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Are Impact Factors Comparable? Impact Factor Comparisons Across Areas of Psychology

Jason J. van der Horst
Brigham Young University - Provo

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Jason van der Horst

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Dr. Bruce L. Brown, Chair
Dr. Dawson W. Hedges
Dr. Jeffrey S. Reber

Department of Psychology

Brigham Young University

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ABSTRACT

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Jason van der Horst

Department of Psychology

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Journal impact factors play an increasing role in academics as a tool for evaluating faculty, research, and resource allocations. These evaluations may be effective in departments where the subject matter is reasonably unified. However, given the diversity found within the subject matter of psychology, the impact factors of journals may not be comparable across the various areas. This study compares the average impact factors across decile levels of journals from seven areas of psychology. It is found that impact factor scores are not comparable across the seven areas of psychology. This difference is more pronounced when looking at higher decile journals. Further research could be conducted to investigate differences among psychology areas using other bibliographic variables, including some of the newer indices of individual scholar productivity, such as the h-index.

Keywords: impact factor, psychology department, faculty evaluation

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Are Impact Factors Comparable? Impact Factor Comparisons across Areas of Psychology

Journal impact factors have been used for over half a century to evaluate the relative strength and influence of journals within a particular field (e.g. Lopez-Munoz, Alamo, Quinteor-Cutierrez, Garcia-Garcia, 2008). This seemingly simple bibliographic measure had humble beginnings as a library tool to assist in finding journals of interest, but it has become a major tool for assessing journal quality (Hantula, 2005). It has also become big business. The largest provider of impact factor data today is Thomson Reuters, whose Institute for Scientific Information (ISI) database generates $600 million in annual revenues (Garfield, 2006).

Impact factor scores were originally designed to identify journals of interest for the Science Citation Index (SCI). Previous journal evaluation methods often dealt with publication size, but this method let many high quality smaller journals fall through the cracks. In an effort to include these small but influential journals, impact factor scores emerged. Since then, the impact factor score has grown to fill many roles. Editors now use this bibliographic measure to gauge the prestige and use of their journals (Creek, 2009); librarians use them to assist researchers (Koskinen et. al., 2008); university and grant committees use them to evaluate funding allocations (Monastersky, 2005); and academic departments are increasingly using journal impact factors to make hiring decisions, and rank and status decisions (Wells, 2007; Cash-Per-Publication, 2006; Joiner, 2009).

In order to improve national rankings, academic departments are focusing not only upon the number of articles published by faculty but also where those articles are published (Seglen, 1997). Journal quality is becoming a major issue. Impact factors provide an easily accessible but perhaps not fully adequate measure of journal quality. The comparability and ultimate utility of journal impact factors for evaluating faculty productivity and for making hiring and retention

decisions may vary as much as research interests vary among subfields within a department. Since impact factors are essentially averages (see Table 1 and accompanying discussion), they can be substantially skewed by one or two highly quoted papers, and can also be affected by discipline specific patterns such as number of authors, size of reference sections, discipline speed, etc. This may vitiate direct impact factor comparisons across sub-disciplines within a department. Given the time-intensive nature of qualitative evaluation of faculty publications, the availability of impact factors as a readily available objective measure is appealing, but the fundamental and important question to be considered is whether impact factors of journals have the same meaning and significance across the many and varied areas of psychology.

History of Impact Factors

Journal impact factors were originally created by Eugene Garfield. Before journal impact factors existed, journals were evaluated based on such things as rejection rates and number of articles published. Garfield first mentioned the idea of impact factors in *Science* in 1955. In the following years, the experimental *Genetics Citation Index* was published which eventually led to the Science Citation Index (SCI) being published in 1961. Garfield founded the Institute for Scientific Information (ISI) which is now part of Thomson Reuters. Today, impact factors are calculated yearly for those journals that are indexed in Thomson Reuter's *Journal Citation Reports* (JCR). JCR includes journal citations evaluations for more than 5000 journals. These journals average about 15 million citations from 1 million sources per year.

Definition of Impact Factor

The journal impact factor is simply the proportion of citations to a particular journal compared to the number of articles published in that journal over a 2-year period. A journal's impact factor for a given year is calculated annually based on the number of article citations and

Table 1

Impact factor (2008) calculation for Psychological Bulletin

Numerator: Citations in 2008 to items published in:	2007 = 435	
	2006 = 583	Sum: 1018
Denominator: Number of items published in:	2007 = 44	
	2006 = 37	Sum: 81
Calculation: $\frac{Citations\ \ to\ recent\ \ items}{Number\ \ of\ recent\ \ items} = \frac{1018}{81} = 12.568$		

the number of articles published in the two previous years. For example, the 2008 journal impact factor for *Psychological Bulletin* would be calculated as shown in Table 1.

For sorting through citations and source materials, the JCR has certain criteria for what is and is not included in the impact factor calculation. First, the numerator includes any citation from any source to any source published in a given journal. This includes any references to editorials, article comments, news items, meeting abstracts, etc. In calculating the denominator, only sources classified as citable items are included. These citable items are either articles or reviews and exclude any additional items listed above. A source item is classified as a review if it meets any of the following criteria: citing more than 100 references, appearing in a review publication or a review section of a journal, the words "review" or "overview" appear in its title, or the abstract states that is it a review or survey.

Issues and Problems with Impact Factors

There are many limitations to the impact factor index, both from the methods used for calculation and also from human error. The numerator of the impact factor contains every detectable citation to a journal's content from the previous two years, regardless of the article

type (Garfield, 1999). For example, the 2006 impact factor numerator contains all citations to all content published in 2004 and 2005. The denominator of the impact factor, however, contains only those articles designated by Thomson Scientific as primary research articles or review articles. Journal "front matter," such as *Nature's* "News and Views" is not counted. Thus, the impact factor calculation contains citation values in the numerator for which there is no corresponding value in the denominator.

Another limitation with regard to the method for calculating impact factors is the fact that the impact factor is a mean, and therefore can be substantially skewed by one or two highly cited papers. This skewed distribution positively biases the impact factor score since a small percentage of papers can account for the majority of citations. Thus the impact factor, as a mean, is a poor reflection of the number of citations given to the typical paper in a particular journal.

One impact factor limitation that has been a subject of discussion is the way in which immediacy affects the impact factors of journals in a particular area. Since only two years of citations are used, impact factor calculations favor journals that have more immediate impact (a relatively "fast" discipline) over those that have a longer impact period (a relatively "slow" discipline) (Taborsky, 2007). Though this is controlled somewhat by making comparisons within a discipline, it biases the comparison of impact factors across sub-disciplines (Garfield, 1999; Kurmis, 2003), and may therefore be an important factor in evaluating the feasibility of comparisons across diverse areas of psychology.

Another important factor in evaluating comparisons across areas of psychology is that journal impact factors are affected by citation density (Garfield, 1999). Citation density is the mean number of references cited per paper. This biases impact factor comparisons across disciplines, since citation density can be discipline-specific.

Due to the large scope of impact factor calculations, there is much room for human error in the construction of the JCR. All of the citations to journals are based on the reference sections created by the authors. It is unknown how JCR handles inaccuracies such as misspellings, incorrect publication year, or references to previous journal titles. For example, the journal *Cognitive Brain Research* stopped publishing in 2005 but the JCR lists seven citations to items published in 2006. Given the massive amount of data compiled within the JCR, other such errors undoubtedly exist.

One such source of error is the practice of articles being placed in categories such as primary, review, or "front matter" by Thomson Scientific employees, as they examine journals using various bibliographic criteria, such as keywords and number of references. This could potentially lead to misclassifications, usually inadvertent, but at least potentially strategic. For example, the accusation has been made (The Impact Factor Game, 2006) that some publishers negotiate with Thomson Scientific to change these designations in their favor. The specifics of these negotiations are not available to the public, but one can't help but wonder what has occurred when a journal experiences a sudden jump in impact factor. For example, *Current Biology* had an impact factor of 7.00 in 2002 and 11.91 in 2003. The denominator somehow dropped from 1032 in 2002 to 634 in 2003, even though the overall number of articles published in the journal increased.

A simple example of inflation of a journal's impact factor can be found in a forum paper published in *Cortex* (Sala & Brooks, 2008). The article reports a simple comparison of number of authors to impact factor. Whereas the intended purpose of this Sala and Brooks paper was to expose author self-citation as a source of bias in impact factors, a careful analysis of the paper shows that the paper itself functions as a huge biasing factor in favor of the journal. The

breakdown of this seven page article is as follows: 1.5 pages of text, a one page table, and four pages of references. This article alters the journal's 2008 impact factor in two ways. First, 110 of the 172 references are self citations that were included in the impact factor calculations. Second, since the article was published as a forum paper instead of a research paper, it is not included in the impact factor denominator. Removing this single article from the 2008 calculations would change the journal's impact factor from 2.749 to 2.173. This illustrates one of the many ways the impact factor index can be misleading if not abused.

In summary, there are many interpretative problems associated with the impact factor score. Scores can be influenced, changed, and misrepresented. The particular calculations that make up the impact factor could potentially favor some disciplines over others. The purpose of this thesis is to examine one aspect of many in evaluating the meaning of impact factors as an index of journal quality—the comparability of impact factors across seven areas of psychology.

Making Impact Factors Commensurate across Areas of Psychology

One of the problems involved in comparing the impact factors of journals across areas of psychology is the widely varying number of journals available in each area. That is, if we want to look at whether impact factors have the same meaning and significance across various areas of psychology we need to take into account and adjust for the number of journals available in each of these areas. It is simply not enough to look at differences in mean impact factors across the areas of psychology. Even if two areas had the same mean impact factors, that does not indicate that the same impact factor level has the same meaning across those two areas. It might be that one area would have higher impact factors in the strongest journals, but lower impact factors in the weakest journals, even though the overall mean impact factors for the two areas are the same. It is therefore important to compare impact factors for the various areas at comparable points across the entire range. To do this, the journals within each area of psychology need to be

broken into deciles according to journal impact factors, so that the comparison of journal impact factors for two areas can be made at each decile level.

It may also be the case that the number of articles published differs substantially from one decile level to another, both within an area and also across areas. These area differences based on journal counts lead to the useful concept of "article slots," that is, the number of potential opportunities to publish a given article. Article slot comparisons move the evaluation of area differences to the perspective of an individual researcher, by considering the total number of articles published in a year for a given area. From this, one can calculate the average impact factor at each decile of available article slots for a given area, and compare them across areas.[1] This article slot approach moves us closer to what might be more useful for a department in comparatively evaluating the publication record of faculty members across areas.

Aims

Starting from the premise that journal impact factors can have much value, but do not necessarily provide parallel and reasonable comparisons, this research investigates directly the question of across area comparability. In particular, three aims are addressed:

Aim 1: The first aim is to test whether areas of psychology differ from one another in the average impact factor of their journals, and to control this by making the comparison at each of ten decile levels. Comparisons are made between seven areas of psychology based on journal impact factors both directly and also grouped according to deciles. Decile comparisons include journal level deciles as well as article-slot level deciles.

[1] The obvious next step would be to also include the number of scholars vying for publication in these article slots – which is not easy – in order to create an "opportunity score" estimate that characterizes the supply and demand for each area of research.

Aim 2: The second aim is to investigate the interactive effects of area and decile upon average impact factors of journals. Two-way ANOVA is used to investigate the area by decile interaction. The area by decile interaction is examined in two kinds of analysis, those based on journal counts and those based on article slots.

Aim 3: The third aim of this study is to create an area comparison method that can be updated at regular intervals, perhaps every five years. Gathering this information over time will provide a measurement of change within areas of psychology as represented by their journal impact factors.

Method

Generation of Psychology Area Data

Overall, seven areas of psychology are selected as the focus of this study. These areas are selected to represent the broad scope of areas found within a psychology department. Psychology journal lists are created for each of the seven areas based on textbook reference sections. Journal impact factors and other bibliographic indices are gathered for each journal selected.

Seven areas of psychology. The seven areas of psychology selected are Sensation & Perception, Cognition, Principles of Learning, Social Psychology, Clinical Psychology, Industrial & Organizational Psychology, and Neuropsychology. These areas are intended as a meld of APA Divisions, APS Fields, and courses offered within psychology departments, representing older and newer as well as larger and smaller areas. Figure 1 shows the APA membership data for the seven areas selected. As can be seen in this figure Clinical Neuropsychology is the fastest growing area of those represented. Experimental, Behavioral, and Industrial & Organizational Psychology have remained relatively stable in membership

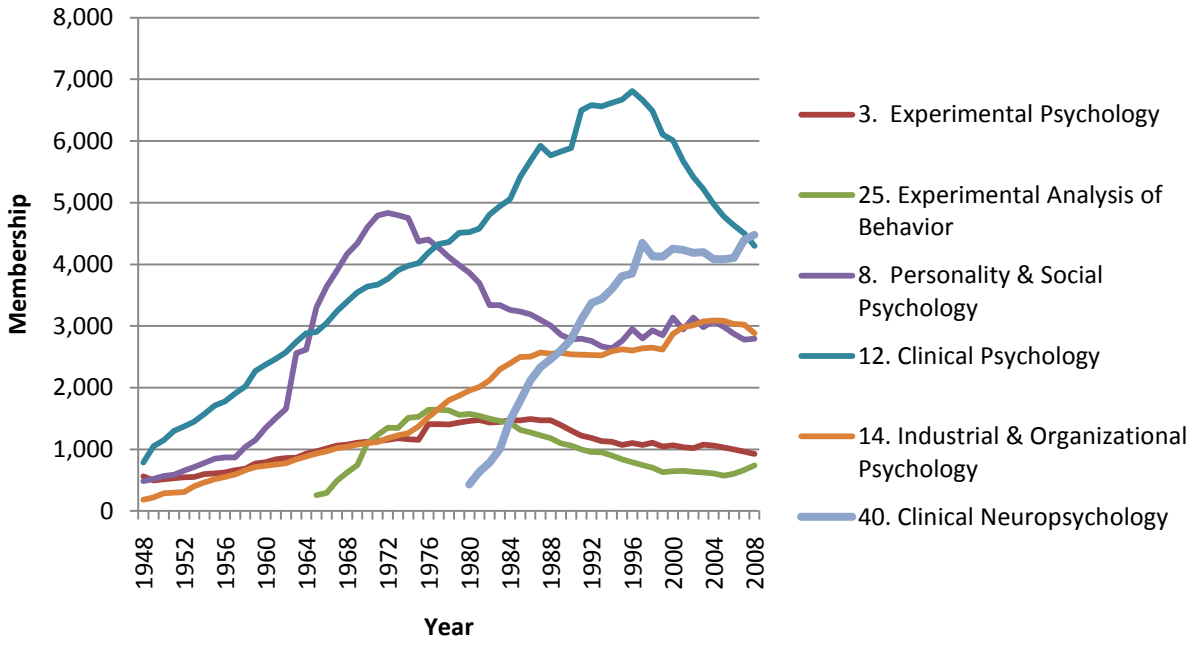

Figure 1. APA Membership data for divisions related to the areas of psychology used in this study. The fastest growing division is Clinical Neuropsychology.

levels over this sixty year period, while Clinical Psychology and Social Psychology have seen a recent slight decline.

Journal lists by area. The first problem to be solved is to identify the journals within the JCR that characterize each area. The approach here is to use textbook reference sections to identify the major journals for an area. The purpose of a textbook is to convey the fundamental content and history of an area of psychology. The reference list therefore is an index of the extent to which each journal is useful in telling that story. Textbooks for the seven psychology areas are used to define the journals most used within each area. Textbooks are selected from a convenience sample of those used by faculty within the BYU psychology department. The seven psychology areas and the corresponding textbook of each are as follows:

1. Sensation and Perception:
   Sensation and Perception, by E. Bruce Goldstein (2010)

2. Cognition:
   Cognition: Exploring the Science of the Mind, by Daniel Reisberg (2007)
3. Principles of Learning:
   Introduction to Learning and Behavior by Russell A. Powell (2009)
4. Social Psychology:
   Social Psychology, by David G. Myers (2010)
5. Clinical Psychology:
   Current Psychotherapies, by Raymond J. Corsini (2008)
6. Industrial and Organizational Psychology:
   Industrial and Organizational Psychology, by Michael G. Aamodt (2010)
7. Behavioral Neuroscience:
   Foundations of Physiological Psychology, by Neil R. Carlson (2010)

The reference section for each textbook is scanned into a computer, converted into searchable text by use of Optical Character Recognition (OCR) software, and journal titles within this list are extracted by use of a JAVA program. This creates a list for each area including journal titles and number of times each journal was cited in the reference section of each text. This list is compared to the journals contained within the JCR database (both science and social science editions). Magazines and books along with any journals that do not have data available from JCR are removed. These lists are rank-ordered by number of times cited. The journals representing the top 80% of citations (and cited at least three times) are included in this study. Journals with fewer than three citations are interpreted as having an insufficient tie to the corresponding area of psychology. See Tables A1 to A7 for the final lists of journals selected in descending number of references for each area along with comments on any excluded journals.

Journal impact factors. Once each journal list by area is created, individual journal information is extracted from the JCR database for each journal for the year 2008. Information extracted for each journal includes: total cites, impact factor, 5-year impact factor, impact factor without self-cites, immediacy index, citable items, cited 10 year cumulative percent, citing 10

year cumulative percent, eigenfactor score, and article influence score. Only impact factor data are used in this thesis.

The fundamental strategy of this thesis is to make the areas more comparable to one another by grouping all of the journals in each area into deciles. In other words, all of the journals in a given area are first listed in descending order by impact factor, and then the list is divided into ten groups (as nearly equal in size as possible) from highest to lowest. This permits direct comparison of the average impact factor in each area for all the journals that are in the first decile, followed by a comparison of all the journals in each area that are in the second decile, and so forth. This approach enables across-area comparison of impact factors at each journal count decile.

The second method used to create decile scores is to include information about the number of articles published in all of the journals within a given area within a given year. This is the number of article slots for that area for that year. One then divides the article slots into deciles (with approximately equivalent numbers of article slots) and compares the average impact factor for each article slot decile. Of course this shifts the distribution of journals among the deciles. In many ways the number of available slots in each decile level is closer to the comparison we wish to make. It more closely answers the question of "what is the impact factor of one's paper likely to be if it is among the top ten percent of papers in that area within that year?"

In reviewing the impact factor and publication data for each area, it is noticed that several multidisciplinary journals appear in several of the areas. Eight multidisciplinary journals are identified using the following criteria: all journals that appear in 4 or 5 areas (Science, Psychological Bulletin, Annual Review of Psychology, American Psychologist, Psychological

Table 2

Journal and Article Slot Counts for Seven Areas of Psychology

Area	# Journals	# Journals adjust	# Article Slots	# Article Slots adjusted
Sensation & Perception	45	41	15942	14804
Cognition	23	17	3253	2043
Principles of Learning	24	20	2896	1914
Social Psychology	39	32	3981	2415
Clinical	25	22	1676	1390
I/O	38	34	2593	2283
Behavioral Neuroscience	87	83	30938	29492

Note: Adjusted counts are with multidisciplinary journals removed.

Science, and Psychological Review), and select journals in 2 or 3 areas that are clearly multidisciplinary (Current Directions in Psychology and Psychological Reports). Because these multidisciplinary journals (which are often high impact) could inflate the impact factors somewhat, results are calculated both with and also without these eight multidisciplinary journals included. Table 2 displays the journal counts and the article slot counts for each area both with and without the multidisciplinary journals included. (These journals are identified by an asterisk in the journal area lists—see Tables A1-A7 of the Appendix).

The above methods create three types of comparisons. The first comparison is based on the raw data collected. The second comparison looks at journal-based deciles with all journals included and then with multidisciplinary journals removed. The third comparison looks at article slot based deciles with all journals included and then with multidisciplinary journals removed. Analysis of Variance (ANOVA) statistics are calculated for each of the two-way area x decile tables of data defined by these comparisons.

Results

The data are analyzed in three ways. First, we compare line graphs of raw impact factors across the seven areas (Figures 2a and 2b). Second, we calculate two-way ANOVAs and examine corresponding tables and their accompanying line graphs for two-way area x decile means of journal impact factors (Tables 3a and 3b, Figures 3a and 3b). Third, we calculate two-way ANOVAs and examine corresponding tables and their accompanying line graphs for two-way area x article-slot-decile means of journal impact factors (Tables 4a and 4b, Figures 4a and 4b). Each of these analyses are conducted in two ways, with the entire dataset (tables and figures marked "a"), and with datasets that have the multidisciplinary journals removed (tables and figures marked "b").

Before examining the more illuminating comparisons according to deciles, we first examine line graphs of raw impact factors for each area (Figures 2a and 2b). The first thing to be

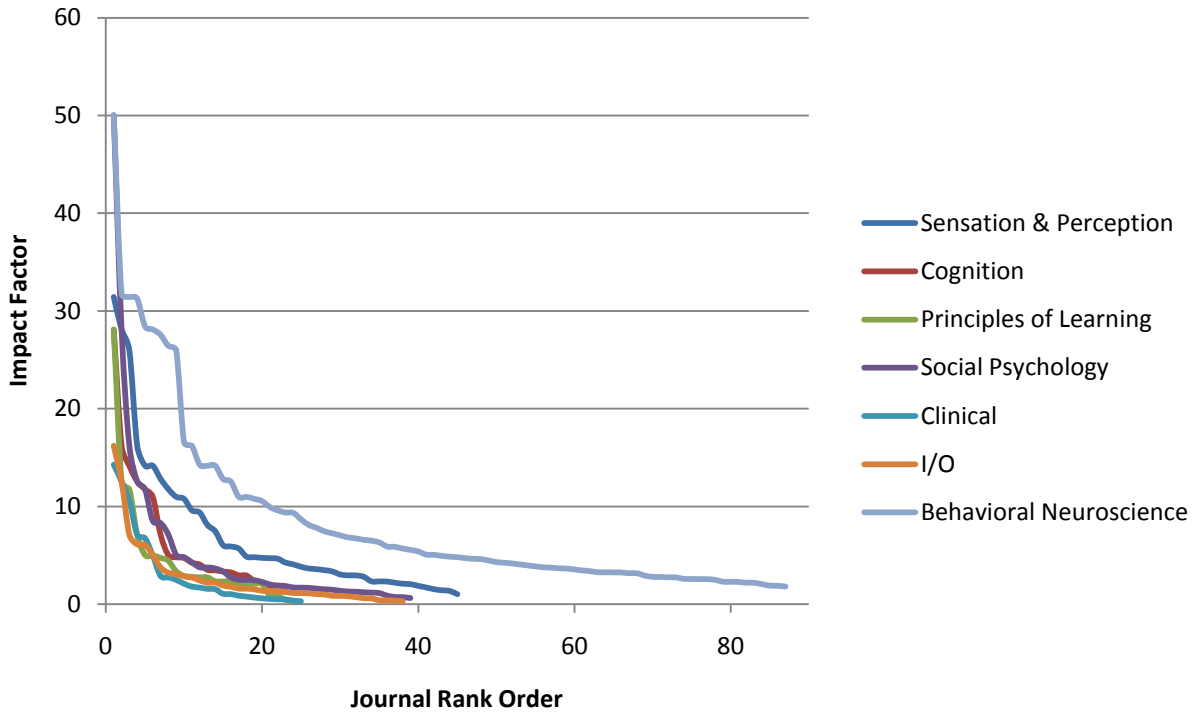

Figure 2a. Impact factor scores by journal rank order for seven psychology areas.

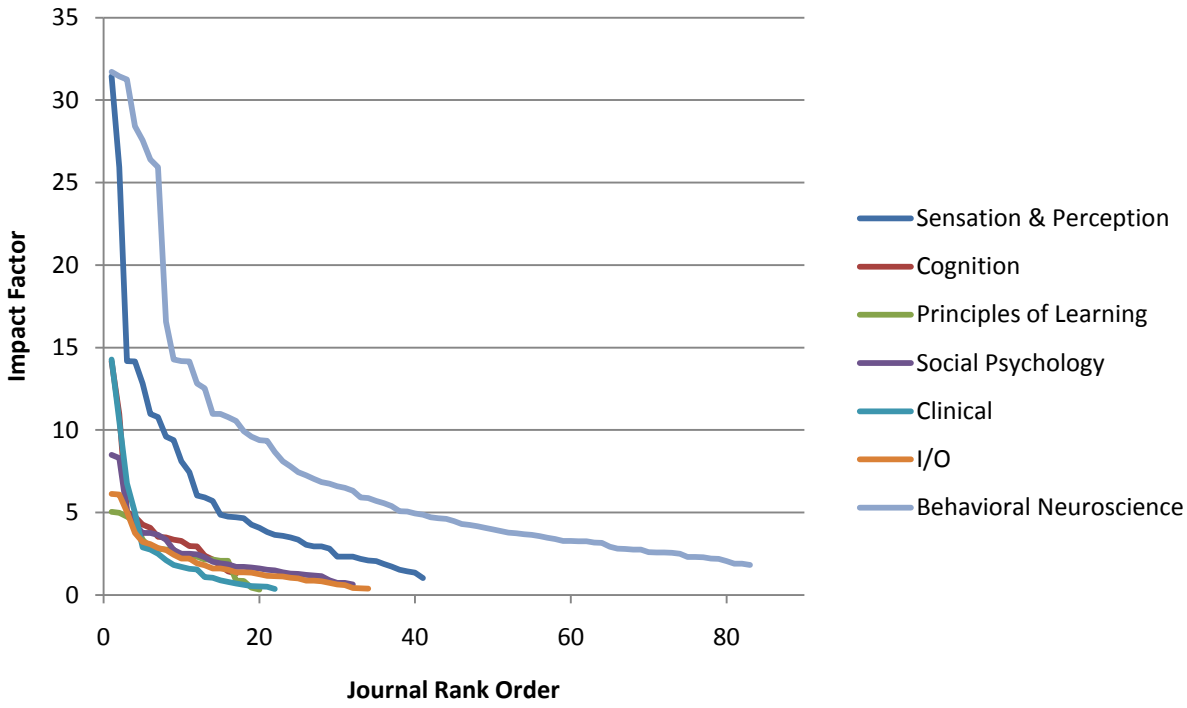

Figure 2b. Raw impact factor scores by journal for seven psychology areas excluding multidisciplinary journals.

noticed from Figure 2a is that the Behavioral Neuroscience area and the Sensation and Perception area have the highest impact factors and also the largest number of journals (87 for Behavioral Neuroscience and 45 for Sensation and Perception). At the far left of Figure 2a it can be seen that two of the areas are quite a bit lower in the impact factor of their highest impact journal, Industrial and Organizational Psychology (with impact factor of 16.217 for the highest impact journal), and Clinical Psychology (with an impact factor of 14.273 for the highest impact journal).

When the multidisciplinary journals are removed (Figure 2b), it becomes more obvious that the Behavioral Neuroscience area and the Sensation and Perception area are substantially higher than the other five areas in impact factors. In other words, the multidisciplinary journals to some extent obscure the differences in the impact factors between areas. The impact factor

Table 3a

Average Impact Factor for each Journal Decile

Area	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Mean
Sensation& Perception	25.42	13.23	10.19	6.87	5.03	4.30	3.42	2.67	**2.11**	1.41	7.47
Cognition	22.16	13.37	11.37	6.07	4.78	4.17	3.50	3.20	**2.50**	1.50	7.26
Principles of Learning	20.34	9.44	5.01	4.59	3.13	2.78	2.47	**2.21**	1.67	0.54	5.22
Social Psychology	31.45	10.29	5.31	3.63	2.55	**2.02**	1.67	1.42	1.21	0.75	6.03
Clinical	13.42	8.83	5.88	2.82	**2.30**	1.70	1.22	0.79	0.56	0.39	3.79
I/O	11.96	5.75	3.23	**2.40**	1.73	1.41	1.17	0.94	0.69	0.38	2.97
BN	31.86	15.83	10.19	7.39	5.71	4.63	3.83	3.24	2.66	**2.10**	8.74
Mean	22.37	10.96	7.31	4.82	3.60	3.00	2.47	2.07	1.63	1.01	5.93

Note: Bolded items indicates average impact factor above 2.00; I/O, Industrial & Organizational Psychology; BN, Behavioral Neuroscience

change in the five areas affected by removing multidisciplinary journals demonstrates that researchers in the lower impact areas publish their best papers in high impact multidisciplinary journals, presumably since their own specialty journals tend not to be high impact.

We now turn to the comparisons according to deciles. Table 3a displays the two-way area x decile means with the one-way areas means on the right margin and the one-way deciles means on the bottom margin. In the two-way (ANOVA) corresponding to this table we see that the strongest main effect, not surprisingly, is for decile ($F(9,69) = 117.00$, $p<.0001$) with an r^2 value of .500 (50% of the variance in impact factor accounted for by decile). Area main effects are also highly significant ($F(6, 29) = 25.76$, $p<.0001$) with an r^2 value of .073. The interaction between area and decile is also significant ($F(54, 69) = 2.82$, $p<.0001$) with an r^2 value of .072. Notice in Table 3a that journals in all ten of the deciles for Behavioral Neuroscience have an

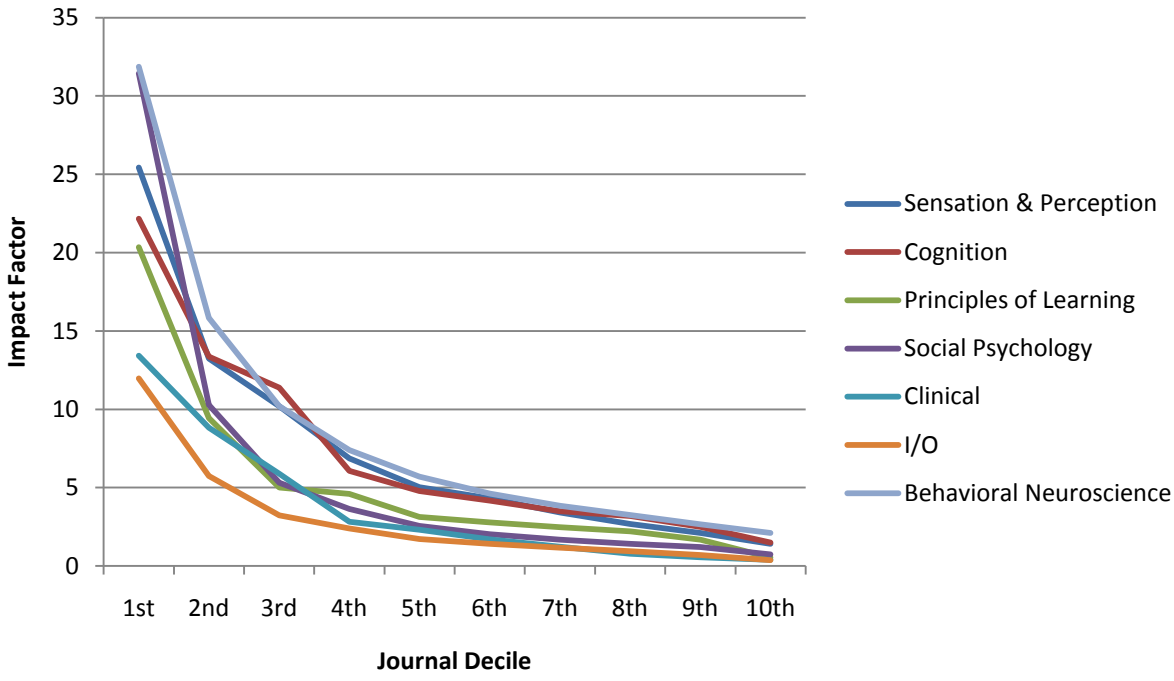

Figure 3a. Impact factor by journal deciles for seven psychology areas

average impact factor of at least two. In other words, it is highly unusual in Behavioral Neuroscience to publish in a journal that does not have an impact factor of at least two. For Sensation and Perception as well as Cognition, the average impact factors are above two except for the tenth decile. On the other hand, in Industrial and Organizational Psychology it is not until the fourth decile that the average impact factor is above two. In Clinical Psychology, it is not until the fifth decile that we reach an impact factor above two.

These observations are also reflected in Figure 3a, where it is seen that the three highest areas in impact factor are Behavioral Neuroscience, Cognition, and Sensation and Perception, particularly in the middle deciles. There is some crossing over in the highest decile with Social Psychology being nearly as high as Behavioral Neuroscience. However, when the multidisciplinary journals are removed (Figure 3b) Behavioral Neuroscience, Cognition, and Sensation and Perception are clearly above the other four areas, even in the first decile.

Table 3b and Figure 3b display the same two-way area by deciles means as Table 3a and Figure 3a but with multidisciplinary journals excluded. As can be seen in Figure 3b, this adjustment clarifies the difference between the top three areas of impact and the lower four areas. Behavioral Neuroscience, Cognition, and Sensation and Perception are shown in this figure as substantially above the other four areas essentially across the entire range of deciles. In the two-way ANOVA corresponding to Table 3b, the amount of variance accounted for by decile decreases from an r^2 of .500 to an r^2 of .267 ($F(9, 69) = 94.13$, $p<.0001$). On the other hand, the r^2 for area now increases substantially, from .073 to .169 ($F(6, 69) = 89.44$, $p<.0001$). Likewise, the r^2 for the two-way interaction between area and decile now increases substantially from .072 to .180 ($F(54, 69) = 10.61$, $p<.0001$). In other words, removing the confounding effects of the multidisciplinary journals reveals clearer differences among the seven areas and also a clearer

Table 3b

Average Impact Factor for each Journal Decile Excluding Multidisciplinary Journals

Area	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Mean
Sensation& Perception	21.43	11.04	7.74	5.3	4.42	3.63	3.07	2.45	**2.05**	1.41	6.25
Cognition	14.16	10.98	5.04	4.5	3.8	3.42	3.12	**2.67**	1.96	1.37	5.10
Principles of Learning	5.01	4.59	3.13	2.78	2.54	2.32	2.16	**2.08**	0.86	0.38	2.59
Social Psychology	7.28	3.94	3.25	2.48	**2.07**	1.76	1.6	1.38	1.21	0.75	2.57
Clinical	12.41	5.88	2.82	**2.3**	1.76	1.56	1.06	0.83	0.62	0.46	2.97
I/O	5.75	3.36	2.68	**2.11**	1.67	1.43	1.23	1.01	0.76	0.45	2.05
BN	27.41	12.59	9.17	6.84	5.44	4.51	3.79	3.24	2.66	**2.1**	7.78
Mean	13.35	7.48	4.83	3.76	3.10	2.66	2.29	1.95	1.45	0.99	4.19

Note: Bolded items indicates average impact factor above 2.00; I/O, Industrial & Organizational Psychology; BN, Behavioral Neuroscience

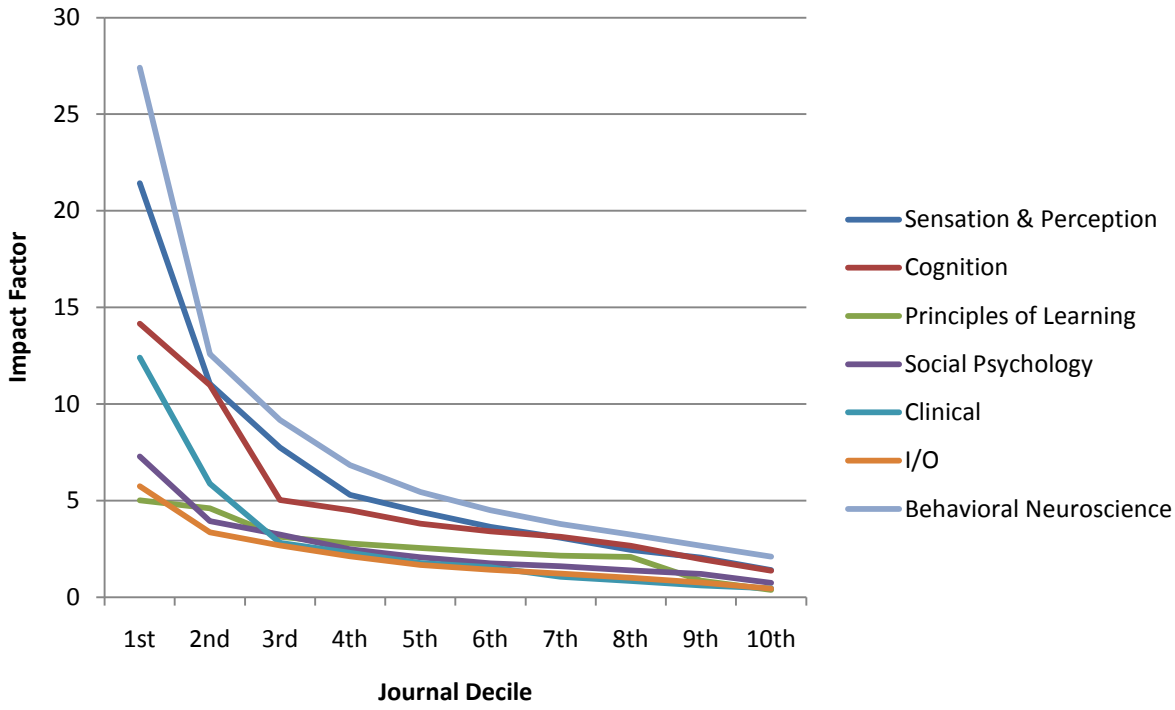

Figure 3b. Impact factor by journal deciles for seven psychology areas without multidisciplinary journals

two-way interaction with the divergence in average impact factor being highest for the first decile and quite small for the last five deciles.

Lastly, we examine differences between the seven areas of psychology using article slot deciles. When the analysis is done by article slot deciles rather than journal deciles, the findings shift substantially. Table 4a displays the two-way area x article slot decile means with the one-way areas means on the right margin and the one-way deciles means on the bottom margin. In the two-way ANOVA corresponding to this table, the r^2 for decile is .307 ($F(9, 69) = 38558.20$, $p<.0001$). Area has an r^2 of .044 ($F(6, 69) = 8316.73$, $p<.0001$). The two-way interaction between area and article slot decile has an r^2 of .116 ($F(54, 69) = 2428.47$, $p<.0001$). The surprising result of this analysis is shown in Figure 4a where Behavioral Neuroscience, which in all other analyses has been at the top, is now lower than Principles of Learning, Social

Table 4a

Average Impact Factor for each Article Slot Decile

Area	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Mean
Sensation& Perception	29.98	14.34	9.38	9.38	7.86	6.06	4.39	3.5	**2.46**	1.69	8.90
Cognition	28.1	28.1	23.41	11.1	4.9	4.17	3.6	3.17	**2.38**	1.52	11.05
Principles of Learning	28.1	28.1	27.83	7.26	4.35	2.83	2.77	2.51	**2.24**	1.45	10.74
Social Psychology	47.7	28.1	28.1	8.96	4.19	2.86	**2.17**	1.66	1.39	0.76	12.59
Clinical	13.84	9.6	5.77	**3.01**	1.98	1.61	1.18	0.79	0.46	0.31	3.86
I/O	7.85	4.13	**2.43**	1.71	1.6	1.47	1.15	0.82	0.49	0.32	2.20
NB	32.22	12.38	9.32	7.27	6.06	4.71	3.83	3.24	2.53	**2.15**	8.37
Mean	26.83	17.82	15.18	6.96	4.42	3.39	2.73	2.24	1.71	1.17	8.24

Note: Bolded items indicates average impact factor above 2.00 I/O, Industrial & Organizational Psychology; BN, Behavioral Neuroscience

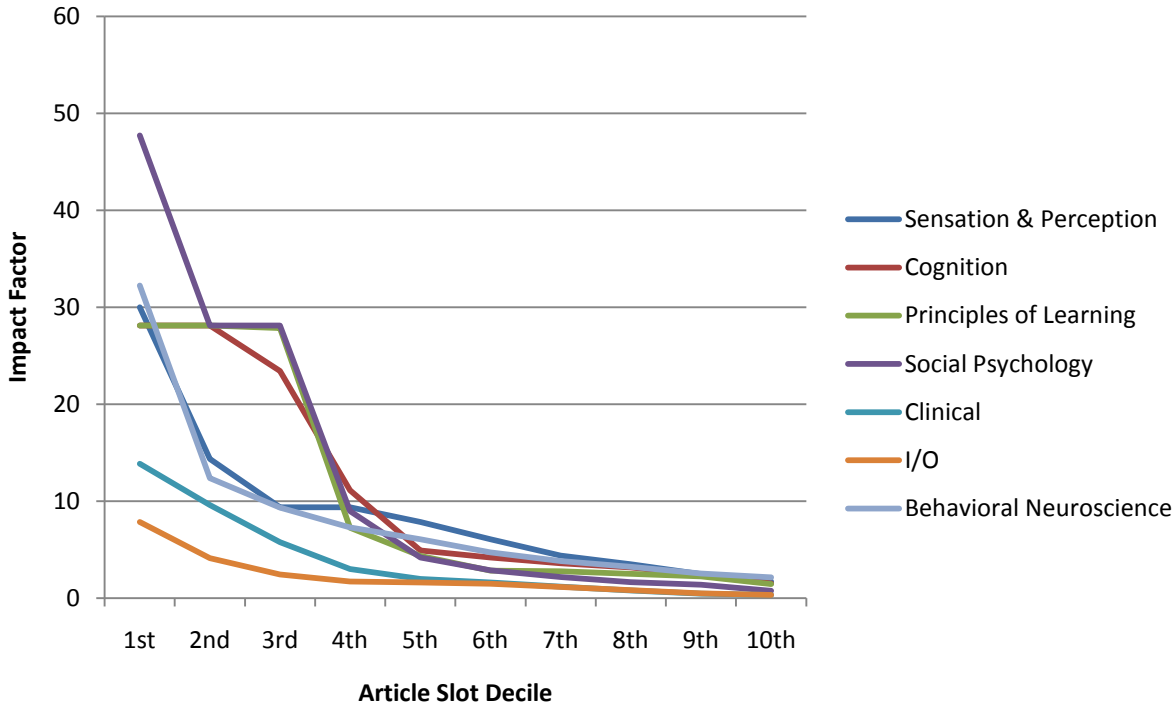

Figure 4a. Impact factor by article slot deciles for seven psychology areas

Psychology, and Cognition in the second and third deciles and is not the highest area in any of the deciles other than deciles nine and ten. This may be due to the differences between areas in the number of articles published in high vs. low impact journals. For example, if Behavioral Neuroscience had a larger number of articles published in their lower impact journals than the other areas, this would shift some of the low impact journal articles into higher deciles by article slot. To fully understand the basis for this strange turn of results would require a substantial amount of tedious investigative work and will be left to future studies.

When we remove multidisciplinary journals from the data, all of the areas drop substantially in average impact at almost every decile. The exception to this is Behavioral Neuroscience which does not drop as much as the other areas and therefore is much higher (relative to the other areas) in Figure 4b than it is in Figuer 4a. This is due to the relatively small number of article slots in Behavioral Neuroscience that are in multidisciplinary journals (4.67%) as compared with 24.43% for the other six areas on average. In other words, the other areas rely on multidisciplinary journals proportionately more than does Behavioral Neuroscience (the fundamental numbers for these analyses are given in Table 3). Much of the decile main effect in the analysis of Table 4a is washed out in the ANOVA for Table 4b, where multidisciplinary journals are removed, with r^2 decreasing from .307 to .090 ($F(9, 69) = 4846.38$, $p<.0001$). The main effect for area, on the other hand, is increased by the removal of multidisciplinary journals with the r^2 going from .044 in the ANOVA for Table 4a to an r^2 of .074 for the ANOVA for Table 4b ($F(6, 69) = 5913.97$, $p<.0001$). The interaction effect for area x article slot decile is somewhat decreased when multidisciplinary journals are removed, with r^2 going from .116 down to .079 for the ANOVA corresponding to Table 4b ($F(54, 69) = 709.09$, $p<.0001$).

Table 4b

Average Impact Factor for each Article Slot Decile Without Multidisciplinary Journals

Area	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Mean
Sensation& Perception	25.21	9.99	9.38	9.19	7.32	5.64	4.08	3.38	**2.35**	1.67	7.82
Cognition	13.87	6.52	4.27	4.04	3.49	3.37	3.01	**2.4**	1.89	1.38	4.42
Principles of Learning	5.03	4.73	3.08	2.81	2.78	2.75	2.37	2.27	**2.14**	1.11	2.91
Social Psychology	5.08	3.7	2.82	2.47	**2.02**	1.71	1.59	1.39	1.01	0.68	2.25
Clinical	13.95	9.81	5.72	3.24	**2.3**	1.75	1.56	1.06	0.79	0.52	4.07
I/O	5.49	3.7	**2.35**	1.73	1.6	1.54	1.28	0.99	0.71	0.42	1.98
BN	25.49	9.94	8.82	7.03	5.76	4.54	3.72	3.15	2.49	**2.14**	7.31
Mean	13.45	6.91	5.21	4.36	3.61	3.04	2.52	2.09	1.63	1.13	4.39

Note: Bolded items indicates average impact factor above 2.00; I/O, Industrial & Organizational Psychology; BN, Behavioral Neuroscience

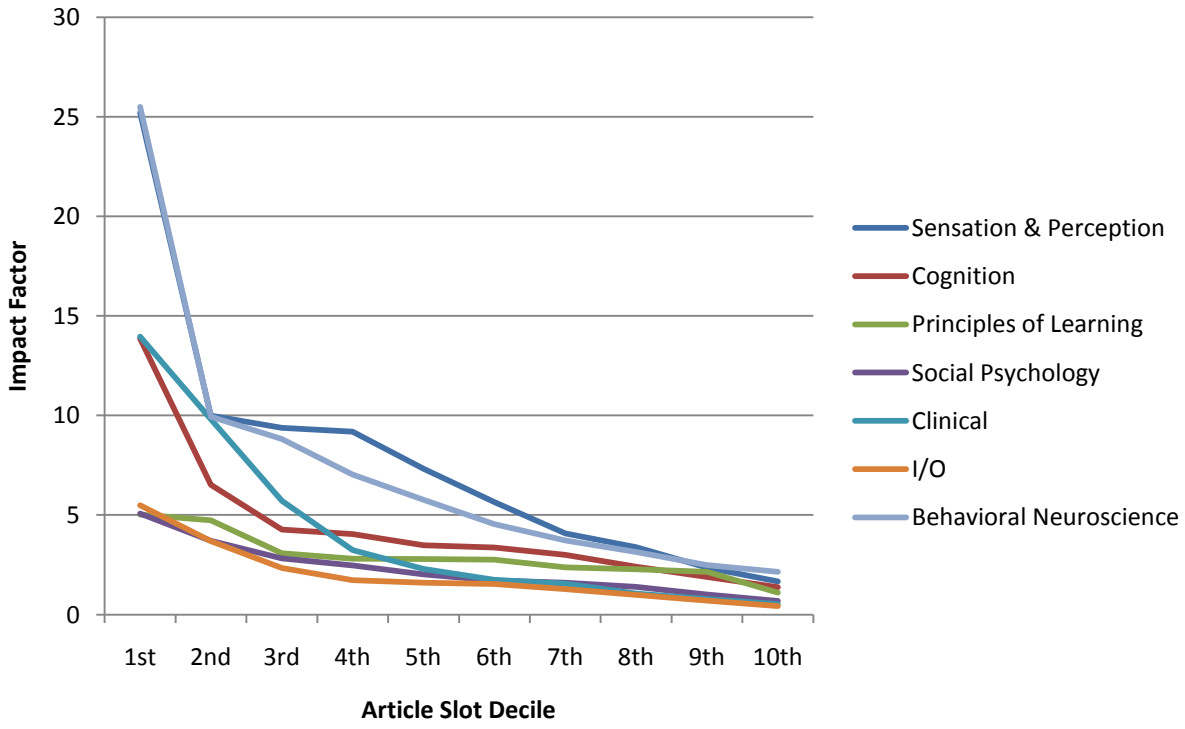

Figure 4b. Impact factor by article deciles for seven psychology areas without multidisciplinary journals.

Discussion

As proposed, journals in these seven areas of psychology have significantly different impact factor scores. Behavioral Neuroscience has the highest overall impact factor scores. Interestingly Sensation and Perception has noticeably higher impact factor scores than the remaining five areas. Behavioral Neuroscience and Sensation and Perception both share biological underpinnings. Future research could investigate whether higher impact factor scores are observed for other biologically based areas or whether this difference can be accounted for in another way.

As proposed, area of psychology and decile have a significant interactive effect upon the impact factor scores for journals. The largest differences among areas are seen in the higher deciles. In some areas it is considerably more difficult to publish in the highest impact journals. Interaction effects are also observed for article-slot based data. The surprising finding for the article slot two-way analysis is, as shown in Figure 4a and Table 4a, that Social Psychology, Cognition, and Principles of Learning have higher mean impact factors calculated in this way than does Behavioral Neuroscience. This needs to be further investigated, perhaps by carefully examining the publishing trends for journals within each area and how article slot deciles reflect these differences. Removing the multidisciplinary journals returns Behavioral Neuroscience to first place, as in previous analyses and figures, adding another piece to the puzzle.

The substantial across-area differences in all of these analyses support the idea that impact factor scores should not be used at face value to compare faculty publication records across different areas within a department. The ease in obtaining impact factors scores may make this tool appealing, but the results shown above indicate that impact factors may not be commensurate across areas of psychology.

The main limitation of this study is probably the issue of the journal lists used. Selecting journals from textbook references biases journal lists away from lower impact journals. These reference sections will of course cite the highly influential articles, which are more likely to be found among higher impact journals. The results of this study therefore apply primarily to impact factor comparisons of the most influential studies within each area, which is obviously of interest, but it is important in future studies to aim for a more complete representation of the spectrum of journals available in each area for comparison with these results.

The journal lists used in this study appear to be more representative of their specific area when multidisciplinary journals are removed. Since the methods used to select the eight multidisciplinary journals removed in supplementary analyses was conservative, future research should use more stringent methods to find and remove additional multidisciplinary journals while still maintaining those journals specific to the area.

Creating a more representative journal list specific to an area of psychology would also produce a more accurate article slot count representative of the area as a whole and better define the difficulty level for researchers to publish in their area at a given impact level. If this information were to be combined with a count of researchers within each area it could lead to a useful kind of supply and demand function.

Further research could also integrate impact factor information with additional information gathered for each journal based on submissions. Such variables could include timeliness of review (longer review times means older reference sections) and acceptance/rejection rates.

Psychology area differences can also be investigated based on the other nine bibliographic measures contained within the JCR data. For example, doing the analyses used in

this study but based on 5-year impact factors scores would potentially provide additional insights into cross-area comparisons, since the normal impact factor score favors faster disciplines. Differences found with these new results and those reported above could prove illuminating in further defining not only areas of psychology but the bibliographic measures themselves.

Analyses based on citing half-life and cited half-life would define the age and relative speed of each area. It could be particularly important to see how ranking journals based on these values would compare when looking at impact factors. Analyses based on eigenfactor scores would test whether these observations of across area differences hold up with this more modern and sophisticated approach.

Future research also needs to look at other bibliographic measures that are purported to replace impact factor scores and see how they vary across areas of psychology. Perhaps the most promising measure, the one that would be most illuminating to compare across areas of psychology, would be the h-index. This is a measurement that is based upon individual researchers' curriculum vitas and takes into account number of publications and how many citations have been made to these particular articles. This would be a substantially more time consuming study since it would involve analysis of individual curriculum vitas. Results would also obviouslybe affected by the particular vitas selected.

Overall, the methods used in this thesis can be used as a tool to check the pulse of psychology over the coming years. Not only can this research be continued with the areas outlined in this thesis but also to other areas of psychology. Longitudinal data would provide a glimpse into the ongoing development, vitality, and changing impact of various fields of psychology.

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Appendix

Table A1

Complete Journal List for Sensation and Perception With Times Cited in the Reference Section and Cumulative Percent of Cites as Based on Sensation and Perception, by E. Bruce Goldstein (2010)

Cum%	# Cited	Journal Title
8.4%	56	Science*
14.9%	44	Nature
20.1%	35	Nature Neuroscience
24.8%	31	Perception & Psychophysics
28.1%	22	Vision Research
31.0%	20	Journal of Neurophysiology
34.0%	20	Journal of Neuroscience
36.6%	17	Trends in Cognitive Sciences
38.8%	15	Neuron
40.9%	14	Journal of the Acoustical Society Of America
42.8%	13	Journal of Experimental Psychology-Human Perception and Performance
44.6%	12	Current Opinion in Neurobiology
46.3%	11	Infant Behavior & Development
47.9%	11	Journal of Cognitive Neuroscience
49.6%	11	Journal of Physiology-London
51.2%	11	Scientific American
52.7%	10	Cerebral Cortex
54.2%	10	Cognitive Psychology
55.7%	10	Perception
57.2%	10	Proceedings of The National Academy of Sciences of The United States of America
58.5%	9	Brain
59.9%	9	Psychological Review*
61.0%	8	Child Development
62.2%	8	Current Biology
63.3%	7	American Journal Of Psychology
64.3%	7	Nature Reviews Neuroscience
65.4%	7	Neuropsychologia
66.4%	7	Physiology & Behavior
67.5%	7	Psychological Science*
68.4%	6	Annual Review of Psychology*
69.3%	6	Current Directions in Psychological Science
70.1%	6	Experimental Brain Research
71.0%	6	Journal Of Vision
71.9%	6	Neuroimage
72.7%	5	Chemical Senses
73.4%	5	Journal Of Experimental Psychology-General

Cum%	# Cited	Journal Title
74.2%	5	Journal Of General Physiology
74.9%	5	Pain
75.7%	5	Visual Cognition
76.3%	4	Cognition
76.9%	4	Hearing Research
77.5%	4	Investigative Ophthalmology & Visual Science
78.1%	4	Journal of Experimental Child Psychology
78.7%	4	Journal of the Optical Society of America A-Optics Image Science and Vision
79.3%	4	Trends in Neurosciences

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Table A2

Complete Journal List for Cognition with Times Cited in the Reference Section and Cumulative Percent of Cites as Based on Cognition: Exploring the Science of the Mind, by Daniel Reisberg (2007)

Cum%	# Cited	Journal Title
15.1%	140	Memory & Cognition
21.2%	57	Journal of Experimental Psychology-General
26.9%	53	Cognition
32.7%	53	Psychological Review*
37.7%	47	Psychological Science*
42.6%	45	Cognitive Psychology
47.2%	43	Journal of Memory and Language
51.3%	38	Psychonomic Bulletin & Review
54.7%	32	Current Directions in Psychological Science
58.2%	32	Trends in Cognitive Sciences
61.0%	26	Science*
63.7%	25	Journal of Experimental Psychology-Human Perception and Performance
66.4%	25	Psychological Bulletin*
68.3%	18	Annual Review of Psychology*
70.2%	17	American Psychologist*
72.0%	17	Journal of Experimental Psychology-Learning Memory and Cognition
73.6%	15	Applied Cognitive Psychology
75.2%	15	Journal of Personality and Social Psychology
76.7%	14	Quarterly Journal of Experimental Psychology
77.7%	9	Cognitive Science
78.7%	9	Neuropsychologia
79.5%	8	Journal of Experimental Psychology-Applied
80.4%	8	Nature Neuroscience

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Table A3

Complete Journal List for Principle of Learning with Times Cited in the Reference Section and Cumulative Percent of Cites as Based on Introduction to Learning and Behavior by Russell A. Powell (2009)

Cum%	# Cited	Journal Title
10.4%	33	Journal of the Experimental Analysis of Behavior
15.8%	17	Journal of Comparative Psychology
21.1%	17	Psychological Review*
25.9%	15	Science*
30.0%	13	Journal of Experimental Psychology-Animal Behavior Processes
33.8%	12	Journal of Applied Behavior Analysis
36.9%	10	American Psychologist*
40.1%	10	Behaviour Research and Therapy
42.6%	8	Journal of Experimental Psychology-General
45.1%	8	Journal of Personality and Social Psychology
47.6%	8	Psychonomic Bulletin & Review
49.5%	6	Journal of Consulting and Clinical Psychology
51.4%	6	Psychological Bulletin*
53.3%	6	Psychological Record
55.2%	6	Journal of Abnormal Psychology
56.8%	5	Physiology & Behavior
58.0%	4	Appetite
59.3%	4	Behavior Analyst
60.6%	4	Behavior Therapy
61.8%	4	Review of Educational Research
62.8%	3	Journal of Experimental Child Psychology
63.7%	3	Learning and Motivation
64.7%	3	Pharmacology Biochemistry and Behavior
65.6%	3	Scientific American

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Journals from the Text Not Included in the List for Principles of Learning.

Cites	Journal Title	Comments
3	Behavior and Philosophy	Currently published as an e-journal, not include in the JCR

Table A4

Complete Journal List for Social Psychology with Times Cited in the Reference Section and Cumulative Percent of Cites as Based on Social Psychology, by David G. Myers (2010)

Cum%	# Cited	Journal Title
25.6%	681	Journal of personality and social psychology
33.8%	219	Personality and social psychology bulletin
40.4%	176	Journal of experimental social psychology
44.7%	114	Psychological Bulletin*
48.4%	99	Psychological Science*
51.3%	75	Journal of Applied Social Psychology
54.0%	73	European Journal of Social Psychology
56.7%	71	American Psychologist*
58.8%	56	Science*
60.6%	49	Basic and Applied Social Psychology
62.3%	46	Journal of Social issues
63.7%	37	Personality and Social Psychology Review
65.0%	33	Journal of Applied Psychology
66.1%	29	British journal of social psychology
67.1%	28	Current Directions in Psychological Science
68.0%	23	Law and Human Behavior
68.8%	22	Psychology of Women Quarterly
69.6%	22	Social Cognition
70.3%	19	Journal of Cross-Cultural Psychology
71.1%	19	Journal of Social and Clinical Psychology
71.7%	17	Annual Review of Psychology*
72.3%	17	Journal of Social Psychology
73.3%	26	Social Psychology Quarterly
73.9%	16	Psychological Review*
74.5%	15	Journal of Research in Personality
75.0%	13	Journal of personality
75.5%	13	Review of general Psychology
75.9%	12	Applied Cognitive Psychology
76.4%	12	Psychological Inquiry
76.7%	10	American Sociological Review
77.1%	10	Sex Roles
77.5%	9	Health Psychology
77.8%	9	Human Relations
78.1%	9	Organizational Behavior and Human Decision Processes
78.5%	9	Personal Relationships
78.8%	8	Advances in Experimental Social Psychology
79.1%	8	American Scientist

Cum%	# Cited	Journal Title
79.4%	8	New England Journal of Medicine
79.7%	8	Personality and Individual Differences

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Journals from the Text Not Included in the List for Social Psychology.

Cites	Journal Title	Comments
23	Journal of Abnormal and Social Psychology	renamed Journal of Abnormal Psychology in 1965
14	Journal of Social Behavior and Personality	stopped publishing in 2005
9	Perspectives on psychological science	started 2006, not covered in JCR
9	The Psychologist	official monthly publication of The British Psychological Society

Table A5

Complete Journal List for Clinical Psychology with Times Cited in the Reference Section and Cumulative Percent of Cites as Based on Current Psychotherapies, by Raymond J. Corsini (2008)

Cum%	# Cited	Titles
7.97%	31	American Psychologist*
15.68%	30	Journal of Consulting and Clinical psychology
21.08%	21	Professional Psychology-Research and Practice
25.19%	16	Archives of General Psychiatry
28.53%	13	American Journal of Psychiatry
31.36%	11	Clinical Psychology-Science and Practice
33.93%	10	Ethics & Behavior
36.50%	10	Psychological Bulletin*
38.82%	9	Psychotherapy
40.87%	8	Behaviour Research and Therapy
42.67%	7	Psychoanalytic Quarterly
44.22%	6	Behavior Therapy
45.76%	6	Journal of Marital and Family Therapy
47.30%	6	Psychological Reports*
48.59%	5	Clinical psychology ReView
49.87%	5	International Journal of psychoanalysis
51.16%	5	Journal of Clinical Psychology
52.44%	5	Journal of Counseling Psychology
53.73%	5	Journal of Humanistic psychology
55.01%	5	Psychotherapy Research
56.04%	4	American Journal of Orthopsychiatry
57.07%	4	Journal of Counseling and Development
57.84%	3	Cognitive Therapy and Research
58.61%	3	Journal of Nervous and Mental Disease
59.38%	3	psychiatric Quarterly

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Journals from the Text Not Included in the List for Clinical Psychology.

Cites	Journal Title	Comments
56	Journal of Individual Psychology	not in JCR
13	American Journal of Psychotherapy	not in JCR
11	Individual Psychologist	last published in 1979
6	International Journal of Individual Psychology	not published anymore
6	Person-Centered Journal	Last published 2006
5	Person-Centered and Experiential Psychotherapies	not covered in JCR

Cites	Journal Title	Comments
5	Psychotherapy in Private Practice	last published 1999
8	Psychotherapy: Theory Research, Practice, Training	1963-current, not in JCR
3	Humanistic Psychologist	journal of division 32, not in
3	International Gestalt Journal	bi-annual journal, not in JCR
4	Journal of Cognitive psychotherapy	not in JCR
3	Journal of Rational-Emotive and Cognitive-Behavior	not in JCR
3	South African Medical Journal	not in JCR
3	The Clinical Psychologist	quarterly publication of Div
3	The Gestalt Journal	not in JCR?

Table A6

Complete Journal List for Industrial & Organizational Psychology with Times Cited in the Reference Section and Cumulative Percent of Cites as Based on Industrial and Organizational Psychology, by Michael G. Aamodt (2010)

Cum %	# Cited	Journal Title
26.10%	261	Journal of Applied Psychology
39.20%	131	Personnel Psychology
42.40%	32	Academy of Management Journal
45.60%	32	Public Personnel Management
48.60%	30	Ergonomics
51.40%	28	Psychological Bulletin*
54.10%	27	Journal of Business and Psychology
56.10%	20	Journal of Occupational and Organizational Psychology
58.00%	19	American Psychologist*
59.90%	19	Journal of Applied Social Psychology
61.70%	18	Academy of Management Review
63.50%	18	Organizational Behavior and Human Decision Processes
65.00%	15	Journal of Personality and Social Psychology
66.20%	12	Journal of Vocational Behavior
67.10%	9	Human Performance
67.90%	8	Environment and Behavior
68.70%	8	Journal of Organizational Behavior Management
69.50%	8	Journal of Social Psychology
70.30%	8	Psychological Reports*
71.00%	7	Annual Review of Psychology*
71.70%	7	Journal of Management
72.40%	7	Journal of Organizational Behavior
73.00%	6	Human Relations
73.60%	6	International Journal of Selection and Assessment
74.20%	6	Journal of Occupational Health Psychology
74.70%	5	Human Factors
75.20%	5	Small Group Research
75.70%	5	Social Psychology Quarterly
76.20%	5	Work and Stress
76.60%	4	Academy of Management Perspectives
77.00%	4	Administrative Science Quarterly
77.40%	4	Applied Ergonomics
77.80%	4	Educational and Psychological Measurement
78.20%	4	Leadership Quarterly
78.60%	4	Perceptual and Motor Skills
79.00%	4	Professional Psychology-Research and Practice

Cum %	# Cited	Journal Title
79.30%	3	Harvard Business Review
79.60%	3	Personality and Individual Differences

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Journals from the Text Not Included in the List for Industrial & Organizational Psychology.

Cites	Journal Title	Comments
101	HR Magazine	removed
24	Applied HRM Research	sponsored by Xavier University and the International Public
18	The Industrial-Organizational	quarterly news publication of the Society for Industrial-
9	Training	magazine published by http://www.vnuemedia.com/
7	Training & Development	not covered in JCR
5	Journal of Applied Behavioral	not covered in JCR
5	Personnel Journal	became Worforce magazine
4	HR Focus	magazine for the members of the American Management
4	Journal of Police and Criminal	not covered in JCR
3	Inc.	Magazine
3	IPMA-HR News	magazine
3	Staffing Management	just started 2007, not covered by JCR

Table A7

Complete Journal List for Behavioral Neuroscience with Times Cited in the Reference Section and Cumulative Percent of Cites Foundations of Physiological Psychology, by Neil R. Carlson (2010)

Cum%	# Cited	Journal Title
7.86%	141	Journal of Neuroscience
14.15%	113	Science*
18.16%	72	Nature
21.56%	61	Proceedings of the National Academy of Sciences of the U.S.A.
24.79%	58	Brain Research
27.91%	56	Nature Neuroscience
30.97%	55	Neuron
33.82%	51	Brain
36.27%	44	Archives of General Psychiatry
38.66%	43	Biological Psychiatry
40.95%	41	American Journal of Psychiatry
42.56%	29	Physiology & Behavior
43.90%	24	Neuropsychologia
45.18%	23	Journal of Neurophysiology
46.41%	22	Trends in Neurosciences
47.58%	21	Neurology
48.75%	21	Nature Reviews Neuroscience
49.86%	20	Current Opinion in Neurobiology
50.86%	18	Annual Review of Neuroscience
51.81%	17	Neuroscience
52.65%	15	Behavioural Brain Research
53.48%	15	Cell
54.32%	15	Hormones and Behavior
55.15%	15	Neuroimage
55.99%	15	Neuropsychopharmacology
56.77%	14	American Journal of Physiology-Regulatory Integrative and Comparative Physiology
57.55%	14	Journal of Comparative Neurology
58.27%	13	Neuroreport
58.94%	12	Journal of Cognitive Neuroscience
59.61%	12	Neuroscience and Biobehavioral Reviews
60.28%	12	New England Journal of Medicine
60.95%	12	Psychopharmacology
61.56%	11	Pharmacology Biochemistry and Behavior
62.17%	11	Annals of Neurology
62.79%	11	Current Biology
63.40%	11	Endocrinology

Cum%	# Cited	Journal Title
63.96%	10	Cerebral Cortex
64.51%	10	Annals of the New York Academy of Sciences
65.01%	9	European Journal of Neuroscience
65.52%	9	Experimental Brain Research
66.02%	9	Lancet
66.52%	9	Sleep
66.96%	8	British Journal of Psychiatry
67.41%	8	JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION
67.86%	8	PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES
68.30%	8	Synapse
68.69%	7	Brain and Language
69.08%	7	Cortex
69.47%	7	Journal of Clinical Endocrinology & Metabolism
69.86%	7	JOURNAL OF PHYSIOLOGY-LONDON
70.25%	7	Nature Medicine
70.64%	7	PROCEEDINGS OF THE ROYAL SOCIETY B-BIOLOGICAL SCIENCES
70.97%	6	Journal of neurology neurosurgery and psychiatry
71.31%	6	Archives of Neurology
71.64%	6	Behavioral Neuroscience
71.98%	6	Journal of Clinical Investigation
72.31%	6	Schizophrenia bulletin
72.65%	6	Trends in Pharmacological Sciences
72.92%	5	Alcoholism-Clinical and Experimental Research
73.20%	5	Annual Review of Medicine
73.48%	5	Archives of Sexual Behavior
73.76%	5	Brain Research Bulletin
74.04%	5	Human Brain Mapping
74.32%	5	Journal of Affective Disorders
74.60%	5	Psychosomatic Medicine
74.87%	5	Trends in Cognitive Sciences
75.15%	5	Vision Research
75.38%	4	American Journal of Clinical Nutrition
75.60%	4	Annual Review of Psychology*
75.82%	4	CNS Drugs
76.04%	4	Developmental Psychobiology
76.27%	4	Experimental Neurology
76.49%	4	Human Molecular Genetics
76.71%	4	Journal of Clinical Psychiatry
76.94%	4	Journal of Endocrinology
77.16%	4	Journal of Nervous and Mental Disease
77.38%	4	Journal of Neuroendocrinology

Cum%	# Cited	Journal Title
77.60%	4	Journal of Pharmacology and Experimental Therapeutics
77.83%	4	Journal of Sleep Research
78.05%	4	Life Sciences
78.27%	4	Molecular Psychiatry
78.50%	4	Neuroscience Letters
78.72%	4	Peptides
78.94%	4	Psychological Medicine
79.16%	4	Psychological Science*
79.39%	4	Schizophrenia Research
79.61%	4	Stroke

Note: Multidisciplinary journals removed for certain analyses are marked with an *.

Journals from the Text Not Included in the List for Neuropsychology.

Cites	Journal Title	Comments
7	Journal of Comparative and Physiological Psychology	Stopped publishing in 1982, continued on as Journal of Comparative Psychology
5	Cognitive Brain Research	Stopped publishing in 2005
4	Society for Neuroscience Abstracts	Annual Meeting archive