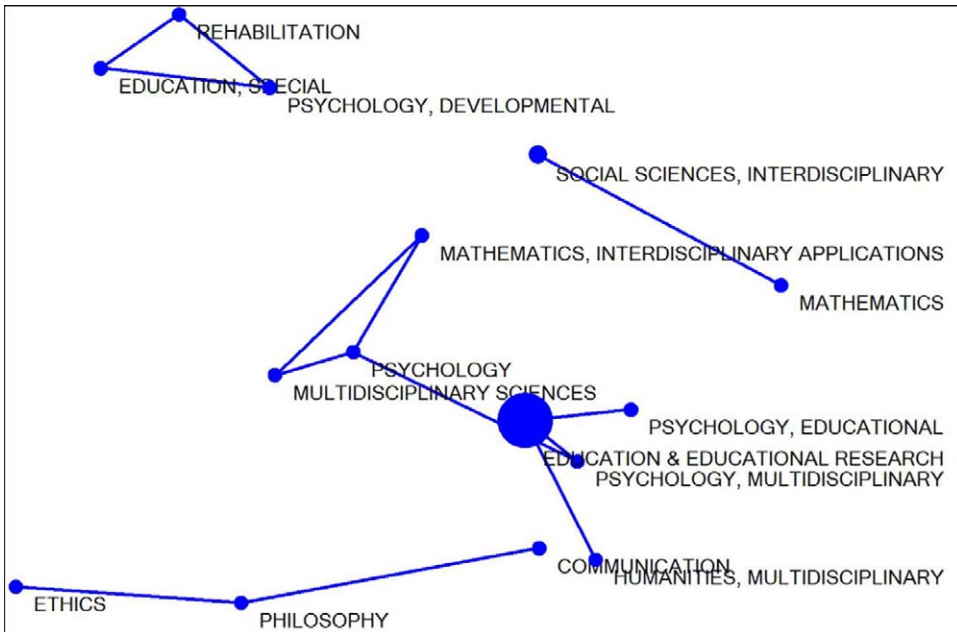
Figure 4. Map of top 15 subject categories cited by valuing theorists.

Web of Science. More than 6,600 different authors from 65 countries wrote the 3,791 articles that cited this sample of theorists' work.

Analyses conducted to address the first research question found that evaluation theorists across all three theory tree categories draw upon others published work in five main subject categories: Education & Educational Research, Social Sciences—Interdisciplinary, Psychology—Educational, Psychology—Multidisciplinary, and Mathematics, Interdisciplinary Applications. Table 7 shows the subject categories in which evaluation theorists' work was most frequently cited. In bold are the (8) common top subject categories (across theory tree categories) from which theorists cite and their work is cited. Also listed are the number of articles from our nine theorist sample that were cited in each subject category, the top three journals in which theorists' work was cited within each subject category, and the top three theorists whose work was most frequently cited in that subject category. Journals, such as the *American Journal of Community Psychology*, may appear in multiple categories.

There are differences in the top subject categories listed on Tables 5 and 7. It is beyond the scope of this article to investigate every possible difference between the two tables, but it is helpful to explore the tables further. The reader is reminded that Table 7 only includes a sample of articles from nine theorists where Table 5 is based on data from the entire group of authors that likely accounts for a portion of the disparities. Additionally, the results may indicate that the nine authors included in the Table 7 data are cited in journals from subject categories outside the ones in which they publish. For example, though the larger group of theorists does not publish enough articles in social work subject category journals to appear on Table 5, other authors who publish in social work journals cite Patton, Rossi, and Weiss enough for that subject category to appear on Table 7. A similar interpretation could be applied to explain a change in a subject category's position on the two tables (e.g., Public, Environmental, and Occupational Health is 10th in Table 5 but 3rd on Table 7).

It is also interesting to examine the second tier (frequent but not the top areas) of subject categories in which the theorists in our sample were cited fields. These fields are outside of the "core"

Table 7. Top 10 Subject Categories Citing Evaluation Theorists' Work

Subject Category	Number of Articles	Top Three Journals (Journals may Appear in more than one Subject Category)	Top Three Theorists Referenced (Alphabetical)
Education & Educational Research	866	*Journal of Curriculum Studies, Educational Administration Quarterly, Curriculum Inquiry*	Eisner, House, Scriven
Social Sciences, Interdisciplinary	489	*Evaluation and Program Planning, American Journal of Evaluation, Evaluation Review*	Patton, Scriven, Weiss
Public, Environmental & Occupational Health	213	*American Journal of Community Psychology, Social Science & Medicine, Journal of Community Psychology*	Patton, Rossi, Weiss
Sociology	177	*American Sociology Review, Social Forces, Law & Society Review*	Campbell, Patton, Rossi,
Psychology, Multidisciplinary	163	*American Psychologist, American Journal of Community Psychology, Psychological Reports*	Campbell, Rossi, Scriven
Social Work	149	*American Journal of Community Psychology, Administration in Social Work, Children & Youth Services Review*	Patton, Rossi, Weiss
Psychology, Applied	127	*Journal of Counseling Psychology, Counseling Psychology, Journal of College Student Development*	Campbell, Patton, Stufflebeam
Psychology, Educational	124	*Journal of Counseling Psychology, Journal of School Psychology, Journal of Experimental Education*	Campbell, Scriven, Stufflebeam
Public Administration	115	*Policy Studies Journal, Public Administration Review, Administration in Social Work*	Patton, Rossi, Weiss
Psychology, Social	111	*Journal of Personality & Social Psychology, Journal of Applied Social Psychology, European Journal of Social Psychology*	Campbell, Cook, Rossi

subject categories and represent other areas that draw upon the work of these authors. Figure 5 shows the subject categories where 50–100 articles citing evaluation theorists were published, which include Sport Sciences, Communications, Information & Library Science, Environmental Studies, and Business, showing that the work of evaluation theorists is being cited in fields beyond the likely areas of psychology and education.

We also examined which theorists are being cited by articles appearing in the group of subject categories shown in Figure 5. We found that authors were cited in areas that we might not have expected, for example include the articles published in the Business subject category are largely referencing the work of Campbell and, to a lesser extent, Cook. The 62 articles published in Planning & Development reference Weiss, Patton, Campbell, Rossi, Scriven, and House. The 51 articles in Medicine, General & Internal subject category cite Patton 22 times.

A third tier of subject categories in which this sample of articles citing evaluation theorists was published was also examined. Looking at the subject categories in which 20–50 articles citing evaluation theorists shows that authors from fields as diverse as Acoustics, Linguistics, Law, Engineering—Mechanical, and Hospitality, Leisure, Sport & Tourism are drawing upon evaluation's knowledge base. Although theorists are not highly cited in these areas, this does suggest that the work of evaluation theorists has broad appeal, even when examining only a sample of the full citations to their collective work.

Another strategy for determining the reach of the work of evaluation theorists is to examine the home countries of citing authors. Although authors in the United States wrote the majority of the articles in this sample, authors from 64 other countries referenced the work of this sample of
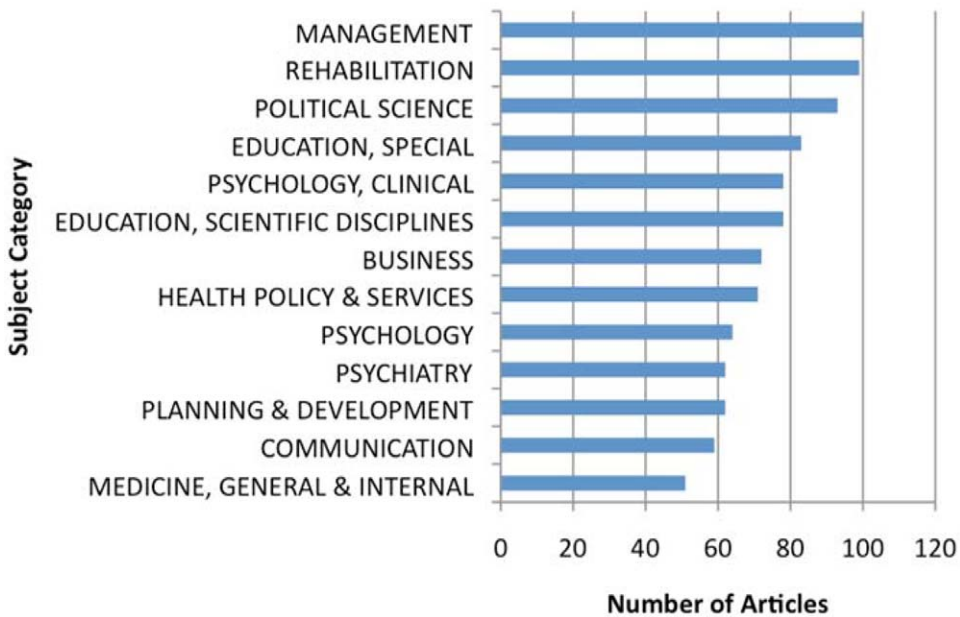
Figure 5. Second-tier subject categories (50–100 articles) citing evaluation theorists' work.

evaluation theorists. In addition to the United States, the United Kingdom, Canada, Australia, and Sweden are among the top five countries of origin for articles in this sample. Germany, the Netherlands, Israel, China, and New Zealand round out the top 10 countries from which authors citing evaluation theorists in this sample are based. These results indicate that evaluation theorists have reached far beyond the countries in which they work and that evaluation is a field with broad impact.

Discussion

As is the case with other fields, there is motivation for studying the impact that the body of evaluation theory literature has within and outside the field. From within the field, it is easier for individual researchers to have a sense for when an article "makes a splash" at a conference, or when an idea gains attention on a LISTSERV. Examining references to a journal article is another indicator of the impact of an article within but particularly outside of a field. Results from this analysis of bibliometric data of evaluation theorists indicate that evaluation is indeed a diverse intellectual field that is informed by and contributes to a range of subjects.

Scriven (2003) defines a transdiscipline as a discipline that possesses its own unique knowledge base while serving many other disciplines as a tool. As such, he argues that like logic and statistics, evaluation is a major transdiscipline because all disciplines depend on it to evaluate the entities within their own purview, and this is reflected in their publications. This evaluation is a subject in its own right. Although some in evaluation have at least passively accepted Scriven's definition, there is little descriptive empirical evidence to support this argument. In addition, while we obviously cannot legitimize evaluation as a discipline or a transdiscipline, we do offer some very initial data to suggest that evaluation affects and is impacted by many fields, and that it offers a platform for

fields to share knowledge and research across the disciplinary divides of research methods and epistemologies.

Although intellectual range and reach was evident in our analysis, consistencies were found when examining the subject categories that theorists used most frequently to inform their work, specifically Education & Educational Research, Social Sciences—Interdisciplinary, Psychology—Educational, Psychology—Multidisciplinary, and Mathematics—Interdisciplinary Applications. These subject categories represent the core areas from which the field of evaluation was built (Fitzpatrick, Sanders, & Worthen, 2003; Shadish, Cook, & Leviton, 1991), and thus we might expect to find that theorists continue to draw upon publications in these areas. Moreover, these findings reinforce and highlight the influence of these disciplines on evaluation's intellectual base.

Although we found that evaluation theorists draw upon the intellectual work of a diverse set of fields, evaluation authors often publish their work in evaluation-related journals such as *American Journal of Evaluation, Evaluation Review*, and *Evaluation and Program Planning*. These journals are included in interdisciplinary and multidisciplinary subject categories, offering evidence for evaluation as its own discipline as well as further supporting the transdisciplinary nature of evaluation. It should be noted that several other journals that frequently serve as publication outlets for evaluation scholars, such as *New Direction for Evaluation, Evaluation*, and *Canadian Journal of Program Evaluation*, are not included in the Web of Science, suggesting that our data offer an underestimate of the extent to which theorists work might be published in evaluation-related outlets.

Supporting the argument that evaluation knowledge is relevant to other subjects, we examined the extent to which the Web of Science articles referenced the work of evaluation theorists. Our findings indicate that theorists' writings are cited not only in the areas that they themselves cite but also in subject areas beyond where they routinely publish. Expectedly, it is mostly practical fields that cite evaluation scholars' work, and this is particularly the case as we moved outside the core subject areas identified in this analysis (e.g., Communications, Sport Sciences, Law, Engineering—Mechanical, and Hospitality, Leisure, Sport & Tourism). Additionally, scholars from more than 60 countries reference the work of the evaluation theorists in our sample, another indication of the extensive reach of evaluation theorists' work.

Our analysis highlights how the absence of particular evaluation journals in the Web of Science may impact our potential to develop a more complete understanding of the influences of and on evaluation knowledge. To be included in the Web of Science, an application must be completed describing the intellectual focus and contributions of journal as well as its peer review process. Additionally, it is of primary importance that the journal has a timely publishing schedule, according to its stated frequency, which should include at least four issues per year. Of course, the journal must maintain a timely release schedule for continued inclusion in the Web of Science. This criterion immediately excludes some of evaluation's publication outlets from the Web of Science. For example, *Canadian Journal of Program Evaluation* and *Evaluation* do not meet the recommended number of issues per year for indexing. This study serves as a reminder of how important it might be for some of these journals to reexamine their production and release schedules.

Examining the Theory Tree

The Alkin and Christie (2004) taxonomy that categorizes theorists into one of three dimensions of evaluation, methods, use, and values, based on the primary emphasis of the theory. The edited book in which the 2004 theory was published included chapters written by each theorist describing, among other things, what influenced their theoretical work. The current study then, can offer further insight into the fields that theorists draw upon in their published work and lend some empirical description of the subjects that influence theory tree theorists' writing.

Each theory tree category reflects a slightly different focus in publishing patterns that seem to match with what Alkin and Christie (2004) have described about these categories. For example, we found a greater influence of psychology and the social sciences on methods theorists than on use or valuing theorists. The methods category includes more theorists trained in psychology relative to the other categories, thus we would expect this to be the case. We found Education & Educational Research and Social Science had the greatest influence on the use category, which includes theorists trained mostly in education but also in social sciences such as sociology. Education & Educational Research also had the greatest influence on the valuing category; however, we also found evidence of subject categories that were unique to this category such as philosophy, ethics, and humanities, which reflects the more philosophical focus of some of the theorists in this category. In fact, the appearance of philosophy as a category in which valuing theorists publish is due to solely works by Scriven. These differences seem congruent with what one would expect from these three categories of theorists.

For the methods category, we found that Psychology—Multidisciplinary was the largest subject category from which methods theorists cite, pointing to the more general influence of psychology and suggesting that no one subdiscipline of psychology (e.g., cognitive, developmental) has had greater influence over others. This may be because psychology as a field is highly diverse and offers much research upon which evaluation can draw. The way journals are classified may also play a role. Some journals may be assigned to the Psychology—Multidisciplinary subject category in addition to other subject categories which might artificially inflate the number of journals appearing in this category. Methods theorists had the greatest reach with their publications, as indicated by the large number of journals and subject categories in which their work was published. They also cited the largest number of subject areas, thus theorists in this category draw upon on a broader knowledge base than those in the other categories. This suggests that methods theorists may be more academically focused and, as a result, are communicating more through peer-reviewed publications with others outside of the field of evaluation. Consequently, as a group, methods theorists' publications may have the greatest intellectual impact on others outside of the field.

When examining the use category, we found that theorists published fewer of the evaluation-related articles found in the Web of Science than theorists from other categories. It is important to explore why this might be the case. For one possible explanation, we hypothesize that use-focused theorists may be equally prolific in their publishing, but that the journals in which they publish are not included in the Web of Science. Additionally, our data show that use theorists are less oriented to a specific social science discipline, such as psychology, and that their writings are more applied. This may be because use theorists are publishing in some of the evaluation-related journals that are not included in the Web of Science. Our data do show that use category theorists publish in areas linked to applied fields such as management, business, and public administration, more than those in the other categories, suggesting that use theorists are more likely to be academic theorist/practitioners than theorists from the other two categories.

Unique to the valuing category, we found that theorists were publishing in *Qualitative Inquiry*, suggesting that this group of theorists is more likely to be qualitatively focused than those from the other categories. This also reflects the methodological conventions of some of the areas from which valuing theorists cite such as humanities, philosophy, and ethics. We found that the valuing theorists have also broad reach relative to the number of publications found in the Web of Science, indicating that valuing theorists are also communicating with others outside of evaluation, but with those in subject areas different from those methods theorists are reaching.

Overall, our findings suggest that theorists from each theory tree category have common subject categories that they cite in their work (Social Science, Education & Educational Research, Interdisciplinary Psychology, and Educational Psychology). Yet, each category also draws upon a unique set of subject areas that reflect the emphasis of those in each category. The results from this analysis

suggest that the grouping of theorists in each category proposed by Alkin and Christie "hangs together" and thus offers some empirical support for the taxonomy.

Implications for Practice

Generally speaking, pure research fields (such as the "hard" sciences) attract higher citation rates than applied fields (such as evaluation). This is because the readership of these two areas is distinctly different. In pure research, the audience for peer-reviewed publications is other researchers who cite these works in their own published work. In applied research fields, readers of peer-reviewed publications include a large proportion of practitioners who use publications to achieve a practical outcome and typically do not publish further articles. Therefore, the level of impact of evaluation publications on practitioners thinking can be substantive but difficult to measure.

Bibliometric analyses can help to identify the areas of evaluation that have made a greater impact on the field itself as well as on other fields. Identifying evaluation publications that are most relevant to those in a particular field can also provide useful knowledge for practitioners, for example, when directing interested stakeholders to evaluation publications that are most relevant to the substantive field of interest. Without studies to understand the impact of our publications, practitioners (and others) are left with only subjective views about the significance or major impact of particular publications, which may be completely different from others' views about the impact of evaluation publications. Additionally, studies such as the one presented here can also serve the field by advancing evaluation associations' interests, of whose memberships are largely practitioners, by identifying and claiming core professional expertise that is unique to evaluation.

Study Limitations

Like any data source, bibliometric data have limitations (Hood & Wilson, 2003). There are many challenges related to microlevel bibliometric data including spelling differences and errors, inconsistencies related to the indexing of subjects, multiple ways of presenting authors' last names and initials, changes to journal titles, date inconsistencies, and inconsistencies with corporate/institutional affiliations. Additionally, macrolevel bibliometric data may also be imperfect. There may be bias in the data due to the coverage of journals included in a database, incomplete historical data beyond a certain period of time, delays between publication and abstract indexing, changes in policies and practices, and standardization routines that alter data.

Van Leeuwen (2006) points out that the main drawback of using bibliometrics to examine the social sciences is incomplete coverage of the social sciences in the ISI Web of Science. This, of course, is a concern for any study of this kind in the social sciences, and although this has not served as a major barrier to conducting the analyses presented in this article, it should be highlighted as a limitation of this study. Perhaps of most concern for the current study is that ISI Web of Science journals are more reflective of some theory tree categories than others (e.g., basic social science categories). Thus, we could have found a greater representation of evaluation authors who are more connected to these areas. Additionally, the Web of Science does not index books, which are an important part of evaluation authorship. Time can also be a confounding factor when analyzing bibliometric data. Because it takes time for an article to be indexed and appear in the Web of Science, very recent articles may not be captured in a search. Similarly, articles that were published multiple decades ago may not be indexed.

However, to reiterate, for this article, we used bibliometric data as an indicator of knowledge exchange between disciplines and fields, specifically to identify the fields that evaluation draws upon and those that draw upon the evaluation literature most heavily. We emphasize the use of these data as an *indicator* of this activity for the purpose of developing a picture of this. Our analysis is not intended to offer an expansive picture of the overall influence of evaluation on other fields or the

influence of other fields on evaluation. This one aspect of scholarship, peer-reviewed journal articles included in the Web of Science, provides a very specific picture on the interactions between people who write evaluation-related articles and the people who use them. We agree with Van Leeuwen (2006) that, "it is better to know at least something of a small portion of the output, than to have no insight in the impact of these papers at all" (p. 152). With a reasonable set of different snapshots of the research questions addressed in this article, we have a fuller, more complete view of the impact and exchange of evaluations' scholarly works. What we offer here is one important snapshot of evaluation scholarship.

Notes

1. The National Academies Keck Futures Initiative, launched in 2003 by the National Academies, is a 15-year effort funded by the W. M. Keck Foundation to catalyze interdisciplinary inquiry and to enhance communication among researchers, funding organizations, universities, and the general public. For more information, please visit www.keckfutures.org.
2. Until 1997, *American Journal of Evaluation* was known as *Evaluation Practice*.

Authors' Note

Any opinions, findings, conclusions, or recommendations expressed in this publications are those of the author and do not necessarily reflect the views of the National Academies.
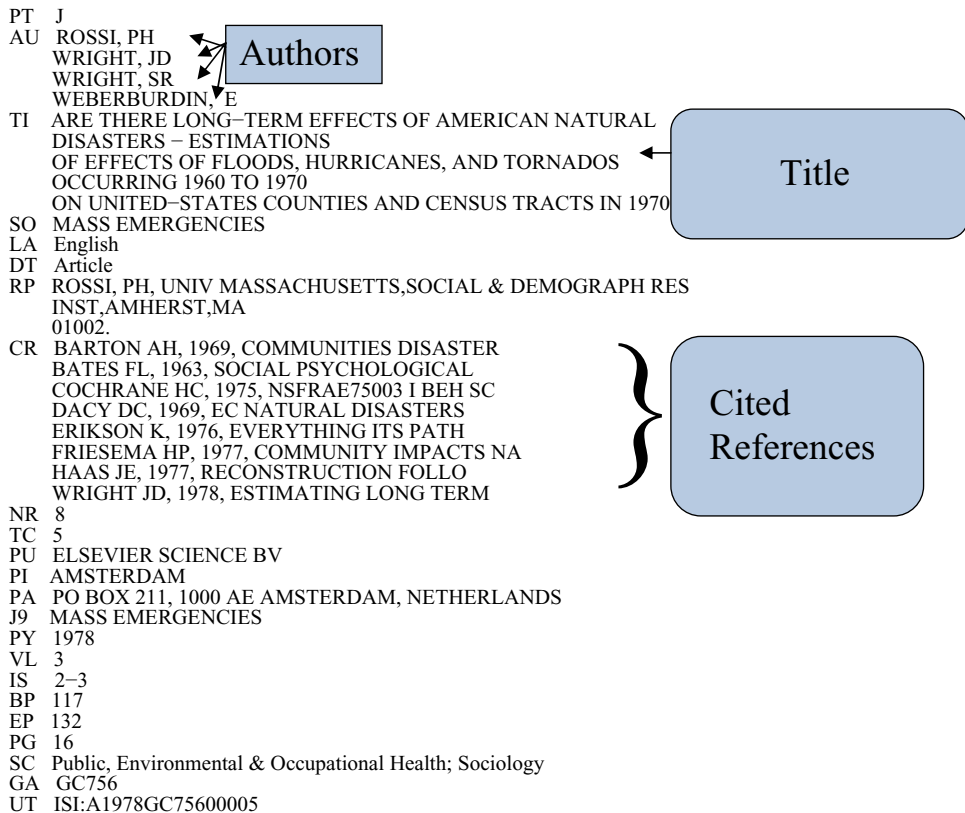
Declaration of Conflicting Interests

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Appendix A: Sample Record from Web of Science

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PT   J
AU   ROSSI, PH
     WRIGHT, JD            Authors
     WRIGHT, SR
     WEBERBURDIN, E
TI   ARE THERE LONG−TERM EFFECTS OF AMERICAN NATURAL
     DISASTERS − ESTIMATIONS
     OF EFFECTS OF FLOODS, HURRICANES, AND TORNADOS        Title
     OCCURRING 1960 TO 1970
     ON UNITED−STATES COUNTIES AND CENSUS TRACTS IN 1970
SO   MASS EMERGENCIES
LA   English
DT   Article
RP   ROSSI, PH, UNIV MASSACHUSETTS,SOCIAL & DEMOGRAPH RES
     INST,AMHERST,MA
     01002.
CR   BARTON AH, 1969, COMMUNITIES DISASTER
     BATES FL, 1963, SOCIAL PSYCHOLOGICAL
     COCHRANE HC, 1975, NSFRAE75003 I BEH SC
     DACY DC, 1969, EC NATURAL DISASTERS
     ERIKSON K, 1976, EVERYTHING ITS PATH                Cited
     FRIESEMA HP, 1977, COMMUNITY IMPACTS NA            References
     HAAS JE, 1977, RECONSTRUCTION FOLLO
     WRIGHT JD, 1978, ESTIMATING LONG TERM
NR   8
TC   5
PU   ELSEVIER SCIENCE BV
PI   AMSTERDAM
PA   PO BOX 211, 1000 AE AMSTERDAM, NETHERLANDS
J9   MASS EMERGENCIES
PY   1978
VL   3
IS   2−3
BP   117
EP   132
PG   16
SC   Public, Environmental & Occupational Health; Sociology
GA   GC756
UT   ISI:A1978GC75600005
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