

Mining Full-Text Journal Articles to Assess Obliteration by Incorporation: Herbert A. Simon's Concepts of Bounded Rationality and Satisficing in Economics, Management, and Psychology

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This study explores the usefulness of full-text retrieval in assessing obliteration by incorporation (OBI) by comparing patterns of OBI and citation substitution across economics, management, and psychology for two concept catch phrases—bounded rationality and satisficing. Searches using each term are conducted in JSTOR and in selected additional full-text journal sources from over the years 1987–2011. Two measures of OBI are used, one simply tallying the presence or absence of references to Simon's oeuvre (strict OBI) linked to the catch phrase and one counting only papers lacking any embedded reference as evidence of obliteration (lenient OBI). By either measure, OBI existed but varied across subject area, time period, and catch phrase. Economics had the highest strict OBI (82%) and lenient OBI (43%) for bounded rationality and the highest strict OBI (64%) for satisficing; all 3 subject areas were essentially tied for lenient OBI at about 30%. Sixty-two percent of the articles for bounded rationality—psychology were retrieved only because the catch phrase occurred in a title in the article bibliography. OBI research can benefit from full-text searching; the main tradeoff is more detailed and nuanced evidence concerning OBI existence and trends versus increased noise in the retrieval.

Introduction

The citation-based tools for assessment of scholarly research activity, visibility, and impact of individuals, institutions, and countries have multiplied since the original publication of the first volume of the *Science Citation Index* (Garfield, 1979). Currently, in addition to Thomson Reuters's Web of Science and *Journal Citation Reports*, researchers, administrators, and assessors may choose

among other sources providing citation data, such as Elsevier's Scopus database, Google Scholar (supported by a variety of free software tools), and CiteSeer (CiteSeerX, 2013). In addition, many disciplinary databases such as PsychArticles and the Association for Computing Machinery (ACM) Digital Library report counts of within-database citations for their source items.

Scholars differ with regard to what citations (and references) measure (see, e.g., review of Moed, 2005, especially pp. 193–208, and extensive discussions of De Bellis, 2009). The present research draws primarily on Small's notion of highly cited documents as concept symbols (Small, 1978) and Cozzen's "rhetoric-first" model (Cozzens, 1989; see also discussion by Schneider, 2006; and White, 2004) as well as Small's dissection and reconstruction of the Mertonian (normative) view of citations as evidence of peer recognition and measures of intellectual influence (Small, 2004). From this perspective, citation context/content, citation counts, and citation history profiles (curves generated by annual counts) can provide insights into the usefulness and influence of the cited work and, by extension, the influence of the author.

The citation profiles exhibited by works receiving more than a very small number of citations have been shown to fall into one or another of a small number of categories (see discussion of Costas, van Leeuwen, & van Raan, 2010), including Garfield's "citation classics" (Garfield, 1977), works whose citation count-based influence remains high for many years.¹ Whether the prominence of the author of the cited work affects the count/profile has been debated. Prior author visibility has been hypothesized to result in

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¹In contrast, Wang, Song, and Barabási (2013) assert that all citation histories with the exception of the supercited or late bloomers fit a single curve.

either “overcitation” (Barabási & Albert, 1999; MacRoberts & MacRoberts, 1989; Merton, 1968; Price, 1976) as the prominent author’s work accrues citations that should have gone to publications by lesser known authors or in “under-citation” (Merton, 1988; Zuckerman, 1987) as the author’s ideas become incorporated into the body of scholarly knowledge and links to the original source(s) are lost or replaced by references to more recent work by other authors. In the case of incorporation, the cited document is no longer being used as a “concept symbol,” if only for this concept.² In the case of citation substitution, one concept symbol replaces another (and the new document may directly cite the original source).

Both of these sources of loss of citation visibility—link loss and link substitution—are generally seen as having been first articulated by Robert Merton in his descriptions of obliteration by incorporation (OBI; the broken link, the ideas are incorporated into “currently accepted knowledge”; see Merton, 1988, p. 622, and accompanying footnote) and the *palimpsestic syndrome* (citation replacement, ascribing to a comparatively recent author the concept originated by an older author; Merton, 1965, p. xxiii).³ In his forward to Garfield’s monograph on citation analysis, Merton (1979) linked this misattribution (substitution of a citation to a newer work by another author, possibly the work in which the citer learned about the concept) as one aspect of the more general process of obliteration by incorporation of the original work (and author). His discussion of citation substitution seems to assume that the citing author specifically intended to attribute the concept to the newer work/author rather than citing the substitute work for, say, a felicitous, contextually useful explication of the original author’s ideas. In any case, citation substitution would necessarily decrease the direct citations to the original author and work and increase those to the substitute.

Since Merton’s articulation of his notion of OBI and Garfield’s *Current Contents* essay that brought it to the attention of a wider scholarly audience (Garfield, 1975), there has been a small but steady stream of research looking for evidence for OBI in various literatures (for a review see McCain, 2014a). Many of the studies focus on eponymous catch phrases and look to see whether the phrase is connected to the work of the author eponymized (see, e.g., Gorraiz, Gumpenberger, & Wieland, 2011, on eponymic references to Francis Galton [such as *Galton-Watson processes*]; Marx and Cardona, 2009, on eponymic references to pioneers in chemistry and physics [e.g., the *Raman effect*], McCain, 2011, on the *Nash equilibrium*, and Thomas, 1992, on the *Southern blot*).

²Small discussed the concept of “percent uniformity”—the percent of citation context/content entries mentioning the same concept—and reported data showing papers with a high PU in the natural sciences. However, even a short journal article may be cited for more than one key idea (see, e.g. McCain, 2012b, for an analysis of concepts represented by Price, 1965).

³Weinberg (2010) discusses references to obliteration and some evidence of its existence in the Talmud and commentaries; she also points to a possible mention of obliteration in the book of *Ecclesiastes* (1:11).

Studies of noneponymous catch phrases and their textual connection to the originating author predate studies of eponymy-related OBI. Overall, noneponymous OBI studies seem to be fewer, perhaps because they are less easily identifiable as a concept that (a) can be tied to a specific work or small oeuvre and that (b) is also popular enough to be subject to potential obliteration. In the first post-Mertonian, formal, quantitative study of OBI, Messeri (1978) looked at the concept of *sea floor spreading* in geology publications and the decreasing connection to one of a set of key texts; more recent examples include Bottom, Kong, and Zhang (2007) on the use of the terms *stereotype* and *schema* introduced by Lippman, and McCain (2012a) on Maynard Smith’s concept of *evolutionarily stable strategies*. Depending on the nature of the data available, authors have distinguished between papers linking the eponymous or noneponymous catch phrase with the originating work or oeuvre (explicit citation), papers linking the catch phrase with a substitute reference (indirect citation), and papers with no link between the catch phrase and any reference (implicit citation).

One basic decision that must be made when embarking on an OBI/citation substitution study is how the data will be gathered and analyzed. McCain (2014b) outlined three approaches that have been taken in OBI/citation substitution studies, as follows.

Record-Level Data Gathering/Analysis

Bibliographic database records with citation data are searched for the occurrence of the catch phrase in a field of the record and records categorized by whether or not they also contain a citation to the source work. Many records can be processed in this way (if their sources are within the database’s domain), but the link between catch phrase and embedded reference is assumed. Also, retrieval is limited to sources with the phrase *in* a database record field. Sources with the phrase only in the text are not available; neither are sources that lack useful database fields. Retrieved papers can be classed as having explicit or implicit citations, but not indirect citations, because their identification would require full-text access.

Record and Text Data Gathering/Analysis

After retrieval of the articles based on a search of the database, the text of the articles is examined to see whether the catch phrase occurs, and whether it is linked to the originating work or a substitute or lacks a link to a prior publication. All three citation categories (explicit, indirect, and implicit) can be identified but, again, only for those items already retrieved because the catch phrase was in the database record. This approach is more expensive in terms of time and (potentially) access to the full text of the items retrieved but allows a more detailed analysis of the status of the catch phrase/concept.

McCain (2013, 2014b) showed that, for one noneponymous catch phrase (bounded rationality), roughly 90% of the articles retrieved in a JSTOR full-text search would be missed because the phrase was not in the title, abstract, or other text field that would be in a standard bibliographic database record but *was* in the text of the article. At this level, all three categories of OBI citation can be observed, along with a fourth category, items retrieved solely because the catch phrase was in a title in the retrieved paper's bibliography, not in the text proper. This level of analysis is almost certainly the most challenging to conduct. It requires access to an appropriate subject range of full-text resources and the ability to search the full text (rather than just having printable access postsearch). Sampling may be necessary if the retrieval is very large (unless one has a small cadre of graduate students to put to work).

The research reported here is an extension and expansion of the full-text bounded rationality study reported by McCain (2013, 2014b). That research examined a 10% sample of all items retrieved from the JSTOR database via the catch phrase, an assessment of the availability of abstracts in 25 top economics journals having articles retrieved in the JSTOR search, and an OBI/citation substitution study of the catch phrase in economics journal articles over the years 1992–2009. In the economics data set, just over 20% of the items retrieved had the catch phrase only in a reference title, not in the text itself. Over half of the articles with the phrase in the text either explicitly cited an appropriate work by Herbert A. Simon (the originator of the concept/catch phrase) or indirectly cited a later work by another author (the most frequent of which contained explicit citations to Simon that were linked to the catch phrase. The degree of OBI observed depended on whether one considered indirect citations to be counted against the citation visibility of Simon's work (they do not cite Simon) or contributing to the citation visibility of Simon's work (they cite *something*, rather than breaking the citation link, and the most frequently substituted citations themselves use the phrase and cite Simon). In considering only the implicit citations, there was no evidence of a trend in increasing OBI over this time period.

The present research reports an OBI/citation substitution analysis for two of Simon's best-known concept/catch phrases—bounded rationality and satisficing. It includes the two top subject areas appearing in the earlier study (economics and management), adds psychology, and broadens the time period studied to 25 years, 1987–2011.

A Brief Digression on Bounded Rationality and Satisficing⁴

In 1978, Herbert A. Simon was awarded the Nobel Memorial Prize in economic sciences for "his pioneering

⁴This section is informed by Simon's definitions of bounded rationality and satisficing in *The New Palgrave* (Simon, 1987a,b) and Selten's chapter

research into the decision-making process within economic organizations" (Royal Swedish Academy of Sciences, 1978). This press release and other commentaries point to the breadth of influence of his work, especially the first edition of *Administrative Behavior* (Simon, 1947), while focusing on his specific impact in economics.⁵ Simon's notions of bounded rationality and satisficing are two key elements in his theoretical framework.

- Bounded rationality represents Simon's view that decision makers face limitations in their ability to make decisions, limitations in available information and limitations in their cognitive capacity to process the information available. (The alternative view in standard economics was that decision makers were completely rational, with unlimited cognitive abilities and complete knowledge, and would find the optimal answer to the problem.)
- Because of these limitations, decision makers have developed decision rules (heuristics) to identify available alternatives (which may change over the decision process). The decision maker chooses the first alternative that satisfies his objective—satisficing in Simon's terminology—rather than searching for, identifying, and choosing the optimal alternative.

Simon's work has been influential across the basic and applied social sciences and in other areas where decision modeling is of interest. In a JSTOR retrieval sample, McCain (2013, 2014b) identified 13 different disciplines in the basic and applied natural and social sciences and humanities whose journal articles contained the catch phrase bounded rationality, with economics and management providing the majority of articles (191 of 364). A memorial website (School of Computer Science, Carnegie-Mellon University, undated) lists bibliographies for Simon in four key areas: psychology, economics and management, philosophy of science, and computer science. Leahey (2003) discusses Simon's orientation toward cognitive psychology and his goal, to bring a psychological perspective to economics and management science, characterizing Simon as "an economist turned psychologist."

Potential Limitations

As noted earlier, the choice of data-gathering protocol can strongly influence the results of any OBI investigation. The choice made for this study is full-text searching for the catch phrase rather than relying on direct searching of bibliographic database records. The decision as to which

defining and discussing bounded rationality (Selten, 2001). In information science, Agosto (2002) has an excellent overview of Simon's concepts and how they can be applied in user behavior studies.

⁵A six-round copurchase analysis (McCain, 2001) of Amazon.com data, using Simon's *Sciences of the Artificial* as the seed purchase, suggested that areas of Simon's influence included "concepts of rationality/game theory," "behavioral decision theory," "strategic management," "management of organizations," "nonmathematical economics of organizations," and "complexity/linear dynamics."

full-text sources to include necessarily affects the results. McCain (2013, 2014b) reports the journal subject distribution of a 10% sample of articles retrieved from JSTOR using the phrases bounded rationality/boundedly rational. As noted earlier, economics and management together produced more than 50% of all of the articles in the sample. What was surprising was the very low return for psychology in the JSTOR search (only four articles in the sample were published in psychology journals). A review of the domain covered by JSTOR suggested that the low return likely was due to the journals available in Drexel's JSTOR subscription (economics and management were also affected, but to a lesser extent). Some exploration suggested that including full-text searching of the 90+ journals covered by PsychArticles (publications of the American Psychological Association) would provide a much better assessment of Simon's influence in psychology than searching JSTOR alone. The next section outlines the selection of source journals/articles for analysis and the justification for choosing the journal titles to add to the JSTOR retrieval.

The restriction of the search to scholarly journals and, within the journals, to articles (eliminating book reviews, editorials, and the like) means that the data might not be entirely representative of Simon's influence in the three areas studied, and the restriction to three disciplines and a limited number of journals within each also lessens the generalizability within and outside of economics, management, and psychology, but the general trends are likely to be informative.

It should be noted that OBI is a citation phenomenon of interest primarily to information scientists and others studying aspects of communication/citation behavior in scholarly fields rather than to evaluators seeking to rank scholarly productivity and visibility of, say, all researchers at a given institution or in a given field. OBI is a process that affects primarily those scholars who are already highly cited and visible in their fields—the “elite” scholars (see discussion in Zuckerman, 1987)—because their contributions would have to be well-known in the community in order to become “household words” (Lederberg, 1972). Those not in this category are less likely to be “obliterated” through a loss of citations linked to an existing, well-known catchphrase that stands for their key contribution and can stand alone (without a reference to the source). I do note that Cabanac (2014) has developed a semiautomatic text-mining approach to identifying eponyms in full-text with an eye toward the use of these data for evaluation.

Methods

Capturing Source Articles

The catch phrases bounded rationality and satisficing were searched in Drexel's JSTOR full-text journal collection and other selected subject-relevant full-text sources using appropriate term variations: Bounded rationality was also searched as boundedly rational and satisficing was searched

with a variety of other endings (e.g., *satisfice*, *satisfices*). JSTOR searches were restricted to scholarly journal articles in each of the three subject areas (as classified by JSTOR); book reviews, editorials, other nonscholarly content, and articles whose text was not in English (including all articles in *Revue Économique*) were not included in the final analysis.

Searches in the JSTOR journal collection were enhanced by including additional journals in all three subject areas in order to provide some reasonable coverage of the core literature (with the same restriction to scholarly articles). Published core lists (lists of journals considered to be central to a subject area) were used to guide the choice of additional journals.

In economics and management, selected individual journals were added to the search.

- *Journal of Economic Theory* was added in searches of the economics literature (see, e.g., lists of Heck, Zaleski, & Dressler, 2009, and Stigler, Stigler, & Friedland, 1995). Article text was searched at the journal website.
- *Journal of Management* and *Journal of Management Studies* were added in searches of the management literature (see, e.g., lists of Holtbrügge & Dögl, 2012, and Lockett, Moon, & Visser, 2006). Although it is also considered a core management journal, *Harvard Business Review* was not added because the articles rarely, if ever, include reference lists. Article text was searched via Business Sources Complete, an EBSCO database that provides access to these journal titles.

For psychology, searches were also conducted in the PsychArticles database published by the American Psychological Association, which includes “over 90 landmark journals in behavioral science and related fields” (American Psychological Association, 2014). The catch phrases were searched in the full database.

To accommodate the majority of publisher embargos in JSTOR and individual library subscriptions, searches were restricted to 2011 and earlier. Articles published before 1987 were not included in the analyses reported here. The article records were uploaded to RefWorks and then ported to FilemakerPro for data collection and analysis.

Data Retrieval

At the next stage, each full-text article was accessed directly and searched for the occurrence of the relevant catch phrase in the article text. The phrase and a sentence or two of context, along with the embedded reference (if available), were captured and added to the FilemakerPro database record. In cases of multiple occurrences of a catch phrase in the article text, the context was captured based on a priority list: (a) term is associated with a reference to a work by Simon (alone or with other works); (b) term is associated only with a reference to one or more works by someone else; (c) term is used without a connected reference. In cases in which the only occurrence of the term was in a reference title, only the first such item in the reference list was

TABLE 1. Distribution of citation categories in three subject fields, 1987–2011.

	Explicit citation	Indirect citation	Implicit citation	Quasieponyms	Reference title only	Other	Total	Percentage strict OBI ^a	Percentage lenient OBI ^b
Bounded rationality 1987–2011									
Economics	177	369	408	10	197	13	1,174	82	43
Management	308	178	308	12	159	3	968	62	40
Psychology	100	19	22	2	239	2	384	30	17
Satisficing 1987–2011									
Economics	86	85	61	5	17	0	254	36	64
Management	117	63	69	5	54	0	308	46	54
Psychology	98	31	63	4	25	1	222	50	50

Note. ^aOBI percentage includes indirect, implicit and quasieponymous citations.

^bOBI percentage includes only implicit and quasieponymous citations.

captured for the initial tally. (A secondary retrieval and analysis of all such reference list items for bounded rationality—psychology was conducted as well because of the very high proportion of articles in this category.)

Data Coding

Following the protocol established by McCain (2012a, 2013, 2014b), each article was assigned to an OBI class, based on the status of the catch phrase in the document text.

- Explicit citation—catch phrase is associated with at least one work by Simon, with or without coauthors. References by other authors may also be associated.
- Indirect citation—catch phrase is associated with at least one work not by Simon and no works by Simon. Multiple references may also be associated.
- Implicit citation—catch phrase occurs in text without any associated references.
- Quasieponym—Simon’s name is used to identify the catch phrase (e.g., “Simon’s notion of bounded rationality”), but there is no associated reference and no work by Simon in the article’s bibliography. This is a new category, not reported in the earlier studies; it recognizes the ambiguous role of Simon’s name in the context of the term. It is not a true eponym (like *Nash equilibrium* or *Moore’s law*) but does provide authorial context for the term of interest.
- Catch phrase only in reference title—the searched catch phrase cannot be found in the title, abstract, author key words, or text of the document but occurs in the title of at least one item in the bibliography.
- Other—used for rare occurrences not fitting one of the other categories. For instance, the catch phrase may be in the author key words of the article, but nowhere else, or in the title of a conference at which the research was first presented.

To facilitate comparisons within and across subjects, the results reported here focus on the most recent 25 years covered by the searches (1987–2011), with a detailed analysis of OBI presented as five 5-year intervals. The use of 5-year intervals to assess the degree of OBI smooths the noticeable fluctuation in annual article counts and provides sufficient numbers for a reasonable assessment and comparison.

Results

Overview

Table 1 shows the overall results of searching and categorization of articles retrieved in each of the three journal sets using the variants of bounded rationality and satisficing. Note that, for psychology, the total number of articles is much lower than in the other two disciplines and that the majority of bounded rationality articles in psychology were retrieved only because the term was in a title of an item in the reference list (reference title only [RTO]). In contrast, psychology articles retrieved by satisficing have roughly the same frequency and distribution across the categories as do economics and management.

The next two sections present detailed analyses of each of the catch phrase/subject sets, focusing on articles including explicit, indirect, and implicit+ citations (the sum of the counts for implicit and quasieponymous citations). These three together can be seen as defining articles “on” bounded rationality and satisficing. Figures allow comparisons of the annual distribution of these articles and the percentage of each citation category across the five 5-year aggregations. Tables report the top-cited Simon publications and top indirectly cited publications. Counts for cited publications reflect the fact that multiple items may be cited in a single source article.

Bounded Rationality

Temporal patterns. Figure 1 shows the annual distribution of retrieved articles belonging to one of the three text-citation categories (explicit, indirect, implicit+) for each of the three subject areas. All three charts are formatted to the same maximum count tally.

Economics and management searches produced relatively similar article counts and proportions of articles “on” bounded rationality. For both subject areas, over 80% of the retrievals in the 1987–2011 time frame fell into one of the three citation categories. In contrast, the total psychology retrieval was much smaller, and over 60% of the psychology articles were retrieved only because the term was in the title of a work in the article’s bibliography. All three charts show

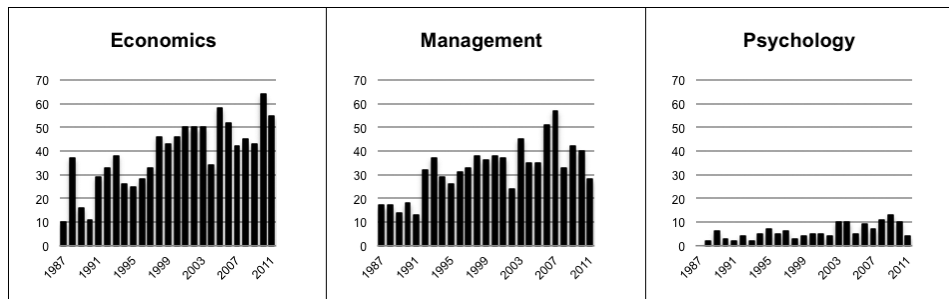


FIG. 1. Annual distribution of articles “on” bounded rationality, 1987–2011. “Reference Title Only” and “Other” categories are omitted.

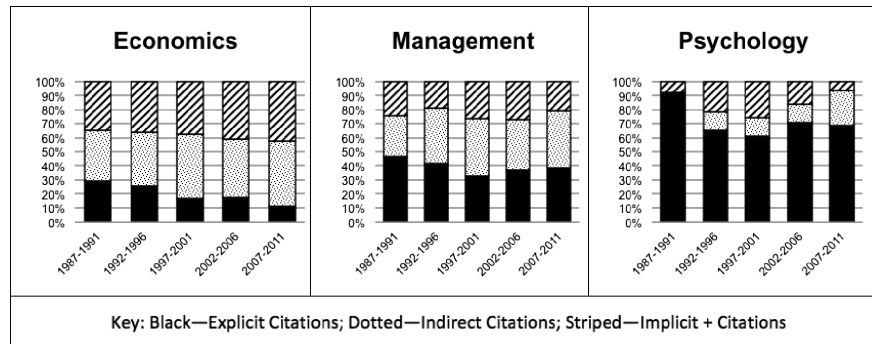


FIG. 2. Percentage of articles in each citation category, 5-year intervals, 1987–2011.

a slight trend toward higher per-year counts in the bounded rationality-related literature over this 25-year period, more so in economics and psychology than in management.

Figure 2 compares the percentage distribution of the three citation categories over 5-year intervals, 1987–2011. In economics, the percentage of explicit citations linking a Simon publication with bounded rationality decreases over the 25-year span, with indirect and implicit+ citations jointly taking up the slack. Management shows no evidence of a trend over time. Psychology is unusual in the much smaller proportion of indirect citations in the (many fewer) articles on bounded rationality; again, there is no identifiable trend over time except to note that the data suggest a strong dichotomy in author choice, cite Simon or don’t cite anything, so that the percentage of articles with indirect citations is noticeably smaller (although it does grow over the period).

Cited works. Tables 2 and 3 list the top five explicit and indirectly cited works in the bounded rationality retrieval, 1987–2011. Counts are based on the total number of references to a work, not the number of articles citing something by Simon or by another author. An X indicates that the work was not in the top five, not that the work was not cited by an article in that subject area. The top 10 journals publishing articles “on” bounded rationality in each subject area are listed in Appendix A.

Satisficing

Temporal patterns. Figure 3 shows the annual distribution of retrieved articles belonging to one of the three text-citation categories (explicit, indirect, implicit+) for each of the three subject areas. All three charts are formatted to the same maximum count tally of 20 articles per year. Figure 4 compares the percentage distribution of these three article categories over 5-year intervals, 1987–2011.

For satisficing, we can see three different patterns of percentage trends in each of the citation categories over the five 5-year intervals. In economics, the percentage of explicit citations for satisficing increases over the 25 years, balanced by a decrease in indirect citations. In management, the percentage of explicit citations remains essentially stable, while the percentage of implicit+ citations drops over all but the last 5-year period; most of the change occurs in the percentage of indirect citations. In psychology, the percentage of explicit citations decreases and implicit+ citations increases (indirect citations remain fairly constant for all but the first period).

Cited works. Tables 4 and 5 report the top five explicit and indirectly cited works in the satisficing retrieval, 1987–2011. Economics had no indirectly cited works with more than two mentions, and management had only two. The top 10 journals publishing articles “on” satisficing in each subject area are listed in Appendix B.

TABLE 2. Counts of explicit citations to works by H.A. Simon linked to bounded rationality in article texts: Top five works in each subject area.

	Economics	Management	Psychology
Simon, H.A. <i>Administrative behavior</i> . New York: Macmillan (various editions)	37	109	9
Simon, H.A. (1957). <i>Models of man</i> . New York: John Wiley & Sons.	31	29	15
Simon, H.A. (1955). Behavioral model of rational choice. <i>Quarterly Journal of Economics</i> , 69(1), 99–118.	29	36	26
Simon, H.A. (1982). <i>Models of bounded rationality</i> . Cambridge: MIT Press.	26	11	X
Simon, H.A. Theories of bounded rationality. In: McGuire, C.B., Radner, R. (eds.). <i>Decision and organization</i> . Amsterdam: North Holland (various editions).	15	X	X
March, J.G., & Simon, H.A. <i>Organizations</i> . New York: John Wiley & Sons. (both editions).	X	103	X
Simon, H.A. (1956). Rational choice and the structure of the environment. <i>Psychological Review</i> , 63, 129–138.	X	X	24
Simon, H.A. (1990). Invariants of human behavior. <i>Annual Review of Psychology</i> , 41, 1–19.	X	X	7

TABLE 3. Counts of indirect citations, only non-Simon works linked to bounded rationality in article texts: Top five works in each subject area.

	Economics	Management	Psychology
Williamson, O.E. (1985). <i>The economic institutions of capitalism</i> . New York: Free Press.	36	46	X
Williamson, O.E. (1975). <i>Markets and hierarchies</i> . New York: Free Press.	34	38	X
Sargent, T.J. (1993). <i>Bounded rationality in macroeconomics</i> . Oxford: Oxford University Press.	19	X	X
Conlisk, J. (1996). Why bounded rationality? <i>Journal of Economic Literature</i> , 34(2): 669–700.	10	X	X
Ellison, G. (2006). Bounded rationality in industrial organization. In <i>Advances in economics and econometrics: Theory and applications</i> , Ninth World Congress, Blundell, R., Newey, W., & Persson T. (eds.). Cambridge, UK: Cambridge University Press = plus 1 mimeo (2005).	9	X	X
Cyert, R.M., & March, J.G. (1963/1992). <i>A behavioral theory of the firm</i> . Englewood Cliffs, NJ: Prentice Hall (both editions).	X	42	X
Nelson, R.R., and Winter, S.G. (1982). <i>An evolutionary theory of economic change</i> . Cambridge, MA: The Belknap Press of Harvard University.	X	10	X
Williamson, O.E. (1991). Comparative economic organization: The analysis of discrete structural alternatives. <i>Administrative Science Quarterly</i> , 36, 269–296.	X	6	X
Gigerenzer, G., Todd, P. M., & the ABC Research Group. (1999). <i>Simple heuristics that make us smart</i> . New York: Oxford University Press.	x	x	3
Gigerenzer, G., & Selten, R. (2001). <i>Bounded rationality: The adaptive toolbox</i> . Cambridge, MA: MIT Press. (including references to individual chapters).	X	X	3

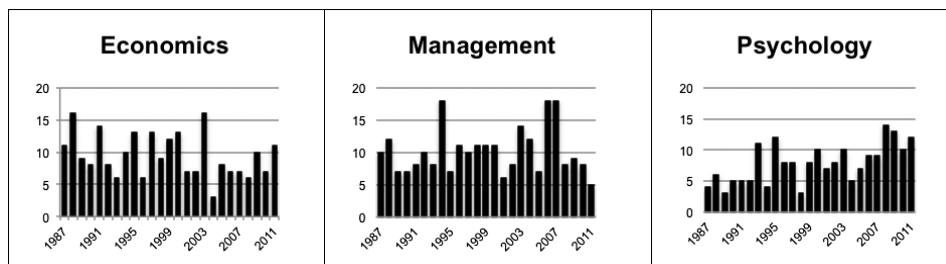


FIG. 3. Annual distribution of articles “on” satisficing, 1987–2011. “Reference Title Only” and “Other” categories are omitted.

Term in Reference Title

One of the “features” of searching full-text articles in OBI research is the retrieval of articles solely because they include a term-relevant item in the bibliography. Because the term of interest is not in the text proper, the article does not fit the OBI citation classification (explicit, indirect, implicit + citation). The data in Table 1 show that, for most

catch phrase/subject combinations, the RTO category is reasonably small, ranging from 7% (satisficing—economics) to 18% (satisficing—management). In contrast, 62% of bounded rationality—psychology articles were retrieved with the term only in a reference title.

A detailed examination of the citation content and context of RTO references in the source article text for all three subject areas and both catch phrases is beyond the scope of

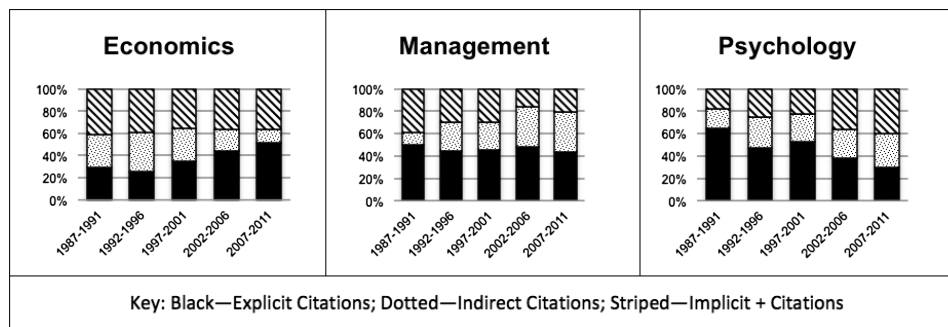


FIG. 4. Percentage of articles on satisficing in each citation category, 5-year intervals, 1987–2011.

TABLE 4. Counts of explicit citations to works by H.A. Simon linked to bounded rationality in article texts: Top 5 works in each subject area.

	Economics	Management	Psychology
Simon, H.A. (1955). Behavioral model of rational choice. <i>Quarterly Journal of Economics</i> , 69(1), 99–118.	24	21	35
Simon, H.A. (1957). <i>Models of man</i> . New York: John Wiley & Sons.	18	10	17
Simon, H.A. (1959). Theories of decision-making in economics and behavioral science. <i>American Economic Review</i> , 49, 253–283.	14	X	X
Simon, H.A. <i>Administrative behavior</i> . New York: Macmillan (various editions).	12	37	10
Simon, H.A. (1982). <i>Models of bounded rationality</i> . Cambridge, MA: MIT Press.	11	X	8
March, J.G., & Simon, H.A. <i>Organizations</i> . New York: John Wiley & Sons (both editions).	X	40	X
Simon, H.A. (1956). Rational choice and the structure of the environment. <i>Psychological Review</i> , 63, 129–138.	X	9	24

TABLE 5. Counts of indirect citations, only non-Simon works linked to satisficing in article texts: Top 5 works in each subject area receiving more than two votes.

	Management	Psychology
Cyert, R.M. & March, J.G. (1963/1992). <i>A behavioral theory of the firm</i> . Englewood Cliffs, NJ: Prentice Hall (both editions).	12	X
Winter, S.G. (2000). “The satisficing principle in capability learning”. <i>Strategic Management Journal</i> , 21, 981–996.	6	X
Krosnick, J.A. (1991). Response strategies for coping with the cognitive demands of attitude measures in surveys. <i>Applied Cognitive Psychology</i> , 5, 213–236.	X	5
Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D.R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. <i>Journal of Personality and Social Psychology</i> , 83, 1178–1197.	X	5
Iyengar, S.S., Wells, R.E., & Schwartz, B. (2006). Doing better but feeling worse: Looking for the best job undermines satisfaction. <i>Psychological Science</i> , 17, 143–150.	X	3
Krosnick, J.A. (1999). Survey research. <i>Annual Review of Psychology</i> , 50, 537–567.	X	3
Kuhn, D., Weinstock, M., & Flaton, R. (1994). How well do jurors reason? Competence dimensions of individual variation in a juror reasoning task. <i>Psychological Science</i> , 5(5), 289–296.	X	3

the present discussion, but, because of the remarkable number of “term in reference title” articles retrieved for bounded rationality—psychology, I conducted a limited examination of the citation content of the two most frequently occurring RTO works listed in Table 6 to gain some notion of the rhetorical function of these two articles in the citing text.

I retrieved all articles in the bounded rationality—psychology RTO set that cited Gigerenzer and Goldstein (1996) or Kahneman (2003; there were no overlapping source articles), extracted the text associated with the

embedded citation, and identified its location within the larger document. A cursory examination of the citation content and text location suggests that the articles are being cited primarily as background (introduction) to the citing author’s own work or in general discussion and are being cited for specific concepts in the cited documents rather than in support of a general discussion of bounded rationality. Articles citing Gigerenzer and Goldstein primarily invoke the authors’ work on “fast and frugal” decision heuristics (equal weighting, recognition heuristic, “take the best” heuristic), often as one of a series of papers dealing with

TABLE 6. Most frequently occurring works in source articles in the Term in Reference Title [RTO] Category in Bounded Rationality—Psychology.

Articles	Item in bounded rationality—Psychology article bibliographies
61	Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. <i>American Psychologist</i> , 58, 697–720.
57	Gigerenzer, G., & Goldstein, D.G. (1996). Reasoning the fast and frugal way: Models of bounded rationality. <i>Psychological Review</i> , 103, 650–669
11	Kahneman, D. (2003). Maps of bounded rationality: Psychology for behavioral economics. <i>American Economic Review</i> , 93, 1449–1475.
10	March, J.G. (1978). Bounded rationality, ambiguity, and the engineering of choice. <i>Bell Journal of Economics</i> , 9, 587–608.
9	Gigerenzer, G., & Selten, R. (2001). <i>Bounded rationality: The adaptive toolbox</i> . Cambridge, MA: MIT Press.
9	Gigerenzer, G. (1993). The bounded rationality of probabilistic mental models. In Manktelow, K., & Over, D. (eds.). <i>Rationality: Psychological and philosophical perspectives</i> (pp. 284–313). London: Routledge.
7	Gigerenzer, G. (2004). Fast and frugal heuristics: The tools of bounded rationality. In Koehler, D., & Harvey, N. (eds.). <i>Handbook of judgment and decision making</i> (pp. 62–88). Oxford, UK: Blackwell.
7	Kahneman, D. (2002). Maps of bounded rationality: A perspective on intuitive judgment and choice. Nobel Prize Lecture [revised and published as Kahneman, 2003; see above].
6	Erev, I., & Roth, A.E. (2002). Simple reinforcement learning models and reciprocity in the prisoner’s dilemma game. In Gigerenzer, G., & Selten, R. (eds.). <i>Bounded rationality: The adaptive toolbox</i> (pp. 215–231). Cambridge, MA: MIT Press.
6	Oaksford, M., & Chater, N. (1993). Reasoning theories and bounded rationality. In K. I.Manktelow & D. E.Over (eds.). <i>Rationality</i> (pp. 31–60). London: Routledge.
6	Simon, H. (1982). <i>Models of bounded rationality</i> (Vols. 1 and 2). Cambridge, MA: MIT Press.

decision heuristics not specifically studied in the source paper. In source papers citing Kahneman (2003; which itself is a review of his Nobel-recognized research), the citation content focuses primarily on his identification of two cognitive streams of decision making (deliberative vs. intuitive, or “thinking fast and slow”; see Kahneman, 2011, for a popular treatment).

Discussion

How Should We Assess OBI, With or Without Indirect Citations?

If we define OBI in a strict sense, as a lack of an explicit citation to one or more of Simon’s publications directly linked to the use of one of the catch phrases, then the data show clear evidence of some degree of obliteration in the aggregate (Table 1). In the case of bounded rationality, economics takes the lead with 82% strict OBI (calculated from Table 1), management follows with 62% and psychology trails behind with 30%. For satisficing, more than half of the

articles in each subject area lack an explicit citation to Simon. Economics leads with 64% of the articles having an indirect, implicit, or quasieponymous citation, followed by management (54%) and psychology (50%). Over the years 1987–2011, the majority of authors in economics and management “obliterated” the connection between the concept/catch phrase and Simon’s work. In psychology, Simon’s connection to satisficing was obliterated at about the same level as the other two, whereas his connection to bounded rationality was more frequently recognized; only 30% of the much smaller set of articles containing the catch phrase lacked a citation to Simon.

When we look at the trend in percentage of explicit citations over time (Figs. 2, 4), however, there are interesting differences between the patterns for the catch phrases. The characterizations of OBI by Merton, Garfield, and other commentators all suggest that [strict] OBI, as evidenced here by the lack of a link to Simon, should increase over time, as the concept becomes more and more of a “taken-for-granted” part of core knowledge (Skilton, 2006) and becomes a “household name” (Lederberg, 1972). Marx (2011) states flatly that “[t]he incorporation of information is a natural process in science, and the seminal knowledge is referred to only if special viewpoints demand it” (p. 438).

For bounded rationality in economics, a trend toward increasing strict OBI does seem to be the case; the percentage of explicitly citing articles decreases from one 5-year aggregate to the next. However, there is no trend observable in management or psychology (which has a strikingly high percentage of explicitly citing articles, albeit from a much smaller base). In the case of satisficing, we can see a general upward trend in explicitly citing articles in economics (a decrease in strict OBI) and a general downward trend for both management and psychology (an increase in strict OBI).

There would seem to be more of a distinction between an author’s decision to cite *something* in connection with the use of bounded rationality or satisficing as part of the discussion or argument and the decision not to cite *any* prior work (we must presume that this was a deliberate decision, although we cannot point to any specific reason or motive). As noted in the Introduction, Small’s characterization of cited works as “concept symbols” that are used in the discussion of specific ideas in the source text is a useful way of thinking about the process of OBI. Because both explicit and (to a large extent) indirect citations connect the phrase in the source text with its conceptual source, a more permissive take on OBI would be to allow citation “credit” for either an explicit link to Simon or a link to another author’s work (an indirect citation that will point immediately or ultimately to Simon’s work). We would only count implicit citations and quasieponymous citations (implicit+) as evidence of OBI. From this perspective, the overall lenient OBI percentage (percentage of only implicit+ citations; see Table 1) decreases by roughly 50% in most cases, to about 40% OBI for bounded rationality in economics and management and

17% OBI in psychology, whereas satisficing hovers around 30% in all three subject areas. In Figure 2 (bounded rationality) there is a suggestion of an increase over time in lenient OBI in economics but none in management or psychology (in which the percentage first increases and then decreases over the five time periods). For satisficing (Figure 4), lenient OBI in economics seems roughly stable; there is a slight decrease in implicit+ citation percentages in management and a fairly steady increase in psychology.

The most we can say about OBI based on these data is that it exists. There are a measurable number of papers in the time frame studied in which authors are not connecting Simon with two of the concepts for which he is best known. We can also observe that the percentage of these papers and the degree of OBI will vary over time. In comparing the two catch phrases, economics shows a steady increase in percentage OBI based on explicit citations for bounded rationality but a steady decrease for satisficing. Management shows no trend for either, and psychology shows a trend (increasing percentage OBI) only for satisficing.

Does Subject Area Matter in Assessing OBI and the Citeable Canon?

Skilton (2006) explored citation practices across natural and social science disciplines to assess the effects of what he terms “taken-for-grantedness,” the accepted core knowledge that may be shared by or may be specific to one or more disciplines. He linked the notion of core knowledge with Merton’s OBI; formal reference is obliterated for knowledge seen as foundational, although this will differ across time and discipline. Skilton compared four major referencing/citation features of “special topics” journal issues (articles on a set theme, including festschrifts) in the natural sciences and social sciences, the number of references, level of reference overlap, homogeneity of sources, and overlap between references to authors. He found that reference lists in the social science special topics article sets were more likely to overlap (sharing references) than were those in the natural sciences and that social science articles in theme issues tended to draw on a more homogeneous set of sources. He drew particular attention to journal articles in strategic management and organization studies as having patterns of high citation overlap and many references to core works.

We can look at the lists of top explicit (Simon) and indirect (non-Simon) references in Tables 2–5 in the same spirit as Skilton, although recognizing that the “thematic” content linking the articles is simply the presence of a catch phrase in the article text of a journal in one of the three subject areas rather than participation in a special topics issue or festschrift. To what extent are the referencing patterns in economics, management, and psychology similar (as subjects within the social sciences) when invoking previously published work to support a discussion of bounded rationality or satisficing?

With respect to explicit citations to Simon, all three subject areas agree that *Administrative Behavior* (any

edition), *Models of Man*, and the 1955 article in *Quarterly Journal of Economics* are canonical sources for both bounded rationality and satisficing. Additionally, *Models of Bounded Rationality* is shared by economics and management (for bounded rationality) and economics and psychology (for satisficing). Management and psychology agree on Simon’s 1956 article in *Psychological Review* for satisficing. Other works are mentioned only in a single subject area (as one of the top five; the works may be listed lower in the ranked list of explicitly cited works). Management articles cite March and Simon (*Organizations*, either edition) almost as often as an edition of *Administrative Behavior* (103 vs. 109 articles).

Not surprisingly, there is much more diversity and evidence of strong disciplinary orientation in the indirectly cited works, those that are “substituted” for a work by Simon as rhetorical support for the catch phrase. In economics, the top five works for bounded rationality are all written by economists—including two by Oliver E. Williamson and one by Thomas Sargent (both Economics Nobel Prize winners). Management shares both Williamson references and adds a third, along with Cyert and March (*A Behavioral Theory of the Firm*) and Nelson and Winter (*An Evolutionary Theory of Economic Change*). Only two indirectly cited works occurred three or more times in the psychology literature on bounded rationality (recall that there were many fewer articles in this data set and almost no indirect citations). Both of these have Gerd Gigerenzer (psychologist and director of the Max Plank Institute for Human Development) as an author.

In the case of indirect citations linked to satisficing, frequently cited works are much thinner on the ground. Economics had no works with three or more references. Management had only two (Cyert & March and Winter, 2000). The indirect citations for psychology include two (Krosnick, 1991, 1999) that deal explicitly with survey design and respondent choice behavior and one (Kuhn, Weinstock, & Flaton, 1994) that discusses juror decision making; the remaining two (Iyengar, Wells, & Schwartz, 2006; Schwartz, Ward, Monterosso, Lyubomirsky, White, & Lehman, 2002) look more generally at decision-making behavior.

These findings are suggestive of differences in degree of obliteration, identification of canonical sources, and what may be cited in place of the original work across the three disciplines studied, but the actual data points are too few to do more than hint at the possibility that disciplinary orientation does make a difference. More studies systematically comparing OBI across disciplinary boundaries are certainly encouraged in order to address this issue.

On Indirect Citations, Citation Substitution, and the Palimpsestic Syndrome

Merton suggested that one way in which an author’s contributions would become “obliterated” was through replacement of references to the author’s work by references

to later work by other authors (as old text is scrubbed out and new text inscribed over it):

And since many of us tend to attribute a significant idea or formulation to the author who introduced us to it, the altogether innocent transmitter sometimes becomes identified as the originator. In the successive transmission of ideas, repeated use may erase all but the immediately antecedent versions, thus producing an historical palimpsest in which the source of those ideas is obliterated (Merton, 1979, p. ix)

In an earlier discussion, Merton suggested that the citing author knew of the older work but chose not to cite it:

[The] palimpsestic syndrome: assigning a striking idea or formulation to the author who first introduced us to it when in fact that author had simply adopted or revived a *formulation that he (and others versed in the same tradition) knew to have been created by another* (Merton, 1972, p. 31, emphasis mine).

Citation substitution, from Merton's perspective, would seem to be a deliberate act on the part of the citing author that attributes the origin of the concept to the newer author/work rather than the originator. Merton uses as examples his own experiences as a citing author, attributing the phrase *on the shoulders of giants* to Newton (Merton, 1965, p. xxiii) and identifying Weber rather than Simmel as the author of an aphorism (Merton, 1972, p. 31). Merton also wrote as the "obliterated" author (in a discussion of his original concept of a focus group ["focussed [sic] interview"] being attributed to a later author; see discussion of Merton, 1987).

However, this would seem to be a take on citation substitution different from, for instance, citing a review of the literature rather than the works being reviewed (see Price, 1965, for a discussion of the effect of reviews on citation patterns and Aksnes & Rip, 2009, for authors' opinions on this practice). Also, citing an author's newer work that contains a more complete and thoughtful discussion of the concept than the original would seem to be acceptable, although it does lower the citation-based visibility of the specific work in which the concept originated. (This is why it is appropriate, in an OBI study, to consider an author's oeuvre of writing on a topic such as bounded rationality or *evolutionarily stable strategies* [McCain, 2012a] rather than focusing on only the first articulation).

Citing a more recent work (by another author) that has a contextually useful discussion of the concept (and that itself cites the original source) may be important to the citing author's rhetorical goals. In his interviews with computer scientists and sociologists, Harwood (2008, 2009) reported that the choice of what (and whether) to cite can depend on the audience (specialized or general, within or outside the subject area) and their perceived expectations (community-based norms of citing). General audiences and out-of-specialty authors may be provided useful reviews or approachable discussions, American and British readers

may be offered alternative sources, and "classic" works may be cited because they're a signal that the author knows the subject (see also White & Wang, 1997; Wang & White, 1999; and Vinkler, 1987). On the other hand, some of the Norwegian scientists interviewed by Aksnes and Rip (2009) recognized OBI as a natural result of the contribution becoming part of established knowledge but expressed concern with citation substitution involving a "secondary" or "followup" article (by another author) or review article.

As discussed earlier, the top indirect citations identified in this study generally fit the notion that the context of discussion of bounded rationality and satisficing can account for their substitution for original works by Simon; economists cite other economists who in turn discuss Simon's notions, management writers draw on both economists and management theorists, and psychologists point to works by other psychologists. The bulk of the indirect citations to Cyert and March (1963 edition of *A Behavioral Theory of the Firm*) in the management literature might appear to be an anomaly from this perspective. In the 1963 edition, there are no index entries for either bounded rationality or satisficing (and a digital version of the book would not have been retrieved in a text-based search OBI-related search for these terms). There is, however, an index entry leading to a discussion of *adaptive rationality* as an attribute of an organization resulting in part from "the limitations on its capacity for assembling, storing, and utilizing information," and the authors go on to say that "as a result, the theory outlined in this volume characterizes the firm as an *adaptively rational* system rather than an *omnisciently rational* system" (Cyert & March, 1963, p. 99). An associated footnote explicitly refers to two of Simon's works—*Models of Man* and *Administrative Behavior*—with the comment that they prefer their term "adaptively rational" [to Simon's terms] as being relevant to the rationality of learning.⁶ Simon's notion of satisficing is captured by Cyert and March as well: "choice takes place in response to a problem, uses standard operating rules, and involves identifying an alternative that is acceptable from the point of view of evoked goals" (Cyert & March, 1963, p. 116). Bounded rationality does have an index entry in the 1992 edition, where it is discussed in an epilogue (p. 214–216).

Thus it appears that the linkage of Cyert and March (1963) to bounded rationality and satisficing does not qualify as a strict Mertonian reattribution of original concept. Rather, like the other indirect citations, the book reference serves as a pointer to a contextually relevant discussion of Simon's ideas that fits well with the orientation of discussions in the management literature (this is supported by Gavetti et al.'s description of satisficing as the "foundation of the last two chapters . . . of Cyert and March"

⁶The phrase *adaptively rational* may have been more common in the 1970s than in more recent years (Roger McCain, personal communication). Its usefulness in capturing the more recent bounded rationality literature was not explored.

(Gavetti, Levinthal, & Ocasio, 2007, p. 526). The Indirect citations in the economics and management literature may also reflect a more general influence of the “Carnegie School” social science researchers. Augier (2010) provides an informative overview of scholarship at Carnegie-Mellon in the second half of the 20th century, with a particular focus on the development of the notions of bounded rationality and satisficing and the influence of Cyert, March, Simon, and others on Oliver E. Williamson and the topic of transaction cost economics. Augier points to the same influential works that are listed in Tables 2–6, most particularly *Organizations* (March & Simon, 1958) and *A Behavioral Theory of the Firm* (Cyert & March, 1963). Similarly, Gavetti et al. (2007) list these two books, along with Simon’s *Administrative Behavior* (Simon, 1947), as the foundational works of the “Carnegie School.” Gavetti et al. provide an in-depth quantitative and qualitative analysis of the influence of these three works and call for a rededication to a “Neo-Carnegie” perspective, a “renewed behaviorally plausible, decision-centered perspective on organizations” (Gavetti et al., 2007, p. 531).

Bounded Rationality—Psychology

As noted earlier, psychology is the “odd subject out” in the bounded rationality retrievals; economics and management are more like each other in terms of overall retrieval counts and counts of articles “on” bounded rationality than either is like psychology.⁷ For bounded rationality—psychology, the overall retrieval was only one-third to one-quarter as large as the other two and the proportion of articles “on” the topic much smaller. On the other hand, all three subjects produced roughly the same number of articles in the initial satisficing retrieval and had roughly the same lenient OBI percentage. An in-depth citation content analysis of those relatively few psychology articles to see whether there are clues in the text concerning the apparent lack of “interest” in bounded rationality is beyond the scope of the present research. It may be that, for psychologists, the notion that people have bounded rather than unlimited cognitive abilities is simply a given and there is no need to even invoke the concept. Satisficing, on the other hand, implies decision heuristics, changing cognitive goals, and switching between deliberate and intuitive modes of thinking, topics of continuing research interest in psychology.

Conclusions

Strictly defined OBI (no explicit citations to Simon) is the only kind that can be identified in studies that depend on

⁷Note that the Carnegie-Mellon memorial website for Herbert Simon links economics and management in a single bibliographic category, whereas psychology is a separate category, and that Augier discusses economics and management as joint topics of interest in the “Carnegie School” but mentions psychology only as part of the interdisciplinary framework in which Simon, March, Cyert, and others worked.

data collected at the citation database level (option 1 in the earlier discussion). One could argue that the existence of eponymy (e.g., *Southern blot*, *Nash equilibrium*, *Bradford distribution*) tempers even strict OBI (eponym without citation link), because there is an implicit pointer to the presumed discoverer/developer (leaving aside the Stigler, 1994, assertion that eponyms are rarely if ever named for the true discoverer). Ultimately what is tallied in assessing OBI is the presence/absence of an appropriate reference to Simon in a paper with the catch phrase in the database record. This presents a serious problem in a field such as economics, in which, in many journals, more than 50% of the articles will lack abstracts. A full-text retrieval/analysis, such as this article describes, allows for the retrieval of articles containing the catch phrase of interest and the identification of the problematic intermediate case (indirect citations) to be considered when assessing OBI (as well as a substantial amount of “noise” contributed by the RTO papers). The challenge in conducting a full-text retrieval/analysis is in assembling an appropriate suite of searchable full-text sources and compiling and analyzing a much larger data set.

The researcher using a full-text approach has the option of taking a strict or lenient approach to calculating OBI, including or excluding indirect citations from the final tally. My preference is to take the lenient approach, reasoning that citing *something* is different from citing *nothing* and that attaching a reference to the textual invocation of the concept keeps it from becoming completely taken for granted. From this perspective, we can observe that a certain degree of OBI of Simon’s concepts exists, but that it varies over time (not always increasing) and varies by subject area as well. There is no single trend that fits all three subject areas and both catch phrases.

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Appendix A: Most frequent journals in each subject category with Bounded Rationality in the article text

TABLE A1. Top 10 Economics Journals (Total 964).

Journal	Articles
<i>American Economic Review</i>	86
<i>Journal of Economic Issues</i>	77
<i>Economic Theory</i>	68
<i>Journal of Economic Theory</i>	68
<i>Economic Journal</i>	50
<i>Econometrica</i>	42
<i>Public Choice</i>	37
<i>Review of Economic Studies</i>	36
<i>Journal of Economic Perspectives</i>	34
<i>Managerial and Decision Economics</i>	32

TABLE A2. Top 10 Management Journals (Total 806).

Journal	Articles
<i>Strategic Management Journal</i>	173
<i>Organization Science</i>	131
<i>Management Science</i>	109
<i>Journal of Management Studies</i>	89
<i>Academy of Management Review</i>	81
<i>Academy of Management Journal</i>	49
<i>Administrative Science Quarterly</i>	43
<i>Public Administration Review</i>	43
<i>Managerial and Decision Economics</i>	39
<i>Journal of Policy Analysis and Management</i>	10

TABLE A3. Top 11 Psychology Journals (Total 143).

Journal	Articles
<i>Political Psychology</i>	22
<i>Psychological Review</i>	16
<i>American Psychologist</i>	10
<i>Journal of Applied Psychology</i>	10
<i>Journal of Experimental Psychology: Learning, Memory, and Cognition</i>	10
<i>Journal of Personality and Social Psychology</i>	6
<i>Psychological Bulletin</i>	6
<i>Canadian Psychology/Psychologie Canadienne</i>	4
<i>Perspectives on Psychological Science</i>	4
<i>Psychological Inquiry</i>	4
<i>Psychological Science</i>	4

Appendix B: Most frequent journals in each subject category with Satisficing in the article text (1987–2011)

TABLE B1. Top 10 Economics Journals (total 237).

Journal	Articles
<i>Journal of Economic Issues</i>	35
<i>American Economic Review</i>	17
<i>Public Choice</i>	14
<i>American Journal of Economics and Sociology</i>	13
<i>Economic Theory</i>	13
<i>Journal of Post Keynesian Economics</i>	12
<i>Economic Journal</i>	11
<i>Journal of Economic Literature</i>	9
<i>Journal of Economic Theory</i>	7
<i>Journal of Economic Perspectives</i>	7

TABLE B2. Top 10 Management Journals (Total 254).

Journal	Articles
<i>Journal of Management Studies</i>	35
<i>Management Science</i>	29
<i>Strategic Management Journal</i>	29
<i>The Academy of Management Review</i>	28
<i>Organization Science</i>	26
<i>Public Administration Review</i>	21
<i>Academy of Management Journal</i>	14
<i>Administrative Science Quarterly</i>	11
<i>Interfaces</i>	11
<i>Journal of Management</i>	10

TABLE B3. Top 9 Psychology Journals (Total 196).

Journal	Articles
<i>Journal of Personality and Social Psychology</i>	21
<i>Political Psychology</i>	20
<i>Psychological Review</i>	18
<i>Journal of Experimental Psychology: Learning, Memory, and Cognition</i>	17
<i>American Psychologist</i>	13
<i>Psychological Bulletin</i>	13
<i>Psychological Science</i>	11
<i>Journal of Applied Psychology</i>	6
<i>Journal of Experimental Psychology: Human Perception and Performance</i>	6

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