Review of General Psychology
2007, Vol. 11, No. 4, 363–380

1089-2680/07/$12.00 DOI: 10.1037/1089-2680.11.4.363

Prominent Schools or Other Active Specialties? A Fresh Look at Some Trends in Psychology

Joseph H. Spear
James Madison University

Past studies investigating trends in psychology have reported some conflicting and surprising results. This article critiques and reevaluates these reports, with a particular focus on those related to the cognitive revolution and the place of neuroscience in psychology. Based on a wide variety of indicators, the following trends are demonstrated: (a) Although cognitive psychology has grown in importance, it has not come to dominate psychology; (b) contrary to prior findings, attention to neuroscience in psychology has grown in a pattern similar to that of cognitive psychology; and (c) there are many signs that cognitive neuroscience is in the process of emergence. Trends are interpreted in light of the argument that psychology is a disunified discipline allowing for many different interests, schools, and approaches.

Keywords: trends in psychology, neuroscience, cognitive psychology, cognitive neuroscience, disunity of psychology

Psychologists are often in disagreement about the nature of psychology as a discipline, including the keys to its historical development. Indeed, what probably stands as psychology's most common and coherent self-narrative—that centered on 20th-century behaviorist and cognitive "revolutions"—has been referred to as "mythical" (Leahey, 1992), and there remains a great deal of disagreement regarding both the past and current states of the discipline. A couple of obvious signs of such disagreement include a significant literature on the question of whether or not psychology can be considered a unified discipline (see, e.g., H. T. Hunt, 2005; Katzko, 2002; Koch, 1993; Staats, 1999; Sternberg & Grigorenko, 2001) and another on attempts to measure such things as trends in research interests and the prominence of persons and research schools (see, e.g., selections in Dalton & Evans, 2004; Friman, Allen, Kerwin, & Larzelere, 1993; Robins, Gosling, & Craik, 1999; Roeckelstein, 1996; Tatman & Gilgen, 1999; Tracy, Robins, & Gosling, 2004). Questions of unity and prominence are important in any field because they reflect issues of professional identity, internal resource allocation, and public legitimacy. This is probably an important reason why historical narratives emphasizing a cognitive revolution have been popular. They provide psychology with a story of both unity and progress. Yet, perhaps because of the implications for internal resource allocation, this interpretation of psychology's history is certainly not without its detractors (e.g., Friman et al., 1993; Leahey, 1992; O'Donohue, Ferguson, & Naugle, 2003; Wyatt, Hawkins, & Davis, 1986).

Uncertainty and skepticism regarding the cognitive revolution have been sufficient to generate several empirical analyses of trends in psychology that have come to some conflicting and surprising conclusions. Friman et al. (1993), for example, found evidence that cognitive psychology has become more important in psychology in recent decades, but that its growth has not been revolutionary nor has it eclipsed other major approaches such as behaviorism and psychoanalysis. On the other hand, more recent analyses (Robins et al., 1999; Tracy et al., 2004) present evidence suggesting that

Joseph H. Spear, Department of Sociology and Anthropology, James Madison University.

This research was supported by the James Madison University Program of Grants for Faculty Educational Leaves. I thank Patrick Erwin for research assistance at early stages of this project, Jody Fagin of the James Madison University library for tireless assistance regarding database search issues, and my colleague Bethany Bryson for generous assistance with figure preparation.

Correspondence concerning this article should be addressed to Joseph H. Spear, Department of Sociology and Anthropology, MSC 7501, James Madison University, Harrisonburg, VA 22807. E-mail: spearjh@jmu.edu

cognitive psychology has become the most prominent school of psychology at the expense of behaviorism and psychoanalysis. Furthermore, and as a surprise to many, these latter reports also find little evidence of any appreciable rise in the prominence of neuroscience within psychology. The primary concern, of course, is the question of what, if any, approach currently dominates psychology. On the whole, the evidence is mixed, and based on comments following the Robins et al. (1999) study, the issue has not been clarified (see comments from Friman, Allen, Kerwin, & Larzelere, 2000; Gibson, 2000; Leighland, 2000; Martens, 2000; Martin, 2000; Robins, Gosling, & Craik, 2000; Tagler, 2000).

The current study makes two primary contributions toward the resolution of these contradictions. First, I argue that concerns about prominence and revolutions in psychology may be misplaced because they make sense only under the assumption that psychology is a unified discipline. Instead, it is probably better to proceed from the assumption that psychology is best thought of, to use Sigmund Koch's (1993) terminology, as the "psychological studies." Such a view helps to make sense out of disagreements over the current status of different approaches within psychology and the conflicting empirical findings related to those disagreements. It may render the disagreements needless in any case. Second, proceeding from these assumptions, I reinterpret, revise, and expand on the results from the most recent analyses of trends in psychology, asking specifically about the place of cognitive psychology and neuroscience. As judged by empirical trends, cognitive psychology certainly has increased in importance over recent decades, but so too has neuroscience. However, there are no indications that the changes are revolutionary or that they have resulted in a dominant approach that has eclipsed others. Rather, growth in these areas has the characteristics of new specialties that have taken their place among other existing psychological specialties.

In the following, I proceed largely through a critique and revision of assumptions, methods, and conclusion appearing in the most recent empirical analyses of general trends (Robins et al., 1999; Tracy et al., 2004). These analyses seem to show that cognitive psychology has been on the rise since the 1970s, that behaviorism has declined during this same period, and that neuroscience and psychoanalysis have been of marginal importance. These findings were based on three sets of empirical measures: (a) keyword searches in the PsycINFO database of journal articles appearing in psychology's four flagship journals (*American Psychologist, Annual Review of Psychology, Psychological Bulletin,* and *Psychological Review*); (b) the same keyword searches on dissertation abstracts listed in PsycINFO; and (c) analysis of citations from articles in psychology's four flagship journals to core journals serving four psychological schools (psychoanalytic, behaviorist, cognitive, and neuroscientific).

Given their purposes and methods, the analyses are quite strong, with each set of indicators giving a similar kind of picture. The strength of the analyses is claimed to lie in the variability of the measures used along with consistency in findings across those measures. The use of dissertation abstracts means that the results cannot be attributed to reliance on the four flagship journals, and the use of citation patterns means that the results cannot be attributed to the use of the keywords alone. Rather, "to question the trends. . .the validity of all three measures would have to be disputed" (Robins et al., 1999, p. 123). The following analysis does that and indicates the need for significantly modified conclusions.

I begin with a reappraisal of the use of psychology's flagship journals to indicate a psychological mainstream. This strategy sits uncomfortably next to a disunity view of psychology and rests on several unquestioned assumptions, including that psychology has a mainstream. A closer look at the flagship journals indicates that the attention dedicated to any particular area of psychology is very small, including that given to cognitive psychology. I then reevaluate the findings regarding the presence of neuroscience in psychology and, based on extended and revised methods of investigation, find strong evidence that attention to neuroscience has generally grown right along with cognitive psychology. Furthermore, cognitive and neuroscience approaches are not mutually exclusive, and many indicators point to the increasing importance of cognitive neuroscience. Finally, I demonstrate that patterns found in psychology dissertations are quite consistent with other results in this revised analysis. In the

end, on many different empirical measures, nothing suggests itself as a candidate for being a dominant area of psychology nor a candidate for providing a basis for unity.

Mainstream Psychology and Psychology's Flagship Journals

A central part of the Tracy et al. (2004) and Robins et al. (1999) analyses lies in their focus on psychology's four flagship journals. The reasoning behind this was that "flagship publications serve dual roles in the field: They reflect current trends, and they define an agenda for the future. Thus, a school's prominence in the flagship publications can serve as an indicator of its prominence in mainstream scientific psychology" (Robins et al., 1999, pp. 117–118). However, there are several problems with these assertions.

Whose Mainstream? The Question of Disunity

The first problem is with the notion that it is possible to speak of, let alone measure, something called mainstream psychology. This assumption is at odds with the long-standing and rather voluminous literature regarding the question of psychology's unity. Many observers are convinced that psychology is less a discipline than a multidiscipline or, even more pessimistically, an administrative label left over from turn-of-the-century experimental approaches to human behavior (Scott, 1991). The disunity argument has perhaps been most frequently and vocally taken up by Sigmund Koch, who argued that psychology is not now and is unlikely to ever become a single coherent science (e.g., Koch, 1971, 1993). In his view, psychology has always been multiparadigmatic, and the multiparadigmatic form derives from the complexity of the subject matter. Thus, for Koch, the disunity is not just a matter of immaturity that might someday be overcome at a theoretical or conceptual level. Rather, there are so many ways of conceptualizing, studying, and defining psychological phenomena that psychologists establish different and distinctive "universes of discourse" (Koch, 1993, p. 903; see also Lilienfeld, 2004; Slife, 2005).

From other points of view, Koch sounds like an optimist. Cronbach (1957, p. 671) referred to psychology as a circus, whereas Miller (1985, p. 40) seems to prefer the imagery of an "intellectual zoo." "By picking your examples carefully," he writes, "you can make psychology and psychologists out to be almost anything that pleases your fancy at the moment" (Miller, 1985, p. 41). Even looking within single departments of psychology, there is a strong perception that psychology is more and more an administrative and institutional label than one that reflects an actual disciplinary structure or domain.

> Every large psychology department is today a small college unto itself, with a faculty able to teach a little bit of everything: optics, acoustics, physiology, pharmacology, histology, neuroanatomy, psychiatry, pediatrics, education, statistics, probability theory, computer science, communication theory, linguistics, anthropology, sociology, history, philosophy, logic, and, when time permits, psychology. (Miller, 1985, p. 42)

The degree of specialization has also grown at the general institutional level as psychologists increasingly find employment with medical schools, business schools, and separate cognitive science departments (M. Hunt, 1993, p. 642). Koch (1993) has argued that "the integration, integrability, coherence, or unity of psychology. . .has been questioned in so many ways that one might raise second-order questions concerning the integrability of the critiques" (p. 903). Furthermore, concern over this point shows no sign of abating as the discussion of psychology's unity or lack thereof continues on a fairly regular basis (see, e.g., H. T. Hunt, 2005; Katzko, 2002; Staats, 1999; Sternberg & Grigorenko, 2001; two special issues of the *Journal of Clinical Psychology* [Henriques, 2004a, 2005]; special issues of the *Journal of Mind and Behavior* [Yanchar & Slife, 2000] and *Theory and Psychology* [Stam, 2000]).

Perhaps the best reason to believe that psychology lacks a mainstream and that it would be difficult to capture using a very small set of general journals is the fact that there is so much discussion and empirical study of the question. A dominant school is, in part, a dominant school because everyone pretty much agrees (at least implicitly) that it is so. When there is so much disagreement, when discussions of unity go on and on, when quantitative counts of indicators of prominence replace common knowledge, then there is no dominant school. Given this situation, it seems unlikely that any small set of

journals, no matter their character, would be able to capture what is going on in psychology.

The argument here is not that the apparent state of disunity means that there is something wrong with psychology. Concerns about it probably come from a distorted picture of the degree of unity in other disciplines (Katzko, 2002, p. 262; Lilienfeld, 2004, p. 1250; see generally Galison & Stump, 1996). Aside from that, it is perfectly possible to interpret the diversity within psychology as healthy (e.g., Slife, 2005). At the very least, however, if one wishes to measure trends in psychology, it makes sense to proceed with an image of psychology as "the psychological studies" (Koch, 1993) or perhaps more appropriately "psychological studies and practice." As such, it becomes less plausible to ask questions or provide interpretations of what kind of research dominates psychology.

Even so, taking disunity seriously does not necessarily mean that there could not be an underlying school or dominant paradigm. Disunity could be apparent at the level of subject matter, while underlying assumptions and interpretive schemes might be unified. However, there are a vast number of constituencies within psychology for which one needs to account. This presents difficulties for trying to identify a mainstream and especially for trying to determine whether or not anything in particular is most prominent within it. Tracy et al. (2004) note that it might be best to take psychology as a multi- or preparadigmatic discipline, but this observation does not inform their analysis. Rather, they proceed on the assumption that it makes sense to identify the existence of dominant schools and go on to make predictions regarding the school that is most likely to rise to dominance in psychology (Tracy et al., pp. 123–125).

What Are Flagship Trends Measuring?

Robins et al. (1999, pp. 117–128) argue that empirical measures of trends rather than personal speculation should guide professional judgments regarding what is "hot" within various fields. However, flagship journals in any discipline do more than just reflect trends. They can certainly play a part in defining agendas, but the extent of reflection is more problematic. In Erving Goffman's (1959) terms, they are arenas for the professional "front stage." As such, they provide the most likely settings for professional identities to be protected. If indeed psychology is being "cannibalized" (E. O. Wilson's, 1975 [p. 575], term) by biology or falling apart at the seams and becoming an outdated administrative label, one would not expect to find it reflected prominently in these settings. It is obvious that for many people part of psychology's recent self-interpretation includes the notion that there has been a cognitive revolution, so it is reasonable to expect to see this reflected in front stage settings. However, the deeper question is whether or not we can take this as representing psychology as a whole.

If we do not question how it is that the content of flagship publications gets shaped, then we have not assured ourselves that we are not measuring something having to do with the speculations of people inclined to contribute to those journals and those of the editors and reviewers for those journals. Perhaps the clearest case in point in this regard is the *Annual Review of Psychology,* which includes invited review essays on selected topics. If those topics are not chosen by empirical criteria, then we have done not much more than obscure the point at which speculation becomes the method for figuring out what is going on in psychology. At some level, empirical measures of trends are tapping into speculation.

These kinds of concerns were reflected in a number of follow-up comments to the Robins et al. (1999) study from psychologists who do not strongly identify with the flagship journals. Martens (2000, p. 272), for example, asks the simple question, "What about psychological practice?" He argues that excluding specific attention to applied psychology is a problem because the flagship journals do not actually serve as the central point of focus for people within clinical and applied specialties. This is particularly relevant because such a large proportion of professional psychologists identify with counseling and clinical fields. Similarly, Martin (2000) argues that the selection of journals, both the flagships and the journals used to represent neuroscience, would not likely reflect changes in the presence of neuroscientific approaches in psychology. Comments such as these make it clear that many people do not regard these flagships as their own flagships. This is to be expected if we assume a disunified psychology.

Of course, one of the justifications for using the flagships is that they consistently appear as the most frequently cited psychology journals as reported by the Institute for Scientific Information's (ISI) Journal Citation Reports (JCR; Robins et al., 1999, p. 118; Tracy et al., 2004, p. 109). Frequent citation is to be expected because the flagships will likely have the most generalized audiences. The discipline of psychology is certainly not mythical. Institutionally and organizationally it does exist, and so it will have its official organizational vehicles for communication at that level. The question is whether or not any sort of unity exists more deeply at the level of what psychologists, on the whole, actually do. In a field with a high degree of specialization, most people's attention is likely to be focused on leading journals within their own specialties, with an eye toward prestigious journals for the discipline as a whole. Simply by greater exposure, flagship journals will be likely to amass more citations. This might mean that flagship publications may be more influential in some respects, but it does not assure us that there is a mainstream that flagship publications are reflecting.

However, even the claims regarding the status of the flagships with regard to frequency of citation are questionable. A more accurate claim is that the flagships are *among* the most frequently cited journals. The same is true for journal "impact factors."[1] It is not clear at all, for any given year of the JCR, that the four flagship journals clearly stand apart from, for example, *Journal of Personality and Social Psychology* (*JPSP*), *Journal of Counseling and Clinical Psychology* (*JCCP*), or other highly cited journals (see more on this point later).

A Closer Look at Citation Patterns in Psychology's Flagships

Based on the assumption that flagship journals reflect a mainstream, one strategy that Tracy et al. (2004) and Robins et al. (1999) used was to plot the number of citations from the four flagship journals to four leading journals[2] for psychoanalytic, behavioral, cognitive, and neuroscience schools in psychology. Their results, plotted from the late 1970s, indicate increased citations to cognitive psychology and flat to declining citations to journals from the other schools. However, exactly what the results indicate is not clear for two reasons. First, the only citation patterns reported are those to journals selected as most representative of those four schools. Second, the citations were reported as raw numbers rather than percentages. In short, there is no context for evaluating their results.

If we look not at patterns for specifically selected journals but at the holistic citation patterns in the flagships, a different picture emerges that does not point to the prominence of any of the schools defined in prior analyses. As derived from JCR data, Table 1 shows the top five citing and cited journals for each of psychology's four flagship journals for 2004 with indications of consistency from 1999. Looking across both citing and cited journals, the most obvious pattern is that the flagship journals are very likely to cite themselves and each other. Aside from that, the most frequently cited journals represent the social, developmental, and clinical areas of psychology. Specifically, across all four flagships, the top five cited journals in 2004 were *JPSP* (711 citations), *Psychological Bulletin* (331), *American Psychologist* (330), *JCCP* (224), and *Child Development* (176). However, even the three area journals in this list cannot be said to dominate. They are the most frequently cited, and this is very consistent over different years, but for 2004 *JPSP, JCCP,* and *Child Development* still only accounted for 5.8% of all citations made in flagship journal articles.

Given this context, it becomes important to take a closer look at the trends in citations to journals from selected schools. Results reported by both Tracy et al. (2004) and Robins et al. (1999) do indicate a clear increase in citations

[1] A journal's impact factor is obtained by dividing the number of citations to articles in a journal over the prior 2 years and dividing it by the number of articles appearing in that journal over those 2 years.

[2] Behavioral, cognitive, and psychoanalytic journals were selected according to a methodology designed by Friman et al. (1993, pp. 659–660). The strategy included descriptive relevance of a journal's title, analysis of mission statements, a requirement that they be included in the Social Science Journal Citation Record, rankings by journal editors in each area, and the journal's impact factor. Robins et al. (1999, p. 119) chose journals for neuroscience by asking neuroscientists working with psychology departments to nominate and rank a pool of journals for prominence and relevance to psychology.

Table 1
Psychology's Flagship Journals: Top Five Citing and Cited Journals, 2004

Cited	Cited by
Psychological Bulletin	
Journal of Personality and Social Psychology[a]	*Journal of Personality and Social Psychology*[a]
Personality and Individual Differences[a]	*Psychological Bulletin*[a]
Personality and Social Psychology Bulletin[a]	*Journal of Consulting and Clinical Psychology*
Psychological Bulletin[a]	*Psychosomatic Medicine*
Journal of Applied Psychology	*Psychological Review*[a]
Annual Review of Psychology	
Journal of Personality and Social Psychology[a]	*Journal of Personality and Social Psychology*[a]
Personality and Social Psychology Bulletin	*Psychological Review*
Annual Review of Psychology[a]	*Vision Research*
Journal of Applied Psychology	*Personality and Social Psychology Bulletin*
Personality and Individual Differences	*Science*[a]
Psychological Review	
Psychological Review[a]	*Psychological Review*[a]
JEP: Learning, Memory, and Cognition[a]	*JEP: Learning, Memory, and Cognition*[a]
Behavioral and Brain Sciences[a]	*Journal of the Acoustical Society of America*
Psychonomic Bulletin & Review	*JEP: Human Perception and Performance*
Journal of Personality and Social Psychology[a]	*Journal of Personality and Social Psychology*[a]
American Psychologist	
American Psychologist[a]	*American Psychologist*[a]
Journal of Clinical Psychology	*Journal of Personality and Social Psychology*[a]
Professional Psychology: Research and Practice[a]	*Journal of Consulting and Clinical Psychology*[a]
Journal of Personality and Social Psychology[a]	*Psychological Bulletin*[a]
Personality and Individual Differences	*Child Development*

Note. *JEP = Journal of Experimental Psychology.*
[a] Also in the top five in 1999.

from the flagship journals to the leading journals for the cognitive school (*Cognitive Psychology, Cognition, Memory and Cognition,* and *Journal of Experimental Psychology: Learning, Memory, and Cognition*). However, if the raw numbers that were presented had been converted to percentages, we would have seen that these citations make up a tiny fraction of all citations made by the flagship journals. For instance, in 1995, the year that citations from flagships to cognitive journals peaked, a total of 16,727 items were cited by articles in the flagship journals, of which only 344 (2.1%) were items published in the four cognitive journals. Citations to the four cognitive journals combined account for fewer citations than *JPSP* alone (574 cites, or 3.4%). Furthermore, this same basic pattern is still evident for the most recently available data (2004). Although the growth in references to the cognitive journals is unmistakable, going from a fraction of a percentage of citations too just over 2% of citations over a period of 20 years does not count as revolutionary. Some degree of growth is certain. Prominence is another question.

Of course, one might argue that the areas represented by the most frequently cited journals are themselves likely to be dominated by the cognitive school. As of 1980, in fact, one of the formal areas of interest of *JPSP* is attitudes and social cognition. Yet if we look at the citation patterns for *JPSP* (Table 2), we do not see evidence that publications in social psychology are strongly connected to anything identifiable as the centers of attention for the cognitive school or to any school at all. Articles in *JPSP* are most likely to cite and be cited by other articles in *JPSP,* articles from other personality and social psychology journals, and the flagships (specifically *Psychological Bulletin* and *Psychological Review*). The first cognitive journals that appear in the top cited list for *JPSP* in 2004 are *Cognition & Emotion* and *Social Cognition* (not shown), appearing as the 16th and 17th most cited journals. For 2004, these cognitive journals accounted for a combined 100 of 8,008 (1.2%) citations made in *JPSP.* Furthermore, in comparison to all psychology journals, these two journals do not rank very high on impact factor. In 2004 *Cognition & Emotion* was ranked 80th (impact factor 1.84) and *Social Cognition* was ranked 154th (impact factor 1.21) among all psychology journals.

We see a similar pattern when looking at *JCCP* and *Child Development* (see Table 2). *JCCP* is most likely to cite itself, flagships, and

Table 2
Area Journals Most Cited by Flagships: Top Five Citing and Cited Journals, 2004

Cited	Cited by
Journal of Personality and Social Psychology	
Journal of Personality and Social Psychology[a]	*Journal of Personality and Social Psychology*[a]
Personality and Social Psychology Bulletin[a]	*Personality and Social Psychology Bulletin*[a]
Personality and Individual Differences[a]	*Psychological Bulletin*[a]
European Journal of Social Psychology	*Psychological Review*[a]
Journal of Consulting and Clinical Psychology	
Journal of Consulting and Clinical Psychology[a]	*Journal of Consulting and Clinical Psychology*[a]
Clinical Psychology: Science and Practice/ Journal of Clinical Child and Adolescent Psychology	*Archives of General* Psychiatry[a]
Clinical Psychology Review[a]	*Journal of Abnormal Psychology*
Addiction	*American Journal of Psychiatry*[a]
Behavior Research and Therapy[a]	*Journal of the American Academy of Child and Adolescent Psychiatry*[a]
Child Development	
Child Development[a]	*Child Development*
Developmental Psychology[a]	*Developmental Psychology*
Development and Psychopathology[a]	*Development and Psychopathology*[a]
Journal of Child Psychology and Psychiatry[a]*/Social Development*	*Psychological Bulletin*[a]
International Journal of Behavioral Development	*Monographs of the Society for Research in Child Development*[a]

[a] Also in the top five in 1999.

psychiatric journals, whereas *Child Development* is most likely to cite itself, flagships, and other developmental journals. Looking farther down the lists of cited journals (top 25, not shown), we actually find that there are two behavioral journals (*Behavior Research and Therapy,* 9th, and *Behavior Therapy,* 14th) on the list for *JCCP* but no cognitive, neuroscience, or psychoanalytic journals. This suggests that, for at least one prominent area of psychology, behaviorism is alive and well. For *Child Development,* we do find *Cognitive Development* and *Cognition* at 12th and 14th on the list, respectively. However, as with the pattern for *JPSP,* citations to these two journals account for only 1.5% of all citations in *Child Development* articles for 2004.

Thus, on the whole, the flagship journals do not appear to be dominated by any school of psychology. Based on these patterns, it might be safe to say that the flagships do represent "the entire field of psychology" (Tracy et al., 2004, p. 109), although it is perhaps better to say "the fields of the psychological studies." To the extent that flagships pay more attention to some areas of psychology than others, it seems clear that those areas are social, developmental, and clinical psychology. Yet, based on citation patterns, none of these appear to be clearly influenced by any of the four schools outlined by Robins et al. (1999) and Tracy et. al. (2004). Rather, to the extent that citations by flagship journals to journals that serve cognitive psychology have increased, the most reasonable interpretation is that cognitive psychology has arisen as a new specialty within psychology. It does not, however, appear to dominate or underlie work in other important areas of psychology. In addition, if we look at a prime journal for psychology's largest specialty areas (clinical and counseling), we find more evidence of the importance of behavioral research than of either cognitive psychology or neuroscience.

"There's More Neuroscience"

Robins et al. (1999) and many of those contributing comments on their article (e.g., Martin, 2000) were quite surprised at the lack of evidence for the rise of attention to neuroscience. Although they tried many additional searches to explore ways that the presence of neuroscience might have been missed (Robins et al., 1999, pp. 122–123), they failed to see several major problems with their analysis. One was the reliance on the flagship journals, which I have already given good reason to question. Second, with regard to the citation analysis, Robins et al. violated their own dictum of letting the empirical data speak rather than intuition.

That is, they selected neuroscience journals based on asking a fairly small number of neuroscientists within psychology departments to

nominate and rate neuroscience journals relevant to psychology. One of the core problems with this, as noted by Martin (2000), is that the journals chosen focus little on questions of human neuroscience. Indeed, none of the journals selected (*Journal of Neurophysiology, Annual Review of Neuroscience, Trends in Neurosciences, Journal of Neuroscience*) are indexed by the Social Sciences Citation Index (SSCI), and they do not appear anywhere among the most cited journals. Judging the matter empirically, the presence of neuroscience within psychology would have been represented by, for instance, the *Neurobiology of Learning and Memory* and *Neuropsychologia* (see later). Although it would muddy the analysis for now, we might also want to include *Journal of Cognitive Neuroscience,* which ranked 10th in impact factor (5.28) among journals classified as psychology journals by the ISI for 2004.

Third, the authors fail to expand their keyword analysis in one simple direction. Their primary keyword searches for identifying neuroscience used "neurosci*" or "neuropsy*" as keywords. This misses reference to the myriad existing neuro-prefixed terms. The question of whether or not our current intellectual landscape includes something called "neuroscience" or "the neurosciences" is still open. There are many terms for referencing approaches that are grounded in the study of the nervous system, and the particular truncation that was used unnecessarily eliminates a great deal that is of potential relevance.

Relatedly, very little attention was given to the emergence of cognitive neuroscience. In Robins et al. (1999), this is not mentioned at all. Tracy et al. (2004, pp. 120–121) give passing mention to the specialty but provide no analysis despite the obvious signs of its growth. These analyses barely give mention to the fact that cognitive psychology and neuroscience are hardly mutually exclusive. In fact, many observers point to a history in which the neurosciences and cognitive science are thoroughly intertwined (see, e.g., Gardner, 1985, pp. 22–23; Posner & DiGirolamo, 2000; Sperry, 1975). Furthermore, there are many indicators (both intuitive and empirical) that point to the increased prevalence of this hybrid field within psychology. Speculative judgment at this point tells many people that cognitive psychology is

Table 3
Top 10 Psychology Journals Ranked by Impact Factor and Number of Citations, 2004 (1999)

Rank 2004 (1999)	Journal title	No. of cites	Impact factor
	Journal rankings by impact factor		
1 (3)	*Annual Review of Psychology*	3,639	12.80
2 (−)	*Trends in the Cognitive Sciences*	3,580	7.99
3 (2)	*Psychological Bulletin*	15,557	7.71
4 (6)	*Monographs of the Society for Research in Child Development*	1,249	7.29
5 (5)	*Psychological Review*	12,753	7.15
6 (1)	*Behavioral and Brain Sciences*	3,926	7.13
7 (4)	*Advances in Experimental Social Psychology*	1,614	6.23
8 (76)	*Psychological Methods*	1,247	5.53
9 (7)	*American Psychologist*	9,444	5.49
10 (8)	*Journal of Cognitive Neuroscience*	5,578	5.28
	Journal rankings by number of citations		
1 (1)	*Journal of Personality and Social Psychology*	26,161	3.632
2 (2)	*Psychological Bulletin*	15,557	7.701
3 (3)	*Journal of Consulting and Clinical Psychology*	13,372	4.233
4 (9)	*Journal of Clinical Psychiatry*	12,916	4.806
5 (4)	*Psychological Review*	12,753	7.145
6 (5)	*Child Development*	12,670	3.278
7 (8)	*Journal of the American Academy of Child and Adolescent Psychiatry*	11,730	3.529
8 (6)	*Physiology and Behavior*	11,259	2.044
9 (12)	*Neuropsychologia*	9,865	3.668
10 (7)	*American Psychologist*	9,444	5.494

important, that neuroscience is important, and that in many respects these two fields go hand in hand. In general, if we take a modified look at empirical indicators of the place of neuroscience in psychology, we will likely find support for these speculations.

Citation Patterns: Impact Factors Among Psychology Journals

Once again, dropping the assumption that psychology has a mainstream and that attention should be focused on selected journals, it is worthwhile to look at overall patterns among psychology journals. Table 3 shows the top 10 (as ranked by impact factor and number of citations, respectively) psychology journals among all 425 psychology journals indexed by the ISI for 2004. Although there are some differences based on whether journals are ranked by frequency of citations or impact factors, the general pattern is rather clear and is consistent with patterns reported previously with regard to flagship citations. The four flagship journals appear as both frequently cited and high-impact journals. The only anomaly is the *Annual Review of Psychology,* which is not among the most frequently cited but does have the highest impact factor by far (12.8). We also find a number of developmental, social psychology, and clinical journals. With regard to the issue of cognitive and neuroscience, however, there is a fairly striking pattern showing that neuroscience and especially cognitive neuroscience journals are strongly represented. With regard to impact factors, three journals can easily be classified as representing cognitive and neuroscience: *Trends in Cognitive Science* (*TCS*; 2nd), *Behavioral and Brain Sciences* (*BBS*; 6th), and *Journal of Cognitive Neuroscience* (10th).[3] As for frequency of citation, *Physiology and Behavior* (8th) and *Neuropsychologia* (9th) are among the top 10 most frequently cited journals.

If we extend our view to the top 25 journals (11–25 not shown in tables), we find the same pattern continued. Several other general psychology journals appear (e.g., *Psychological Science, Journal of Experimental Psychology: General*) as do social, developmental, and clinical–counseling journals. There are also a number of neuroscience (e.g., *Neurobiology of Learning and Memory,* 12th in impact), cognitive (e.g., *Cognitive Psychology,* 15th in impact) and *Cognition,* 22nd in impact, 24th in frequency), and cognitive neuroscience (e.g., *Journal of Cognitive Neuroscience,* 20th in frequency) journals along with one behavioral psychology journal (*Behavior Research and Therapy,* 22nd in frequency).

Keeping in mind that any of the neuroscientific or cognitive journals may very well include articles relevant to the other school, there is actually quite a bit of evidence here that both cognitive and neuroscience approaches figure prominently in modern psychology. It is, however, not apparent that either of these constitutes a mainstream because a very large variety of journals are represented among psychology's top journals, including the specialties mentioned previously (social, clinical, and developmental). Also, although behavioral psychology journals are not as common as neuroscience or cognitive journals, it is not clear that behaviorism has been eclipsed.

Top Psychology Departments: Publication Outlets and Affiliations

We can also approach the same problem from the other end of the stick by finding out something about where prominent psychologists are likely to publish. Based on a ranking of psychology PhD departments from the National Research Council (NRC; Goldberger, Mahar, & Ebert Flattau, 1995, p. 371),[4] I performed location searches in the Social Sciences Citation Index to see where members of those departments have published over the last decade (1996–2005). The results, shown in Table 4, are quite consistent with the patterns found thus far. The most obvious point is that *JPSP* was by far the most common place that persons from top

[3] *TCS* and especially *BBS* are a bit ambiguous to classify. However, a look at their self-descriptions and citation patterns clearly indicates that they are both heavily oriented toward issues in cognitive and neuroscience. Details regarding journal descriptions and citation patterns are available on request.

[4] These departments were Stanford, Michigan (Ann Arbor), Yale, University of California, Los Angeles, and Illinois Urbana–Champaign. The 1995 rankings were the last available from the NRC. Although any rankings that one might find are subject to criticism on various grounds, there is little question that these departments, if not truly the top five, are at the very least among the most prestigious psychology departments.

Table 4
Top 10 Publication Outlets for the Top Five U.S. Psychology PhD Departments, 1996-2005

Rank	Journal	No. of publications
1	*Journal of Personality and Social Psychology*	194
2	*Journal of Neuroscience*	125
3	*Psychological Science*	96
4	*Journal of Cognitive Neuroscience*	75
5	*Behavioral and Brain Sciences/American Psychologist*	70
6	*NeuroImage*	66
7	*Journal of Consulting and Clinical Psychology*	65
8	*Contemporary Psychology: APA Review of Books*	64
9	*Personality and Social Psychology Bulletin*	61
10	*Behavioral Neuroscience*	60

Note. Searches were performed using the "Address" search field specifying both university and department. For example, the exact search string for Stanford was "AD=(Stanford Univ SAME Dept Psychol)".

departments published during this period. However, it is also quite apparent that faculty from these departments are very likely to be publishing in neuroscience journals, with two neuroscience-oriented journals represented in the top 10 (*Journal of Neuroscience* and *Behavioral Neuroscience*). In fact, *Journal of Neuroscience* is the second most common place to publish behind *JPSP*. At the same time, no purely cognitive journals appear in the top 10, but there are three journals that serve both cognitive and neuroscience: *BBS, Journal of Cognitive Neuroscience,* and *NeuroImage*.

A similar picture emerges if we look at the program affiliations of faculty in top psychology departments. Of the top five NRC-rated psychology departments in the United States, all have faculty that also serve as faculty in a neuroscience program or department. The same goes, of course, for cognitive science programs, with the exception that these are less likely to be degree-granting programs. Furthermore, many psychology faculty serve as faculty for both cognitive and neuroscience programs or in hybrid cognitive neuroscience programs. Table 5 shows the breakdown for the top five psychology departments.[5] As can be seen, every department has a substantial representation of faculty serving both neuroscience and cognitive science programs. In two of three departments (UCLA and University of Illinois, Urbana–Champaign), faculty in neuroscience programs outnumber those in cognitive science programs, although the differences are negligible in any case. Across the top five departments, 20% are associated with cognitive science programs, 17% are associated with neuroscience programs, 6% hold appointments as faculty for both neuroscience and cognitive science programs simultaneously, and 10% participate in hybrid cognitive–neuroscience programs. Again, cognitive psychology and neuroscience both appear to be important, but there is nothing to strongly suggest that any of these areas dominate psychology.

A Revised Database Search

Based on the patterns shown previously and given the problems in the Robins et al. (1999) and Tracy et al. (2004) keyword searches (noted previously), I decided to perform a set of revised keyword searches of the PsycINFO database. These were modeled after the methods used by Robins et al. (1999) and Tracy et al. (2004), but significantly revised. First, to ensure that I was using consistent procedures, I followed their methodology for the keyword analysis on articles in the four flagship journals, including performing keyword searches using "psychoanal*" to represent psychoanalysis, "reinforc*" and "conditioning" to represent behaviorism, "cognit*" to represent cognitive psychology, and "neuropsy*" and "neurosci*" to represent neuroscience. The only modification that I made was that, instead of recording data for every year and using a "smoothing function" (undisclosed by Robins et al., 1999, p. 122), I

[5] These calculations should be taken as imperfect. See notes in Appendix.

Table 5
Program Affiliations of Faculty from Top Five U.S. Psychology Departments

School	No. of faculty	Neuroscience program	Cognitive program	Both programs	Cognitive neuroscience
Stanford	31	8 (26%)	10 (32%)	3 (10%)	—
Michigan	105	15 (14%)	21 (20%)	0 (0%)	21 (20%)
Yale	29	8 (28%)	11 (38%)	5 (17%)	—
UCLA	91	15 (16%)	13 (14%)	3 (3%)	—
Illinois U-C	65	16 (25%)	7 (11%)	0 (0%)	10 (15%)
Total	321	55 (17%)	64 (20%)	21 (6%)	31 (10%)

Note. UCLA = University of California, Los Angeles; U-C = Urbana-Champaign.

tabulated results every 5 years, which has a similar smoothing effect. The results for these searches were nearly identical to those of the original study.[6] Given this replication, I am confident that the following citation analyses were performed in a manner consistent with the prior studies.

Next, three modifications were made to the strategy. First, rather than relying on the four flagship journals, which makes the searches too narrow, I performed searches on all peer-reviewed journal articles indexed in PsycINFO. The obvious problem, of course, is that this might now be too inclusive, capturing many things that exist only on the periphery of psychology. However, identifying a periphery can occur only if one can identify a center, and the ability to identify a center has already been challenged. Thus, the rationale is based on several points. First, as argued previously, it is not safe to assume that psychology has a stable mainstream. As such, the flagship journals just provide one set of "conversations" among those who happen to sit in the positions that most influence the intuitions of editors, reviewers, writers, and so forth. Second, any journal selection short of a large random sample would likely run into problems similar to those we confront when using the flagships. Although a large random sample would be ideal, in practical terms the complications involved in producing search specifications would be prohibitive. Third, according to the American Psychological Association (APA; 2006, p. i), PsycINFO covers publications "of relevance to psychologists." Hence, we can say that the following searches indicate, at the very least, changes in what can be considered to be relevant to psychology.[7]

The second modification was to the keyword strategy for identifying articles with neuroscience content. As noted previously, Robins et al. (1999) and Tracy et al. (2004) used the terms "neurosci*" and "neuropsy*," which has the effect of eliminating a potentially large number of connections to neuroscientific approaches in general. Therefore, I simply used the search term "neuro*" but excluded any variant of the word "neurosis," which is typically associated with psychoanalytic approaches.[8] The final modification was to add search terms to identify articles that made reference to both cognitive psychology and neuroscience ("cognit* and neuro*").

The results of the modified searches are shown in Figure 1. In general, these findings corroborate those of Robins et al. (1999) and Tracy et al. (2004) on the points regarding trends in cognitive, psychoanalytic, and behavioral psychology references. Cognitive references have indeed increased steadily over the past 55 years, with an especially sharp increase between 1965 and 1980. Psychoanalytic references, in contrast, are not as common as they used to be (although they were never very common). Behavioral psychology references peaked

[6] Results are available on request.

[7] Of course, this does not really eliminate problems of selection. Given this strategy, questions simply move to decisions about how things come to be included in PsycINFO. However, there is not much of a way around the problem except to say that I am attempting to use a broad range of empirical information, of which these searches are but a part.

[8] Specifically, these were neurosis, neuroses, neurotic*, psychoneurosis, psychoneuroses, and psychoneurotic*.

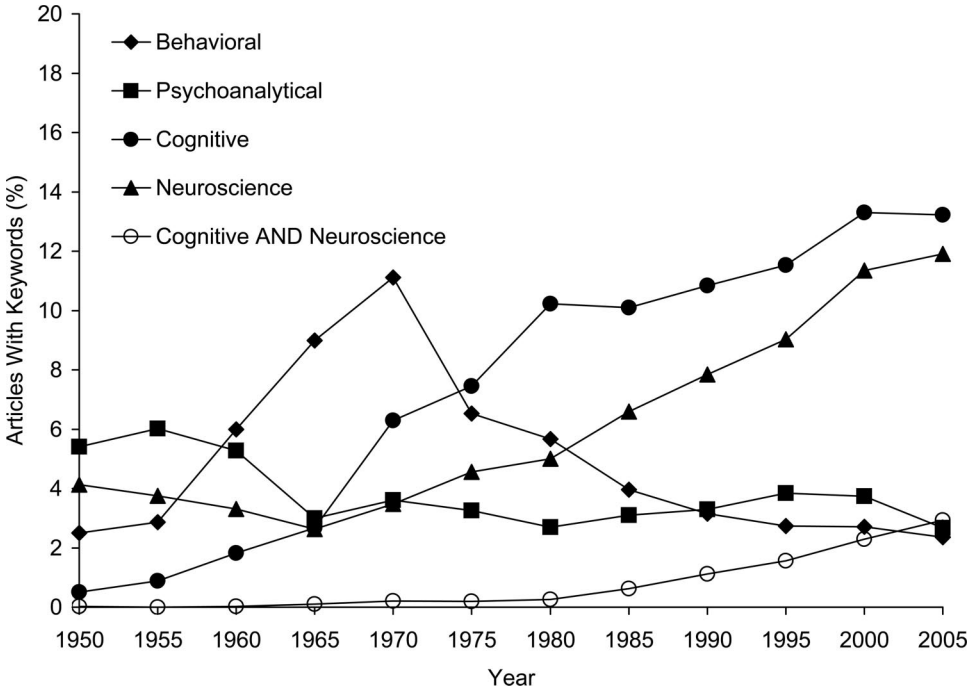

Figure 1. Keyword searches on all refereed journal articles in PsycINFO, 1950–2005.

around 1970 and have now fallen back to their 1950 level.[9]

The primary difference shown in the current results is seen in the appearance of neuroscience keywords. The search of the four flagship journals using only "neurosci*" or "neuropsy*" as keywords showed a minimal presence of neuroscience in psychology literature with only a slight rise in prominence in the last decade (Tracy et al., 2004, p. 117). The expanded journal index search using "neuro*" as the search term does show a minimal level of neuroscience references in the 1950s and 1960s. However, from 1965 onward, neuroscience references have increased steadily in a pattern quite similar to cognitive references. The only difference is that since 1965 cognitive keywords appear slightly more frequently than neuroscience keywords, and the increase in the appearance of cognitive keywords was much sharper between 1965 and 1980. However, by 2005, cognitive and neuroscience keywords appeared in very similar proportions (13.2% and 11.9% of articles, respectively). Hence, based on the results of this search alone, it appears that, although neuroscience may not be as much in the headlines of the flagship journals, it has become an area that is at least "more relevant" to psychology.

The results from the combined cognitive and neuroscience searches also show a fairly clear pattern. Prior to about 1980 the keywords for cognitive psychology and neuroscience rarely appear together, but after 1980 there is a very clear and consistent increase in their co-frequency. These results are highly consistent

[9] One finding of particular note that goes unmentioned by Robins et al. (1999) and Tracy et al. (2004) is that keywords indicating behavioral psychology do not follow an expected pattern. Both their analyses of the flagships and my analysis here show keywords for behavioral psychology increasing substantially between 1950 and 1970, peaking, and then declining. If behavioral psychology was dominant and replaced, we should expect behavioral terms to be very common throughout the period from 1950 to 1970, only declining afterward. Thus, there is more here than meets the eye, whether on searches of flagships (where the pattern is less pronounced) or in searches of all refereed journals (where the pattern is highly pronounced). Future research on trends in psychology would do well to investigate this pattern.

with the earlier observations regarding citation patterns among journals and the publication patterns and program affiliations of faculty in top departments. Thus, one of the questions that has taken up attention in prior analyses—whether cognitive or neuroscientific approaches are becoming more important to psychological analysis—could be in the process of being made moot.

There are at least two good reasons to believe that the neuroscience and cognitive neuroscience patterns are not solely artifacts of an overly inclusive search strategy. First, the patterns are not the sole result of including a great deal of literature that is only of peripheral interest or attention within psychology. Figure 2 shows the results if one runs the neuroscience and cognitive keyword searches using the PsycARTICLES database rather than PsycINFO. The PsycARTICLES database indexes a much more restrictive set of 58 core psychology journals, most of which are APA journals. The coverage only extends back as far as 1985, so searches on the entire time period are not possible, but for the period from 1985 to 2005 we see a pattern similar to that found with the PsycINFO database. The trends in the appearance of cognitive and neuroscience keywords are similar, with cognitive keywords appearing only slightly more frequently (14.7% cognitive and 11.3% neuroscience) and combined reference to cognitive and neuroscience small but increasing.

Second, one could argue that the increase in neuroscience keywords comes solely from an explosive growth in the field of neuroscience itself, along with accompanying journals, which are likely to be indexed by PsycINFO. However, growth in neuroscience journals began in earnest in the middle of the 1950s (Spear, 2006). These findings actually show a decrease in the appearance of neuroscience keywords between 1950 and 1965, with increases occurring after that time. If the trends here were solely the result of an increase in the number of existing neuroscience journals, we would expect the increases in neuroscience keywords throughout the period.

Thus, the search results based on the modified neuroscience keyword provide a dramatically different picture from that given by Robins

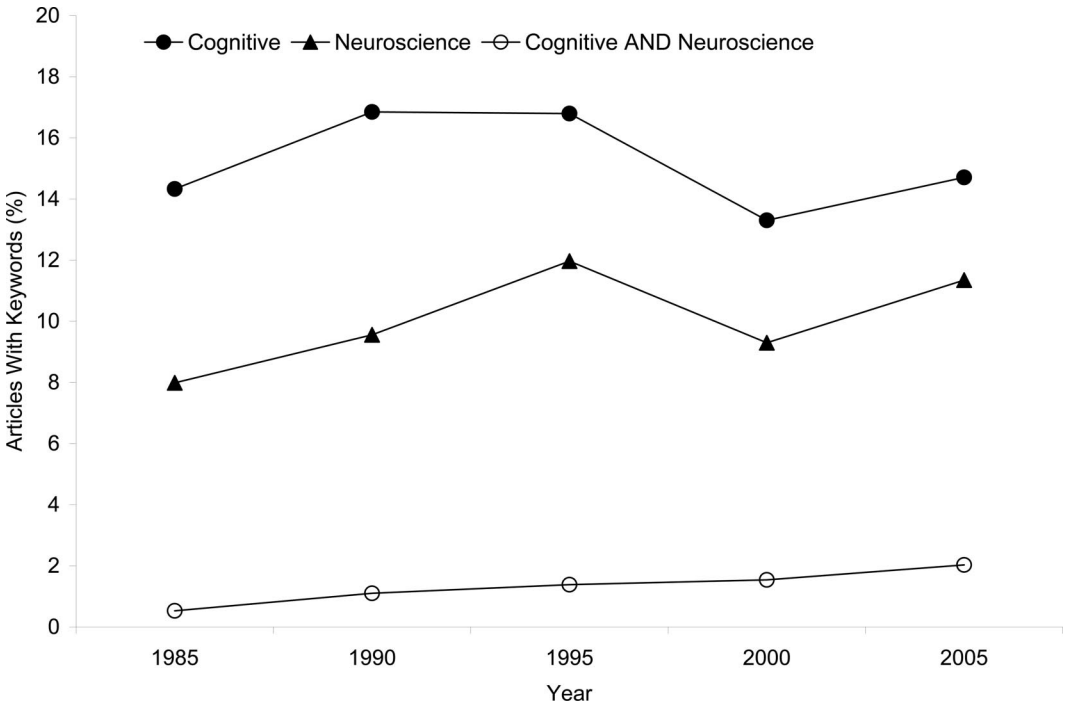

Figure 2. Keyword searches on articles in PsycARTICLES database, 1985–2005.

et al. and Tracy et al. Throughout the period from 1965 through 2005, both neuroscience and cognitive references grow at a similar pace, with neuroscience articles lagging only slightly behind since about 1985. Coupled with other data presented previously, it seems clear that both neuroscience and cognitive psychology are relatively prominent within psychology, yet neither can be said to dominate. Rather, combined with the results presented, cognitive and neuroscientific approaches in psychology appear to be new specialty areas that have arisen since the 1960s and have taken their place among other specialty areas in psychology.

Another Look at Psychology Dissertations

Another look at flagship citation patterns and keywords in psychology articles has given good reason to question many of the claims of Tracy et al. (2004) and Robins et al. (1999), but what of dissertations? Patterns found in keyword searches of dissertation titles and abstracts appeared to strengthen the argument that cognitive psychology has risen to prominence, but there are a couple of obvious points that went unnoticed in the earlier analyses. First, the patterns found in dissertation keywords for the behavioral and cognitive schools do not match up with the patterns found in journal articles. In both PsycINFO searches and citation analyses, the indicators of attention to the cognitive school continually increased over the period from 1950 to 2002, whereas for dissertations the frequency increased from 1967 to about 1973 and then leveled off through the remainder of the period. This indicates a potential problem with the reliability of these measures.

Furthermore, and perhaps more telling, at only one point (between about 1994 and 1997) did dissertations containing the cognitive keyword account for more than even 10% of all dissertations indexed by PsycINFO (see Tracy et al., 2004, p. 114). If indeed the keyword searches provide a representation of the presence of a cognitive school, then it is surely not dominant. Moreover, the pattern is not just a simple artifact of the keyword because we can find a similar flat pattern in tabulations of psychology PhDs provided by the National Science Foundation (NSF, 1992, 1997, 2006). As shown in Figure 3, PhDs in cognitive psychology have remained fairly constant from

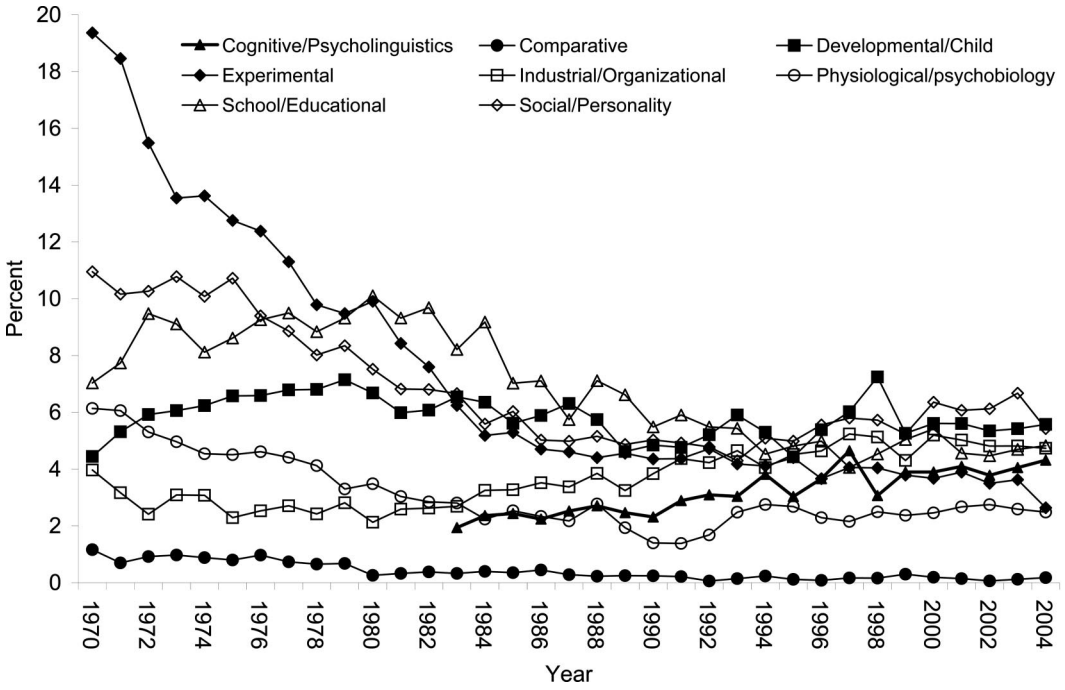

Figure 3. Psychology PhDs by specialty area, 1970–2004.

1983 to 2004 (the period since cognitive psychology was listed as a separate specialty) and hover in the range of 3% to 4% of all psychology PhDs. Whether considered as a specialty or a paradigm that underlies other specialties, these are not the kinds of patterns that one would expect to see if cognitive psychology had risen or is rising to prominence. Based on the classification of PhDs, if psychology has a mainstream, it is in the area of clinical and counseling psychology, which, since at least the early 1980s, has consistently accounted for approximately 50% or more of the psychology PhDs awarded.[10] In this case, Marten's (2000) comments about the importance of paying attention to what is occurring in psychological practice as well as the prior findings become more salient.

Once again, on closer inspection, there is little indication that there is a dominant school in psychology, whether cognitive or otherwise. This does not mean that cognitive psychology has not become more important over the past 30 to 40 years. However, there is little to suggest that its appearance was revolutionary or even that it is currently prominent.

Discussion

In general, this look at psychology leaves the impression that psychology is not really something that is dominated by a particular approach or paradigm. It is likely best to recognize that the discipline is so vast and so specialized (or fragmented) that one can find evidence for the vitality of most any of the commonly recognized fields of psychology. This should come as no surprise. Amply put by Sigmund Koch (1993),

> Psychological events are multiply determined, ambiguous in their human meaning, polymorphous, contextually environed or embedded in complex and vaguely bounded ways, evanescent, and labile in the extreme. . . .Different theorists will. . .make asystematically different cuts on the same domain. . . . The cuts. . .will in all likelihood establish different universes of discourse, even if they are loose ones. (p. 903)

Although this is not likely a position that can be given conclusive empirical support and efforts to provide some unifying theory for psychology continue in earnest (e.g., Henriques, 2004b), a disunity view does provide a sensible framework for interpreting empirical patterns in psychological research.

An assumption of disunity will also help make sense out of conflicting findings. It is possible, as Friman et al. (1993) show, to establish empirical support for the assertion that behavioral analysis is still strong in psychology. My own analysis corroborates this, especially in relation to citation patterns in clinical and counseling psychology. It is also possible, as Robins et al. (1999) and Tracy et al. (2004) demonstrate, to establish empirical support for a contrary view and to trace out signs of a cognitive revolution. We can argue about indicators, data sources, and forms of analysis, but in the end what we likely learn is that there are many ways to tell a complex story. The problem, of course, is that the outcome of this story has real and important implications for the distribution of organizational resources. If indeed every dean, every granting agency, and every department head "knows" that there has been a cognitive revolution or that a cognitive neuroscience revolution is afoot, then where does that leave the claims of those who do not identify themselves with cognitive psychology or, worse yet, those who identify with behavioral analysis? There is much at stake in how the history of psychology is told.

Thus, regardless of the unity of psychology, perhaps we should expect disagreements about trends and prominence. In this respect, I think that the picture with regard to the cognitive revolution and its skeptics lines up best with Leahey's (1991, p. 362) argument that reference to a revolution provides a good "origin myth" for many people who identify with cognitive psychology. However, it is likely a bit more generalized than that. Reference to a cognitive revolution has provided one means for psychologists, as professionals, to delineate a distinctive area of professional expertise and to describe the field in terms of progress. Every field of intellectual inquiry needs a way to claim some intellectual territory and to describe what is going on as a story of advancement, progress, and knowledge accumulation (Fuchs & Spear, 1999, pp. 28–30; Spear, 2004, pp. 59–60). If psychology's accounts of itself read as something that sounds like more of the same old stuff, then the discipline appears to be stagnant. We all need to present our professions, both to ourselves and to others, as dynamic, exciting,

[10] Clinical psychology and counseling psychology were excluded from the graph because the change in scale would obscure patterns among other specialties.

and full of new frontiers and discoveries. The cognitive revolution provides psychology with a power story. It implies that psychology is an important discipline with a domain of its own, one that is not physiology and one that is not sociology. It implies that important advancement has been made, and it may help protect psychology from becoming a branch of neuroscience despite some wishes to the contrary (e.g., Churchland, 1995; Wilson, 1975, p. 575).

This is not meant to be some critical unveiling of baseless rhetoric. Self-exemplification is a fundamental part of what all professions and organizations do when they present themselves to themselves and to their wider publics (see, e.g., Fuchs, 1993, pp. 5–13; Meyer & Rowan, 1977/1991). In other words, the notion of an origin myth is not peculiar to psychology.

By the same respect, none of this should be taken to imply that nothing happened with regard to cognitive approaches to psychology. There is an important distinction to be made between asking questions about thought processes or excluding them based on the fact that they are unobservable. Attention to the former has certainly gained in legitimacy since the 1960s. Cognitive psychology is important to modern psychology. It is just that the degree to which it has been revolutionary or prominent within psychology appears to have been intuitively and now empirically overestimated by many.

Along those same lines, concern with the brain and nervous system is also very important in modern psychology. It has been for a very long time, because it is possible to argue that "neuroscience" itself is simply a new name for the old specialty of physiological psychology (e.g., "Galambos," 1996, p. 192). However, neuroscience is not dominant either for reasons outlined previously. Even though, as Robins et al. (1999) note, "much as changed since Heidbreder (1933) described. . .the field in terms of 'seven psychologies'" (p. 117), there are probably still at least seven psychologies, if not more.

References

American Psychological Association. (2006). *2006 PsycINFO journal coverage list.* Washington, DC: Author.

Churchland, P. M. (1995). *The engine of reason, the seat of the soul.* Cambridge, MA: MIT Press.

Cronbach, L. J. (1957). The two disciplines of scientific psychology. *American Psychologist, 12,* 671–684.

Dalton, T. C., & Evans, R. B. (Eds.). (2004). *The life cycle of psychological ideas: Understanding prominence and the dynamics of intellectual change.* New York: Kluwer Academic/Plenum Press.

Friman, P. C., Allen, K. D., Kerwin, M. L. E., & Larzelere, R. (1993). Changes in modern psychology: A citation analysis of the Kuhnian displacement thesis. *American Psychologist, 48,* 658–664.

Friman, P. C., Allen, K. D., Kerwin, M. L. E., & Larzelere, R. (2000). Questionable validity, not vitality. *American Psychologist, 55,* 274–275.

Fuchs, S. (1993). Positivism is the organizational myth of science. *Perspectives on Science, 1,* 1–23.

Fuchs, S., & Spear, J. H. (1999). The social conditions of cumulation. *The American Sociologist, 30,* 21–40.

Galambos, R. (1996). Robert Galambos. In L. Squire (Ed.), *The history of neuroscience in autobiography* (pp. 178–220). Washington, DC: The Society for Neuroscience.

Galison, P., & Stump, D. J. (Eds.). (1996). *The disunity of science: Boundaries, contexts, and power.* Stanford, CA: Stanford University Press.

Gardner, H. (1985). *The mind's new science.* New York: Basic Books.

Gibson, K. R. (2000). Corroboration. *American Psychologist, 55,* 271–272. Goffman, E. (1959). *The presentation of self in everyday life.* New York: Doubleday.

Goldberger, M. L., Maher, B. A., & Ebert Flattau, P. (Eds.). (1995). *Research-doctorate programs in the United States: Continuity and change.* Washington, DC: National Academy Press.

Heidbreder, E. (1933). *Seven psychologies.* New York: Appleton.

Henriques, G. R. (Ed.). (2004a). Defining psychology: Articles and commentaries on a new unified theory (Pt. 1) [Special issue]. *Journal of Clinical Psychology, 60*(12).

Henriques, G. R. (2004b). Psychology defined. *Journal of Clinical Psychology, 60,* 1207–1221.

Henriques, G. R. (Ed.). (2005). Defining psychology: Articles and commentaries on a new unified theory (Pt. 2) [Special issue]. *Journal of Clinical Psychology, 61*(1).

Hunt, H. T. (2005). Why psychology is/is not traditional science: The self-referential bases of psychological research and theory. *Review of General Psychology, 9,* 358–374.

Hunt, M. (1993). *The story of psychology.* New York: Doubleday.

Katzko, M. W. (2002). The rhetoric of psychological research and the problem of unification in psychology. *American Psychologist, 57,* 262–270.

Koch, S. (1971). Reflections on the state of psychology. *Social Research, 33,* 669–709.

Koch, S. (1993). "Psychology" or the "psychological studies." *American Psychologist, 48,* 902–904.

Leahey, T. H. (1991). *A history of modern psychology.* Englewood Cliffs, NJ: Prentice Hall.

Leahey, T. H. (1992). The mythical revolutions of American psychology. *American Psychologist, 47,* 308–318.

Leighland, S. (2000). On cognitivism and behaviorism. *American Psychologist, 55,* 273–274.

Lilienfeld, S. O. (2004). Defining psychology: Is it worth the trouble? *Journal of Clinical Psychology, 60,* 1249–1253.

Martens, M. P. (2000). Difficulties in analyzing trends in psychology. *American Psychologist, 55,* 272–273.

Martin, G. N. (2000). There's more neuroscience. *American Psychologist, 55,* 275–276.

Meyer, J. W., & Rowan, B. (1991). Institutionalized organizations: Formal structure as myth and ceremony. In W. Powell & P. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 41–62). Chicago: University of Chicago Press. (Original work published 1977)

Miller, G. (1985). The constitutive problem of psychology. In S. Koch & D. E. Leary (Eds.), *A century of psychology as science* (pp. 40–45). New York: McGraw-Hill.

National Science Foundation. (1992). *Science and engineering doctorates: 1960–1991, Detailed statistical tables.* Washington, DC: Author.

National Science Foundation, Division of Science Resource Studies. (1997). *Science and engineering doctorate awards: 1996* (NSF 97–329). Retrieved May 18, 2006, from http://www.nsf.gov/statistics/nsf97329

National Science Foundation, Division of Science Resource Statistics. (2006, March). *Science and engineering doctorate awards: 2004* (NSF 06–308). Retrieved May 18, 2006, from http://www.nsf.gov/statistics/nsf06308

O'Donohue, W., Ferguson, K. E., & Naugle, A. E. (2003). The structure of the cognitive revolution: An examination from the philosophy of science. *Behavior Analyst, 26,* 85–110.

Posner, M. I., & DiGirolamo, G. J. (2000). Cognitive neuroscience: Origins and promise. *Psychological Bulletin, 26,* 873–889.

Robert Galambos. (1996). In L. Squire (Ed.), *The history of neuroscience in autobiography: Vol. 1* (pp. 178–220). Washington, DC: Society for Neuroscience.

Robins, R. W., Gosling, S. D., & Craik, K. H. (1999). An empirical analysis of trends in psychology. *American Psychologist, 54,* 117–128.

Robins, R. W., Gosling, S. D., & Craik, K. H. (2000). Trends in psychology: An empirical issue. *American Psychologist, 55,* 276–277.

Roeckelstein, J. E. (1996). Eminence in psychology as measured by name counts and eponyms. *Psychological Reports, 78,* 243–254.

Scott, T. R. (1991). A personal view of psychology departments. *American Psychologist, 46,* 975–976.

Slife, B. (2005). Testing the limits of Henriques' proposal: Wittgensteinian lessons and hermeneutic dialog. *Journal of Clinical Psychology, 61,* 107–120.

Spear, J. H. (2004). Cumulative change in scientific production: Research technologies and the structuring of new knowledge. *Perspectives on Science, 12,* 55–85.

Spear, J. H. (2006). *Toward a sociology of interdisciplinarity: Lessons from the sociology of science and the emergence of neuroscience.* Manuscript submitted for publication.

Sperry, R. (1975). In search of the psyche. In F. G. Worden, J. P. Swazey, & G. Adelman (Eds.), *The neurosciences: Paths of discovery* (pp. 425–426). Cambridge, MA: MIT Press.

Staats, A. W. (1999). Unifying psychology requires new infrastructure, theory, method, and a research agenda. *Review of General Psychology, 3,* 3–13.

Stam, H. (Ed.). (2000). The future of theory in psychology [Special issue]. *Theory and Psychology, 10*(1).

Sternberg, R. J., & Grigorenko, E. L. (2001). Unified psychology. *American Psychologist, 56,* 1069–1079.

Tagler, M. J. (2000). Neuroscience and mainstream psychology. *American Psychologist, 55,* 271.

Tatman, A. W., & Gilgen, A. R. (1999). Authorities emphasized in the *Annual Review of Psychology,* 1975–1998. *Psychological Reports, 85,* 89–100.

Tracy, J. L., Robins, R. W., & Gosling, S. D. (2004). Tracking trends in psychological science: An empirical analysis of the history of psychology. In T. C. Dalton & R. B. Evans (Eds.), *The life cycle of psychological ideas: Understanding prominence and the dynamics of intellectual change* (pp. 105–130). New York: Kluwer Academic/Plenum Press.

Wilson, E. O. (1975). *Sociobiology: The new synthesis.* Cambridge, MA: Harvard University Press.

Wyatt, W. J., Hawkins, R. P., & Davis, P. (1986). Behaviorism: Are reports of its death exaggerated? *Behavior Analyst, 9,* 101–105.

Yanchar, S. C., & Slife, B. D. (Eds.). (2000). The problematic of fragmentation [Special issue]. *Journal of Mind and Behavior, 21*(3).

(*Appendix follows*)

Appendix
Details and Notes for Table 5

Listings of faculty for psychology departments, cognitive science, neuroscience, and cognitive neuroscience programs were compiled using faculty lists posted at the university Web sites for the programs. The only faculty counted were core faculty from psychology departments. That is, all instructors, adjuncts, "affiliated," or otherwise part-time faculty and emeritus faculty were excluded.

The process involves some ambiguity and imprecision with regard to classifying cognitive science owing to variability in organization and labeling of programs. The most ambiguous case is the University of Michigan (see later). In general, I located the closest thing to a cognitive science program at each university. The details, including Web sites and retrieval dates, were as follows:

Stanford University (data retrieved April 15, 2006): Psychology Department: http://www-psych-.stanford.edu/people.html. Symbolic Systems Program (equivalent of cognitive science): http://symsys.stanford.edu/ssp_people?group=Faculty. Neuroscience Institute at Stanford: http://neuroscience.stanford.edu/research/faculty.html

University of Michigan, Ann Arbor (data retrieved April 15, 2006): Psychology Department: http://www.lsa.umich.edu/psych/people/directory/faculty/. Culture and Cognition (counted as cognitive science): http://www.lsa.umich.edu/psych/grad/program/affiliations/cultcog/faculty/. Cognitive Science and Cognitive Neuroscience (counted as cognitive neuroscience): http://www.lsa.umich.edu/psych/grad/program/affiliations/cscn/faculty/. Neuroscience Graduate Program: http://www.umich.edu/~neurosci/faculty/faculty.htm

Yale University (data retrieved, April 15, 2006): Psychology Department: http://www.yale.edu/psychology/faculty.html. Cognitive Science: http://www.yale.edu/yalecollege/publications/ycps/chapter_iv/cognitive_science.html. Interdepartmental Neuroscience Program: http://info.med.yale.edu/neurosci/

UCLA (data retrieved, May 17, 2006): Psychology Department: http://www.psych.ucla.edu/Faculty/. Cognitive Science Research Program: http://www-.cogsci.ucla.edu/. Interdepartmental PhD Program for Neuroscience: http://faculty.neuroscience.ucla.edu/institution/personnel-list/

University of Illinois, Urbana–Champaign (data retrieved, April 15, 2006): Psychology Department: http://www.psych.uiuc.edu/people/faculty.php Neuroscience Program: http://www.life.uiuc.edu/neuroscience/people/faculty/Beckman Institute Cognitive Science Group: http://www.beckman.uiuc.edu/directory/directoryCS.html Beckman Institute Cognitive Neuroscience Group: http://www.beckman.uiuc.edu/directory/directoryCNS.html *Note:* In the time since initial data retrieval the websites listing Beckman Institute faculty have changed. As of October 2, 2007, the Cognitive Science and Cognitive Neuroscience faculty listings are at: http://www.beckman.uiuc.edu/directory/bifaculty.php

Received November 27, 2006
Accepted February 7, 2007 ■