What's Hot in Psychology?

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Suppose you are a newly minted PhD looking to make your mark in psychology. What should you study? Such decisions are usually driven by a combination of personal curiosity, mentors' influences, and happenstance. But as most of us have more scientific interests than we can realistically pursue at any given time, it couldn't hurt to try to pick a research topic strategically.

Different scientists take different approaches. Some seek out big, well-established research topics. They may thrill at the prospect of competing against other laboratories for the latest scoop, value the specialized meetings and societies that evolve around well-established topics, or appreciate that areas with a lot of research being done tend to attract steady sources of funding. Other researchers prefer to work in areas that have been neglected or are just emerging. They may be enticed by the prospect that a new discovery could revolutionize thinking on the topic or open up a whole new area of research. Whether you seek out or avoid hot topics, it's helpful to know what they are.

But what counts as a hot topic? Being good empirical scientists, we attempted to answer that question by looking at some data. Large citation databases are increasingly being used to evaluate the impact of academic journals and the productivity of individual researchers (Garfield, 1979; Monastersky, 2005). Why not apply the same approach to research topics?

When looking for hot research topics, two questions jump to mind: "Which topics have attracted other researchers?" and "Which topics have had the most impact on the scientific community?" To answer these questions, we selected a set of 178 representative topic terms[1] and analyzed their patterns of publication and citation using data from the Social Science Citation Index (SSCI) and Science Citation Index (SCI) from 1988 through 2005.[2]

A Pure Popularity Contest: What's Attracting Researchers?

To identify popular research topics in psychology, we counted the total number of articles in the SSCI for each topic term. The top 10 are listed in the top section of Table 1. The first, "research, " isn't much help in selecting a particular research topic — it tops the list as a special case, as the term appears as a topic descriptor for articles reporting or discussing research on pretty much any topic under the sun. The remaining top-10 terms indicate two strong trends. Mental health advocates and researchers will be pleased to learn that clinical research is wildly popular, as reflected in topics such as "health," "patients," "well-being," and "treatment." Development is also a popular research area, as indicated by the terms "development," "children," and "age."

Many psychological scientists identify not just with the fields indexed by SSCI, but also with fields such as biology, neuroscience, pharmacology, computer science, or engineering, which are indexed more thoroughly by SCI. To capture these broader affiliations, we repeated all analyses using the combined "SCI + SSCI" database. As can be seen in the bottom of Table 1, the most popular topics in the

combined database were similar to those in SSCI alone. Across all topics, the correlation between the number of articles in the two databases was .77.

A canny researcher might look at the data and think, “I’m not looking to follow the herd; what I want is a research topic that’s growing rapidly so I can get in on the ground floor of something big.” Unfortunately, the data do not offer many opportunities for identifying such topics. We examined the number of articles published on each topic on a yearly basis from 2000 through 2005. The relative popularity of topics was extremely stable. For both SSCI and the combined database, the correlation across topics between the two years was .99. So, surprisingly, the topics of publication in psychology have not changed appreciably in recent years. (An important caveat: Our pool of representative topics underrepresents newly emerging research areas, in which one might expect to find the largest relative growth.)

See the Cites

Popularity clearly can’t be the whole story, though. For most scientists, the reason to select a research topic and work on it is to make discoveries that impact scientific thought. One popular way to measure impact is by counting citations. For each topic, we counted the total number of citations in each database that were made to articles within that topic. We estimated the citation rate for a given topic by dividing the total number of citations by the total number of articles on the topic.[3] Articles published on topics with high citation rates, on average, are more likely to be cited than articles on topics with low citation rates. (Of course, publishing in a topic with a high citation rate is no guarantee that your articles in particular will be highly cited! In 2005, 68.7 percent of the articles in the combined database were not cited at all.)

The topics with the highest citation rates in the SSCI and the combined database are given in Table 2 (p.26). Mental health advocates and researchers can again take heart — at least as far as the results from the SSCI go. Six of the top-10 topics described clinical disorders or issues. Psychologists who also identify as neuroscientists should be happy to note the presence of “prefrontal cortex” at the top of the list and “hippocampus” a few lines down. Citation rates in the combined database reflect the stronger presences of biology and neuroscience. Only one clinical disorder, “Alzheimer’s disease,” made the top 10 (and the study of that condition is largely biologically based), whereas five other entries in the top 10 referred to components of the nervous system.

In the previous section, we suggested that selecting a topic that is rising in popularity might be a good idea — if relative popularity weren’t so stable over recent years. Similarly, a strategic researcher might try to select a topic that seems to have a growing amount of impact; that is, a topic with an increasing citation rate. Unfortunately for such a researcher, citation counts4 were just as stable over time as popularity. For both SCI and the combined database, the correlations between citation counts for 2000 and 2005 were greater than .99.

The fact that clinical topics were both popular and highly cited (at least in SSCI) might lead one to think that selecting a popular research topic is also a good way to select an impactful topic. However, note that the particular clinical topics listed in the top of Table 2 do not overlap at all with those in Table 1. The highly cited topic terms appear to refer to more specific topics and therefore include many fewer articles in their scope. Across the whole set of topics, popularity and citation rate were essentially uncorrelated (r

= .07 for the combined database, which was not statistically significant) or showed a weak negative correlation (r = -.15 for SSCI). This lack of correlation makes sense — a huge topic such as “research” encompasses so many articles that its citation rate in the SSCI (7.2) is close to the mean of all the topics (8.8). Less popular topics afford more opportunity to vary in citation rate, as illustrated in Figure 1. Why does citation rate decrease slightly with increasing popularity in the SSCI? One speculation is that some of those researchers intent on avoiding the herd and making revolutionary discoveries by focusing on less-well-studied topics have been successful — but that doesn’t explain why SSCI should differ from the combined database.

H is for… Hatfuls of Highly Cited Papers

Recently, an alternative to citation rate has been proposed for evaluating individual researchers (Hirsch, 2005; see Roediger’s April 2006 “Academic Observer” column). For an individual, h is defined such that h papers by that author have been cited h or more times. To achieve a high h, a researcher can’t just publish one or two blockbuster papers and can’t publish reams and reams of low-impact research. Instead, the researcher needs a consistent record of publishing high-impact research. A similar metric can be defined for research topics (Banks, 2006): Let h-b be defined such that for a given topic, h-b papers in that topic have been cited h-b or more times. Intuitively, h-b is somewhere between popularity (as measured by article counts) and citation rate. Empirically, in the combined database, h-b grows linearly with citation rate and as a negatively accelerated function of the number of articles. The topics with the top-10 h-b values based on the SSCI span a range of broad areas in both clinical psychology (“depression,” “symptoms,” “prevalence,” and “schizophrenia”) and cognitive psychology (“attention,” “memory,” “models,” and “performance”). In the combined database, topics with large h-b were dominated by those that had the most articles (compare the bottom of Table 3 with the bottom of Table 1).

What does it mean for a topic to have a high h-b? It means that researchers want to study that topic and that other researchers want to read the results of those studies. Not a bad heuristic for choosing a research topic. However, topics with high h-b values tend to be popular, and popular topic terms tend to be broad, so h-b may be of limited value in choosing a particular research problem.

The Bottom Line

So, after a bit of torturing, the databases gave up a few secrets. First, an answer to the question, "Which topics have attracted other researchers?" In short, the answer is "topics in clinical and developmental psychology." Second, an answer to "Which topics have had the most impact on the scientific community?" Both within the social sciences and in the broader scientific community, topics in neuroscience are consistently highly cited. In the social sciences in particular, clinical topics are also highly cited, and some topics in cognitive psychology combine popularity and impact to achieve high h-b values.

Now, back to our newly minted PhD. What can we advise? One reasonable definition of a hot topic is that it hasn't received a lot of attention — but it should. That is, we should look for topics with relatively few articles and high citation rates. In the SSCI, it turns out that the topic with the very highest citation rate has a rather modest number of articles: "prefrontal cortex." ("Psychiatric disorders" and "comorbidity" were not far behind.) In the combined database, "prefrontal cortex" was in second place, edged out on citations by "hippocampus." ("Neurons" had a slightly higher citation rate than "prefrontal cortex" but failed the few-articles criterion.) More broadly, one could plot citation rate against popularity as in Figure 1 and seek out topics in the upper-left quadrant of the graph.

Of course, any analysis of this sort is fraught with confounded variables and alternative interpretations. We saw that topic terms varied in their generality and that this influenced the number of articles that fell under the umbrella of a given term. Different subfields have different citation practices, so it is difficult to compare citation rates between topics in, say, social psychology and neuropsychology. Here, we have offered a few snapshots of the data and a few heuristics for interpreting them. Do you have a better scheme for analyzing or interpreting the data? Great! They are online at https://www.psychologicalscience.org/observer/2007/0407/whats-hot.xls.

References

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[1] Neither SSCI or SCI has a standard set of topic terms. To identify a set of topics representative of psychology, we therefore turned to PsycInfo, which has a standardized set of subject terms. We collected the 200 most frequently occurring keywords (subject terms, plus words in the title, notes, abstract, and description fields of the database record) in PsycInfo from 2000 to 2005. Synonymous descriptors (e.g. "psychoanalysis" and "psychoanalytic theory") were combined, leaving 178 unique topics.

[2] We searched for topics using the “Topic” field in Web of Science. We then recorded 1) the total number of articles on the topic; 2) the number of articles published each year on the topic; 3) the total number of times articles on the topic were cited; 4) the number of times each year articles on the topic were cited; and 5) the h-b value for the topic, as defined in the text. This was performed for the SSCI alone and for the combined SCI and SSCI.

[3] We also looked at two alternative citation measures. First, we considered the number of articles that cited a topic rather than the number of citations. For both databases, the two measures were highly correlated (SSCI: .94; combined: .93). Second, we corrected the count of citing articles for self-citation at the topic level — that is, citations from articles in a given topic to articles in the same topic. For both databases, the correlation between the corrected and uncorrected citing article counts was > .99.

[4] For this analysis, we used citation counts rather than citation rates because, over time, both the articles being cited and the articles doing the citing are changing, rendering citation rate calculations complex.