

Chapter 7

The American Reception of Logical Empiricism: A Mention-Based Bibliometric Analysis



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Abstract This paper supplements existing work on the development of logical empiricism with new quantitative data concerning the movement's reception in the United States. Using EDHIPHY ("Enriched Data for the History of Philosophy"), a relational database specifically designed for bibliometric research on the development of twentieth-century philosophy, we trace the impact of logical empiricism on American philosophy before and after the migration. Specifically, we make use of EDHIPHY's mention index, a catalogue of 1,095,765 mention links extracted from 22,977 full-text articles published in 12 Anglophone philosophy journals between 1890 and 1979 and conduct a comparative analysis of these mentions over time. We (1) explore the relative impact of 11 prominent representatives of logical empiricism, (2) compare the movement's reception with a number of contemporaneous philosophical schools, (3) map its evolving place in the American philosophical landscape through a series of co-mention analyses, and (4) dissect logical empiricism's reception by exploring the role of various journals and universities.

Keywords Logical empiricism · Digital humanities · Bibliometric analysis · EDHIPHY · Analytic philosophy · American philosophy · Intellectual migration

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7.1 Introduction

Logical empiricism has its origins in Europe but was most successful in the United States. It emerged from the activities of several groups of scientific philosophers in, among others, Berlin, Prague, and Vienna and became one of North America's leading intellectual currents after some of its foremost representatives—e.g. Rudolf Carnap, Herbert Feigl, Philipp Frank, Carl Gustav Hempel, and Hans Reichenbach—sought refuge across the Atlantic in the years before the Second World War. The logical empiricists and their American followers helped institutionalize philosophy of science as a stable philosophical (sub)discipline and played an important role in the development of analytic philosophy, still the dominant approach to philosophy in the United States today (e.g. Giere 1996; Stadler 2007; Richardson 2017; Dewulf 2021; Verhaegh [forthcoming](#)).

Logical empiricism's successes raise a number of questions concerning the development of mid-twentieth century American philosophy. In recent years, historians have tried to answer these through detailed studies of the movement's reception history (e.g. Hardcastle et al. 2003; Reisch 2005). They have traced logical empiricism's first encounters with American philosophers in the years before the migration (e.g. Uebel 2015, 2016; Verhaegh 2023, 2024a). They have uncovered the empiricists' activities and the responses of their new American colleagues (e.g. Jewett 2011; Limbeck-Lilienau 2012; Misak 2013; Verhaegh 2020a, b). And they have developed new, more critical perspectives on the movement's reception, noting that important elements of its original program were lost in translation (e.g. Howard 2003; Reisch 2005; Uebel and Limbeck-Lilienau 2022). While Carnap is one of the most-discussed philosophers in the analytic tradition, much of his program appears to have been misunderstood by his American students and critics (Richardson 1998; Friedman 1999). Other currents within the logical empiricist movement, most notably the perspectives of Frank and Neurath, were altogether ignored by the analytic mainstream (Tuboly 2020; Reisch and Tuboly *ms.*).

As yet, most work on logical empiricism's reception is based on literature study and archival research. These methods are well suited to conduct relatively fine-grained analyses but are less useful if one seeks to map logical empiricism's place in American philosophy more broadly. While close reading and archival research allow historians to develop detailed reconstructions of the activities of (small networks of) philosophers and the evolution of specific concepts, theories, and debates, they have limitations when one seeks to investigate bigger-picture claims. Historians can only analyze relatively small sets of publications and documents and are thus forced to examine this period through a magnifying glass, making it difficult to establish to what degree their sources are representative of the broader philosophical conversation (cf. Braat et al. 2020, 2).

This paper aims to supplement existing work on the development of logical empiricism with new quantitative data concerning the movement's reception in the United States. Using EDHIPHY (“Enriched Data for the History of Philosophy”), a

relational database specifically designed for bibliometric research on the development of twentieth-century philosophy (Petrovich et al. 2024), we trace the impact of logical empiricism on American philosophy before and after the migration. Specifically, we make use of EDHIPHY's mention index, a catalogue of 1,095,765 mention links extracted from 22,977 full-text articles published in 12 Anglophone philosophy journals between 1890 and 1979 and conduct a comparative analysis of these mentions over time. We (1) explore the relative impact of 11 prominent representatives of logical empiricism, (2) compare the movement's reception with a number of contemporaneous philosophical schools, (3) map its evolving place in the American philosophical landscape through a series of co-mention analyses, and (4) dissect logical empiricism's reception by focusing on the role of various journals and universities.

Before we proceed, a warning is in order. The aim of this paper is not to present a *competing* method for the study of the reception of logical empiricism. Nor is it our ambition to refute or verify existing perspectives on the development of twentieth-century philosophy. Though bibliometric analyses may help confirm or challenge received views and hidden assumptions, mention statistics alone do not suffice to overturn or validate qualitative historical research. Citations and mentions are useful but imperfect proxies for intellectual influence such that detailed historical knowledge remains needed to both generate and interpret the data. EDHIPHY was developed in close collaboration with historians of twentieth-century American, German, and French philosophy (see acknowledgements) and many of the choices we had to make in selecting, cleaning, disambiguating, and interpreting the data were informed by existing research. It is better, therefore, to view the present study as an attempt to infuse prevailing discussions with new data, allowing historians to explore different types of questions and generate new research ideas. Quantitative methods do not *replace* traditional approaches, they offer logical empiricist scholars an additional tool, helping them explore the movement's reception through a new, wide-angle lens.

7.2 Mention Extraction and Analysis

Bibliometric analyses of academic corpora typically rely on *citations* in mapping connections between scholars, publications, ideas, journals, and institutions. Citations are (relatively) standardized references to outside publications and thus an ideal tool to explore links between large numbers of books and articles. Unfortunately, citations are not useful instrument to study mid-twentieth-century philosophy. Academic papers from this period typically include few standardized citations and there are severe technical limitations to extracting them on a large scale. Up until the

1980s, very few articles included a list of references and most journals allowed different citation styles, sometimes even within a single paper or issue.¹

EDHIPHY relies on an alternative method to map and analyze links between scholars and institutions in philosophy. While articles published before 1980 typically include few bibliographic citations, they usually *mention* dozens of philosophers, scientists and other persons of interest. Moritz Schlick’s “Meaning and Verification” (1936), for example, does not include a single standardized reference but mentions dozens of people, including Richard Avenarius, P. W. Bridgman, Rudolf Carnap, Albert Einstein, David Hume, Immanuel Kant, C. I. Lewis, Ernst Mach, John Stuart Mill, Bertrand Russell, Arthur Schopenhauer, Herbert Spencer, Hans Vaihinger, and Ludwig Wittgenstein. Some of these philosophers and scientists are mentioned more than others (Lewis 23 times, Mill just once) indicating their varying importance to Schlick’s argument. EDHIPHY includes mention data of 22,977 articles published in 12 Anglophone philosophy journals between 1890 and 1979 and can be used to (1) generate detailed mention statistics of specific philosophers and journals, (2) track broad changes in mention behavior over time, and (3) generate networks of co-mention relations to identify clusters of philosophers and scientists who are frequently mentioned together.

In building EDHIPHY, we developed a procedure to extract mentions from our corpus of full-text articles.² In short, we combined four existing databases—including a list of philosophers in WikiData—to create a dictionary of 44,376 philosophers. This dictionary was used as an entity ruler to identify which combinations of strings in the full-text articles potentially refer to a philosopher.³ In addition, we created a list of 139,623 aliases (3.7 variants per philosopher on average) and added them to our dictionary to increase the probability of finding matches. Rudolf Carnap, for example, has five aliases in EDHIPHY, including ‘R. Carnap’, the common misspelling ‘Rudolph Carnap’, and simply ‘Carnap’ to make sure that the most common variants are picked up by the extraction algorithm.

The next step of the process was to develop a procedure to *disambiguate* mentions. For while it may be obvious to a historian that Schlick meant to refer to Clarence Irving Lewis in mentioning “Lewis” on page 347 of “Meaning and Verification”, our extraction algorithm is unable to determine which of the 28 philosophers named ‘Lewis’ in the dictionary he was referring to. In order to disambiguate such mentions, we used a series of strategies. One of these strategies searches for unambiguous mentions elsewhere in the paper and assigns the

¹An exploratory investigation of a random sample of 80 articles published in *Journal of Philosophy* and *Philosophical Review* between 1921 and 1960 (five articles per journal per decade) reveals that a fifth of the publications does not include a single bibliographic citation. Not one of the articles in the sample included a bibliography or list of references.

²The full-text articles were obtained from JSTOR through its Data for Research service (Burns et al. 2009). A Python script was used to clean the documents and prepare them for mention extraction. This script i.a. corrects small OCR errors, removes page numbers, rejoins words split by a line break, and eliminates author names (which would otherwise count as mentions).

³See Petrovich’s et al. (2024) for a more detailed description of the extraction procedure.

corresponding philosopher to all ambiguous mentions containing the same string of letters. Because Schlick unambiguously mentions “C. I. Lewis” on page 343 of his paper (and none of the other ‘Lewises’ in the dictionary), all 23 mentions of ‘Lewis’ in the paper are linked to Clarence Irving Lewis. Another strategy makes use of co-mention frequencies. Even though Schlick never specifies whether the string ‘Spencer’ is a reference to ‘Herbert Spencer’ or to any of the other philosophers named Spencer in our dictionary, one can still determine that ‘Herbert Spencer’ is by far the most likely option if we take into account (1) the other, unambiguously mentioned philosophers in the article and (2) the co-mention frequencies between the different ‘Spencers’ and all other philosophers in the corpus. Combined, these and two other strategies helped us to successfully link 93% of the mentions to specific philosophers, with an estimated reliability of 82–91%.⁴

The present paper uses a subset of EDHIPHY to generate mention statistics and co-mention networks concerning the reception of logical empiricism in American philosophy. Concretely, we limit our study to the 10,190 articles published in six American journals—*Journal of Philosophy*, *Philosophical Review*, *The Monist*, *Philosophical Studies*, *Philosophy and Phenomenological Research*, and *Philosophy of Science*—between 1921 and 1979.⁵ In addition to mention data, we will use two sets of additional data that are also included in EDHIPHY: (1) A list of 8,940 American philosophy dissertations including information about author, university, and year of completion; (2) A list of 559 philosophy hires at the assistant, the associate and the full professor level at 11 prestigious philosophy departments (Berkeley, Chicago, Columbia, Cornell, Harvard, Michigan, Pennsylvania, Princeton, Stanford, UCLA, and Yale) between 1930 and 1970.⁶ This additional data is used to group mention statistics by author affiliation (analysis 4).

7.3 Analysis 1: Eleven Logical Empiricists

Figure 7.1 presents the mention statistics of 11 philosophers, logicians and scientists commonly associated with the logical empiricist movement: A. J. Ayer, Gustav Bergmann, Rudolf Carnap, Herbert Feigl, Philipp Frank, Carl Gustav Hempel, Otto Neurath, Karl Popper, Hans Reichenbach, Moritz Schlick, and Alfred Tarski. It displays the number of total mentions to each of the 11 empiricists (top graph), the number of distinct articles mentioning them at least once (middle graph), and the

⁴The reliability of the links was estimated through a manual assessment of a random sample of one thousand mentions. See Petrovich et al. (2024) for a description of the two other disambiguation strategies and the reliability test.

⁵Occasionally, we will compare the US and the British contexts. In these analyses we also make use of the British journals in the database: *Analysis*, *Mind*, *Philosophical Quarterly*, *Philosophy*, and *Proceedings of the Aristotelian Society*. Note that not all journals had been founded in 1921, such that analyses of different decades will be based on different sets of journals.

⁶<http://www.proquest.com>; Strassfeld (2020).

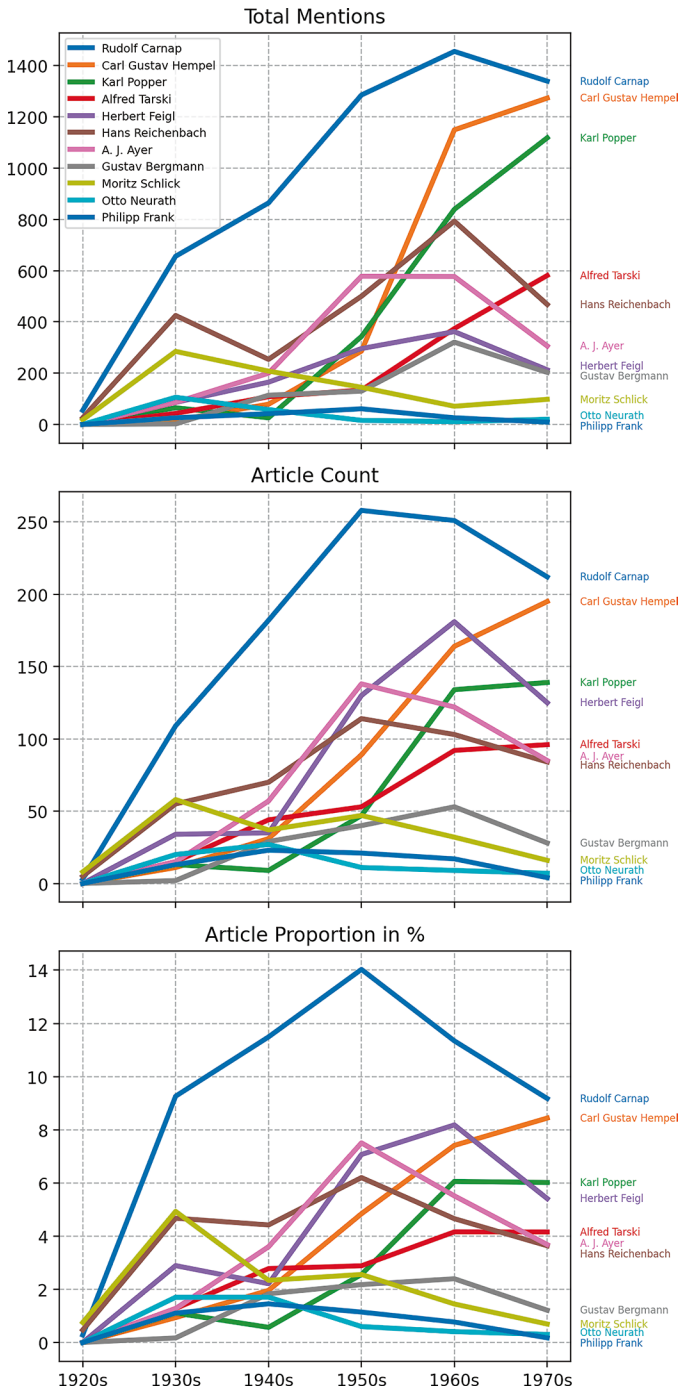


Fig. 7.1 Mention statistics of 11 logical empiricists in American philosophy journals by decade, displaying (a) total number of mentions, (b) number of distinct mentioning articles, (c) proportion of distinct mentioning articles

proportion of mentioning articles mentioning them at least once (bottom graph) between the 1920s and the 1970s, thereby offering three measures to estimate their relative impact and to track shifts in their influence over time.⁷

The three graphs reveal that Carnap was the most-mentioned logical empiricist in every decade between 1930 and 1980. Likely, this will not be a surprise given the impact of his *Der Logische Aufbau der Welt* (1928) and *Logische Syntax der Sprache* (1934) as well as the influence of the so-called Carnap-Quine debate in the development of analytic philosophy. More remarkable is the magnitude of Carnap's influence. At the height of his fame in the 1950s, a stunning 14.1% of all articles in our six American journals mention Carnap at least once (with an average of 5 mentions per mentioning article). His impact is also impressive if we compare it to the other logical empiricists. In the 1940s, approximately 42% of all mentions connected to one of the aforementioned logical empiricists were mentions of Carnap.

Reichenbach is, overall, the second most-mentioned logical empiricist between 1921 and 1950, reflecting the influence of his work in the philosophy of physics, probability, and the popularity of textbooks such as *Experience and Prediction* (Reichenbach 1938). His influence starts to decline after his untimely death in 1953 and his second-place position is taken over by Ayer, whose numbers more than double in the 1950s, echoing the impact of, among others, his notorious *Language, Truth, and Logic* (Friedman 1999). Even more remarkable is the growth of Feigl's influence. His mention numbers quintuple between the 1940s and the 1960s, making him the second-most mentioned logical empiricist of the latter decade (in terms of distinct mentioning articles). Feigl's impact likely reflects his prominent role in debates about meaning, scientific realism, and the mind-body problem as well as his active role in the production of anthologies (Feigl and Sellars 1949; Feigl and Brodbeck 1953) and editor of volumes of the *Minnesota Studies in Philosophy of Science* series (e.g. Feigl and Scriven 1956).⁸ By the 1970s, Hempel becomes the second most-mentioned logical empiricist, just before Popper, Feigl, and Tarski, demonstrating the growing importance of these second-generation logical empiricists. As yet, little work has been done on the American reception of Popper and Tarski, whose numbers continue to grow in a period when references to other second-generation logical empiricists (e.g. Feigl, Ayer, and Bergmann) start to decline, suggesting that there is an interesting story to tell about the reception of their work.

⁷The number of total mentions is equal to or greater than the total number of distinct mentioning articles because articles can mention a philosopher more than once. Schlick, for example, is mentioned 825 times in 198 distinct articles, meaning that he is mentioned 4.17 times per mentioning article on average.

⁸The growth of Feigl's mention numbers is less impressive if we focus on total mentions. This is likely an effect of the popularity of his aforementioned anthologies. These are mentioned in many distinct articles but are rarely discussed in-depth. In the 1960s, Feigl's is mentioned just twice per mentioning article while Reichenbach averages almost 8 mentions per mentioning article in the same period (see footnote 7).

While Fig. 7.1 displays some (perhaps) unanticipated results concerning the magnitude of Carnap’s influence (in the 1940s and 1950s) and the reception of Popper, Feigl, and Tarski (in the 1960s and 1970s), it confirms existing work on the marginalization of the perspectives of Neurath and Frank, who appear to have played little to no role in American philosophical debates (see Sect. 7.1). Figure 7.2 presents the proportion of references to each of the 11 logical empiricists as a percentage of the combined number of mentions and shows that both Frank and Neurath received no more than 1% of these mentions each. Figure 7.3, finally, displays the proportion of mentions of each of the 11 logical empiricists in five *British* journals of philosophy (see footnote 5), showing that the two were (almost) equally ‘unpopular’ in the United Kingdom. A comparison of Figs. 7.2 and 7.3, finally, reveals that country of residence was an important factor in logical empiricism’s reception in the Anglophone world. Ayer and Popper (both based in the UK) receive a much larger share of the mentions in British than in American journals. The converse holds for Carnap, Feigl, Hempel, Reichenbach, and Bergmann (all based in the US).⁹

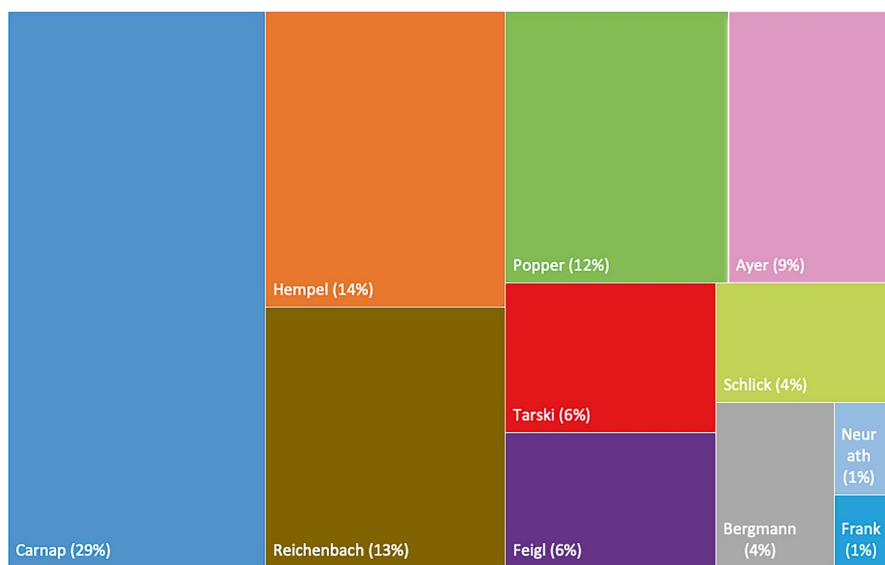


Fig. 7.2 Proportion of mentions (article count) of 11 logical empiricists in American philosophy journals between 1921 and 1979

⁹Considering this last conclusion, one may expect Friedrich Waismann to have done rather well in the UK, too. This is incorrect. Waismann received fewer mentions than Neurath, both in British and in American journals.

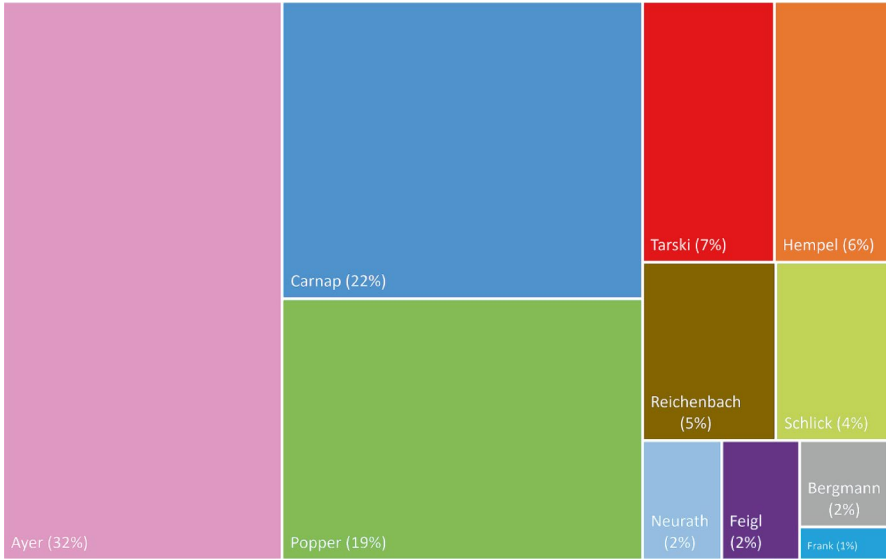


Fig. 7.3 Proportion of mentions (article count) of 11 logical empiricists in British philosophy journals between 1921 and 1979

Table 7.1 Most-mentioned contemporary authors (article count) in American philosophy journals by decade

	1921-30	1931-40	1941-50	1951-60	1961-70	1971-79					
James	242	Whitehead	254	Dewey	314	Dewey	290	Wittgenstein	307	Quine	376
Russell	209	Dewey	239	Whitehead	253	Russell	286	Quine	273	Davidson	294
Bergson	177	Russell	213	Russell	240	Carnap	258	Russell	252	Wittgenstein	227
Whitehead	146	James	179	James	226	Whitehead	209	Carnap	251	Carnap	212
Dewey	146	Einstein	157	Carnap	182	James	179	Feigl	181	Harman	197
Santayana	131	Bergson	141	Bergson	145	Quine	168	Moore	171	Hempel	195
Einstein	130	Santayana	123	C. I. Lewis	138	Moore	167	Ryle	167	Frege	191
Bradley	118	Bradley	120	Husserl	126	C. I. Lewis	163	Hempel	164	Chisholm	183
Bosanquet	113	C. I. Lewis	118	Peirce	126	Wittgenstein	161	Strawson	151	Russell	177
Spencer	98	Carnap	109	Santayana	116	Peirce	156	Dewey	144	Strawson	168
Royce	90	Peirce	100	Moore	116	Einstein	141	Whitehead	143	Goodman	156
Broad	64	Wittgenstein	87	Einstein	110	Ayer	138	Goodman	142	Putnam	154
Alexander	62	Eddington	81	Mead	81	Feigl	130	Einstein	137	Hintikka	151
Eddington	61	Lovejoy	78	Heidegger	75	Bergson	119	Popper	134	W. Sellars	150
Morgan	55	Bosanquet	73	Nagel	72	Reichenbach	114	Black	130	Kripke	146
Holt	51	Husserl	70	Reichenbach	70	Ryle	111	Frege	130	D. Lewis	142
Wundt	48	Moore	68	Bradley	69	W. Sellars	111	W. Sellars	126	Popper	139
Lovejoy	46	Mach	65	Morris	65	Broad	109	Ayer	122	Feigl	125
Croce	46	Royce	61	Wittgenstein	62	Santayana	107	James	119	Lehrer	125
Mach	45	Bridgman	61	Broad	61	Black	105	Maxwell	119	Black	123

7.4 Analysis 2: Philosophical Movements

Carnap was not just one of the most-mentioned logical empiricists. Table 7.1 lists the top-20 most-mentioned contemporary philosophers and scientists per decade (article count), revealing that he was among the most influential academics in

American philosophy more generally.¹⁰ He enters the top ten of most-mentioned authors in the 1930s and is firmly located within the top five in the four subsequent decades. Nor is he the only logical empiricist to be included in this list. Feigl, Reichenbach, Ayer, Popper, and Hempel are included in several decades, as are some of the young American philosophers—e.g. Ernest Nagel and Charles Morris—who played a role in the promotion of their work in the United States.

Since most logical empiricists only emigrated to the United States in the late 1930s, their omnipresence in U.S. philosophical discussions is a remarkable achievement. If we compare the reception of Carnap, Reichenbach, Feigl and Hempel to other well-known philosophers who sought refuge in the United States—Theodor Adorno, Hannah Arendt, and Herbert Marcuse (Fig. 7.4)—the differences

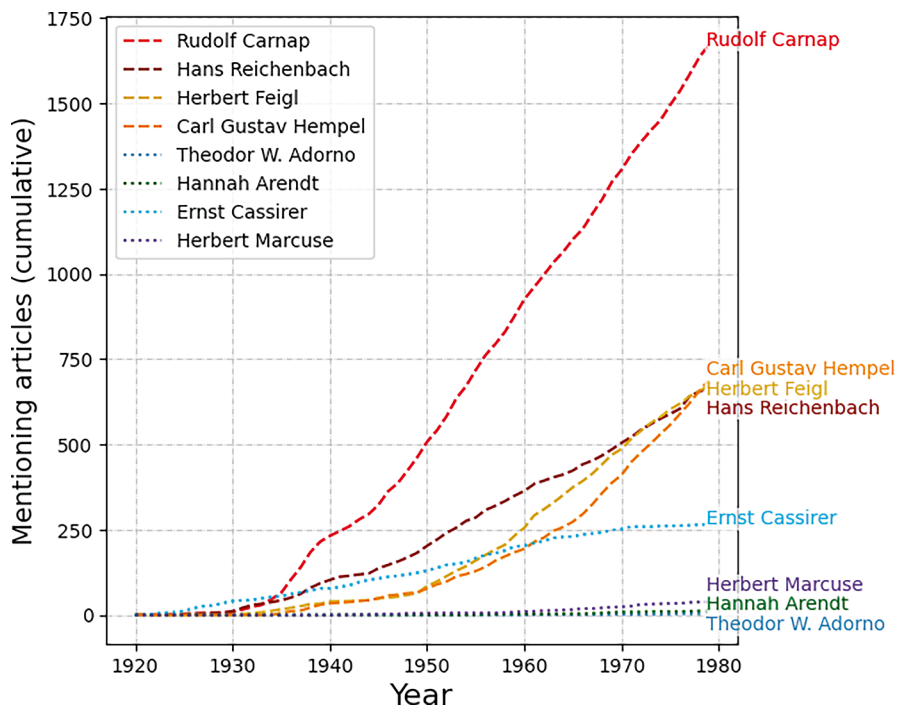


Fig. 7.4 Cumulative mentions (article count) of eight European migrants

¹⁰Table 7.1 only includes academics who were alive on or born after January 1, 1901, excluding historical figures such as Hume and Hegel. If we had included them, James would have been the fourth most-mentioned philosopher of the 1920s, after Kant (335 mentions), Plato (286), and Aristotle (270). In addition, Ullin Place and Richard J. Blackwell were removed from the top lists of the 1920s and 1970s respectively because their rankings are the result of incorrect mention identifications. Most occurrences of the string ‘Blackwell’ are actually references to the publisher; most occurrences of the string ‘Place’ are actually uses of the English term ‘place’. See Petrovich et al. (2024) for a detailed discussion of the incidence of false positives in EDHIPHY.

are striking. Only Ernst Cassirer had a reception comparable to, e.g. Feigl and Reichenbach, up until his death in 1945. In the 1940s, approximately 20% of all articles published in six American journals mention at least one logical empiricist. A decade later, when the movement was at the peak of its influence, this number grows to about one in three.

Table 7.1 can also help suggest developments that paved the way for the reception of logical empiricism. While American philosophers appear to have largely ignored logical empiricists in the 1920s (see Fig. 7.1), the list of most-mentioned authors in this period reveals that debates about the foundations of relativity theory (e.g. Albert Einstein and Arthur Eddington) and psychology (e.g. Wilhelm Wundt, E. B. Holt, and C. Lloyd Morgan) significantly affected the development of US philosophy (cf. Verhaegh 2024a, b). Bertrand Russell, well known for his work in logic and the foundations of mathematics as well as the promotion of “scientific philosophy” in his 1914 Harvard Lectures, is one of the most-mentioned philosophers in 1920s and 1930s. As was A. N. Whitehead, who was best-known for the *Principia Mathematica* and his work in philosophy of science up until 1924, when he accepted a position at Harvard.¹¹ Within philosophy proper, several representatives of the Cambridge school of analysis—e.g. C. D. Broad, G. E. Moore, and Ludwig Wittgenstein—are included in the list of most-mentioned philosophers. All these philosophers and scientists had direct or indirect ties with the logical empiricists, which may help explain why the US was fertile soil for their perspective and approach.

Finally, Table 7.1 can help us estimate when and to what degree certain (competing) schools and movements played a role in American philosophy. Several prominent representatives of the (British) idealist movement—e.g. F. H. Bradley, Bernard Bosanquet, Josiah Royce, and Benedetto Croce—are among the most-mentioned philosophers of the 1920s but their mention numbers rapidly decline in subsequent decades. Something similar applies to classic American pragmatists such as William James, C. S. Peirce, and John Dewey. Much has been said about the decline of pragmatism in the wake of the analytic turn, but these numbers can help estimate when and to what degree this happened.¹² Figure 7.5 offers a preliminary way to visualize some of these effects. It compares the total mentions of the top-3 most-mentioned pragmatists, British analysts, idealists, logical empiricists, U.S analytic philosophers, and Bergsonists/phenomenologists and tracks the growth and/or decline of these proportions over time.¹³ In addition to the decline of the classical pragmatist

¹¹ After the publication of *Process and Reality*, Whitehead also became known for his metaphysics, which makes it more difficult to interpret his mention statistics from the 1930s onwards.

¹² Rorty (1995) and Misak (2013) represent various perspectives on the development of pragmatism. We will return to this issue in analysis 3 below.

¹³ Depending on the decade, these top 3s include James, Santayana, Dewey, Peirce, and C. I. Lewis (pragmatism), Russell, Wittgenstein, Moore, Broad, Ryle, and Strawson (British analytic philosophy), Bradley, Bosanquet, Royce, and T. H. Green (idealism), Carnap, Reichenbach, Schlick, Tarski, Hempel, and Feigl (logical empiricism), Quine, Stevenson, W. Sellars, Goodman, Davidson, and Harman (American analytic philosophy), and Bergson, Husserl, Hartmann, Heidegger, and

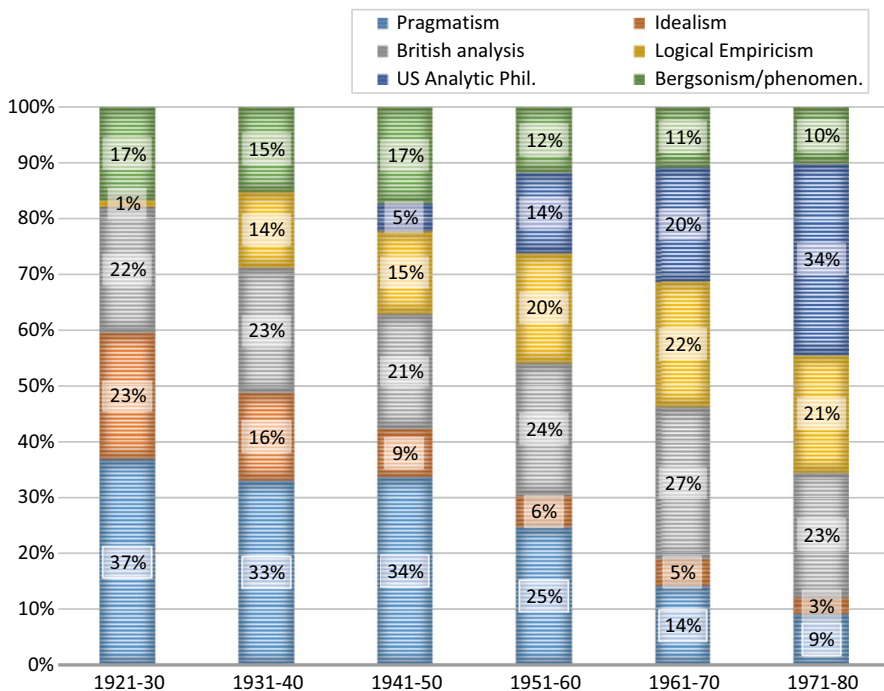


Fig. 7.5 Proportion of mentions of pragmatists, idealists, British analysts, logical empiricists, American analytic philosophers, and Bergsonists/phenomenologists by decade based on the top-3 most-mentioned philosophers of each movement per decade

and idealist movements, this figure showcases the explosive growth of American analytic philosophy from the 1940s onwards. Logical empiricism, on the other hand, encompasses a rather stable proportion of mentions between the 1950s and the 1970s, despite or perhaps because of the rapid growth of the analytic movement.

7.5 Analysis 3: Co-mention Networks

While Fig. 7.5 can help us track the development of various school and movements, it makes use of external, historically contentious labels such as ‘pragmatism’ and ‘idealism’ to group philosophers together. Such school labels are problematic since (1) there is no clear-cut, generally agreed upon definition of when someone does or does not qualify as a ‘phenomenologist’ or ‘logical empiricist’, (2) they are

Sartre (Bergsonism/phenomenology). We excluded Whitehead from these top-3 s since it is difficult to disentangle references to Whitehead qua logician and Whitehead qua process philosopher. See footnote 11. We also excluded Ayer because he played a prominent role in debates about logical empiricism and British analytic philosophy more generally.

relatively inflexible, making it difficult to do justice to philosophers whose work is associated with various approaches in different periods of their careers (e.g. A. J. Ayer or Richard Rorty), and (3) they fail to incorporate shifts in meaning regarding these labels themselves. ‘Analytic philosophy’, for example, meant something different when Nagel wrote “Impressions and Appraisals of Analytic Philosophy in Europe” (1936) than it did when Robert Ammerman published *Classics of Analytic Philosophy* (1965).

An alternative method to map connections between philosophers is to track their *co-mention* relations. Since there are many more articles that mention both Hempel and Nagel than articles mentioning both Hempel and Sartre (even though Nagel and Sartre have comparable mention numbers), one can conclude that the former were perceived to be doing more similar work than the latter. A co-mention *network* visually represents co-mention relations between all mentioned authors in a corpus and clusters them into groups of authors who are frequently mentioned together. Co-mention networks, unlike school labels, do not rely on external classifications, they are multi-dimensional because they represent a philosopher’s relation with every other author in a community, and they are sensitive to historical shifts because one can track developments within a corpus by comparing co-mention networks representing distinct periods of publication. Figures 7.6, 7.7, 7.8 and 7.9 present co-mention networks of the (approximately) top-200 most-mentioned authors in American philosophy in four decades: the 1920s, the 1930s, the 1950s, and the 1970s. Each node in these networks represents a particular philosopher or scientist, the sizes of the nodes represent their mention numbers (article count), and the location of each node reflects the co-mention distance between the author and all other authors in the network.¹⁴

Figure 7.6 presents a co-mention network of the American philosophical literature in the 1920s. It is divided into five clusters. The largest cluster is a group of mostly Anglophone philosophers located on the left (the blue cluster). This group is sandwiched between a red cluster comprising mostly German-speaking philosophers and a green cluster comprising mostly logicians and scientists. Philosophers associated with the pragmatist and realist traditions (e.g. Dewey, James and Santayana) are located near the logicians and the scientists in the green cluster, while philosophers commonly associated with the idealist tradition (e.g. Bradley, Bosanquet, and Royce) are nearer to the German philosophers in the red cluster.¹⁵ C. I. Lewis and Whitehead are some of the only philosophers located within the green cluster (positioned on the border between the blue and the green cluster),

¹⁴The networks are generated by VOSviewer. See Waltman et al. (2010) and Van Eck and Waltman (2010) for expositions of VOSViewer’s mapping and clustering algorithms. In all maps, we used the default clustering resolution (1.0). The minimum cluster size was set to 20. Authors whose inclusion is mostly the result of incorrect mention identifications (footnote 10) were removed.

¹⁵Not all these names are visible in Fig. 7.6 which presents a screenshot of the network. A complete interactive version of the network can be accessed via the link in the Figure caption. The same applies to Figs. 7.7, 7.8 and 7.9 below. Some of the clusters in the online networks have different colors but they are the same in every other respect.

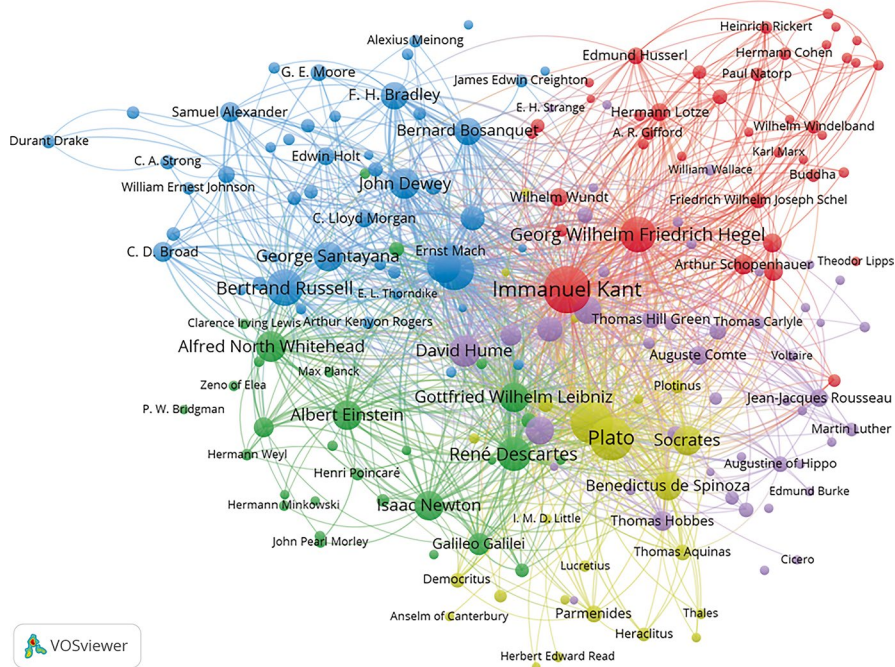


Fig. 7.6 Co-mention network of most-mentioned philosophers 1921–1930. (Complete interactive network available at <https://tinyurl.com/2chlfo78>)

reflecting their contributions to the development of symbolic logic and debates about the philosophical implications of relativity theory. The yellow and purple clusters, finally, contain mostly historical figures and historians of philosophy. The yellow cluster contains mostly ancient and medieval philosophers, the purple cluster mostly (early) modern philosophers.

Figure 7.6 presents the American philosophical landscape before the intellectual migration. Figure 7.7 presents a co-mention network of the 1930s and can be used to study how the rise of logical empiricism changed U.S. philosophy. The philosophers and scientists in the network are divided into roughly the same groups, except for the two historical clusters which have merged into a single cluster. Yet we can clearly detect an expansion of the green cluster, which now comprises a substantial group of scientists, logicians, *and* philosophers, including all logical empiricists (i.e. Carnap, Reichenbach, Schlick, Feigl, and Neurath).¹⁶ Interestingly, this network also comprises (a) (former) Cambridge analysts who contributed to the development of mathematical logic (e.g. Russell, Whitehead, and Ramsey) but *not* their Cambridge colleagues who relied on a more ordinary language approach (e.g. Moore and Broad); (2) pragmatists who defended an anti-psychologist perspective

¹⁶Again, not all these names are visible in Fig. 7.7. See footnote 15.

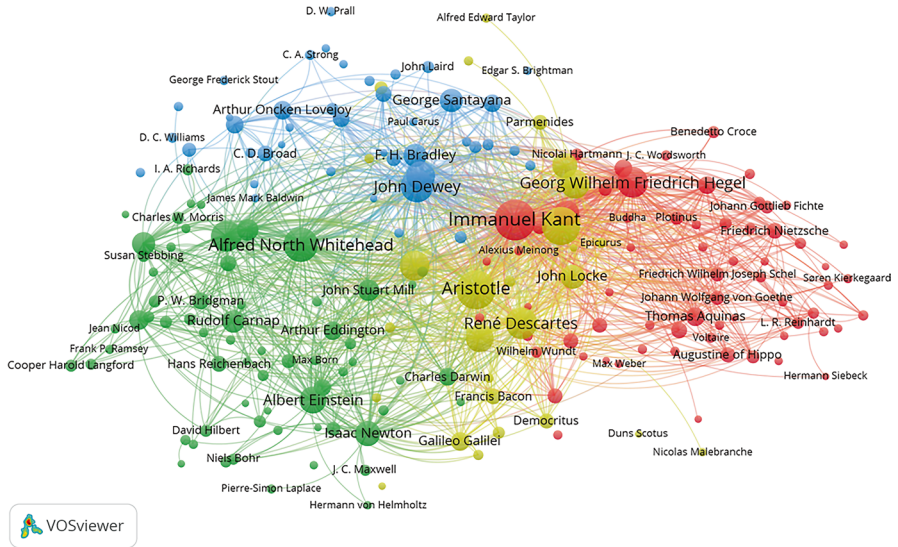


Fig. 7.7 Co-mention network of most-mentioned philosophers 1931–1940. (Complete interactive network available at <https://tinyurl.com/2y59rt7q>)

on logic and used formal tools in their research (e.g. Peirce and Lewis) but not their more naturalistically oriented colleagues (e.g. Dewey, James, and Santayana); and (3) representatives of a new generation of American philosophers who were interested in scientific philosophy and semiotics (e.g. Nagel and Morris) but not their contemporaries who advocated a different approach (e.g. D. C. Williams and A. E. Murphy). The division between the blue and green cluster, in sum, cuts across now common labels such as ‘pragmatism’ and ‘analytic philosophy’, suggesting that the divide between formal/anti-psychologistic and non-formal/naturalistic philosophy played a more significant role at the time.

Figure 7.8 portrays the American philosophical landscape in the 1950s. The logical empiricists are still located in a (green) cluster comprising mostly scientists, logicians, and philosophers of science but most other philosophers (including Lewis, Wittgenstein, and Whitehead) have ‘moved backed’ into the region where most Anglophone philosophers are located. This region is now split into two distinct groups: a blue cluster comprising mostly analytic philosophers (e.g. Quine, Moore, and Sellars) and a turquoise cluster including an amalgam of non-analytic American philosophers—e.g. process philosophers such as Paul Weiss and Charles Hartshorne, naturalists such John Herman Randall Jr. and Roy Wood Sellars as well as some major figures in the history of American philosophy (e.g. James, Peirce, and Royce). Bergman and Reichenbach are firmly positioned within the green cluster, while Carnap and Feigl are located near the edge, close to e.g. Russell and Quine, reflecting their role in discussions in analytic philosophy proper (e.g. the Carnap-Quine debate about analyticity and Feigl’s contribution the philosophy of mind).

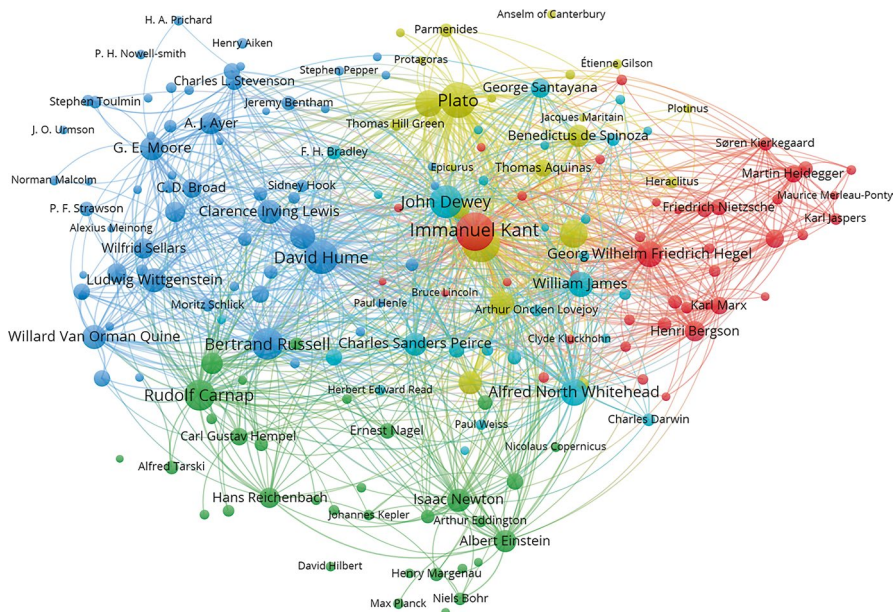


Fig. 7.8 Co-mention network of most-mentioned philosophers 1951–1960. (Complete interactive network available at <https://tinyurl.com/2ax79cbn>)

The gradual separation between philosophy of science and philosophy proper is even more evident in Fig. 7.9, which presents the American landscape in the 1970s. In this period, analytic philosophy has come to play such a dominate role that all four clusters contain philosophers working in the analytic tradition. While historical figures (e.g. Aristotle and Hume) and representatives of various schools of American (e.g. James and Dewey) and continental philosophy (e.g. Husserl and Heidegger) were located in separate clusters up until the 1950s, not even the combination of the three is sizeable enough to form a separate cluster by the 1970s. The three groups are cramped together into one (red) cluster which also contains a variety of analytic ethicists and political philosophers (e.g. Nozick, Hampshire, Feinberg, and Rawls). The blue cluster comprises mostly technical analytic philosophers who contributed to logic, metaphysics, and philosophy of language (e.g. Davidson, Geach, Hintikka, David Lewis, and Quine), while the turquoise cluster comprises mostly analytic philosophers with a less technical approach, including most ordinary language philosophers (Austin and Ryle) as well as various epistemologists and philosophers of mind and action (Anscombe, Gettier, and Malcolm). Within the green cluster, finally, one can detect various approaches and subgroups, too: Logical empiricists who emphasized philosophy's role in studying the logic of science (e.g. Carnap, Hempel, and Suppes) are located at the top of the cluster near prominent

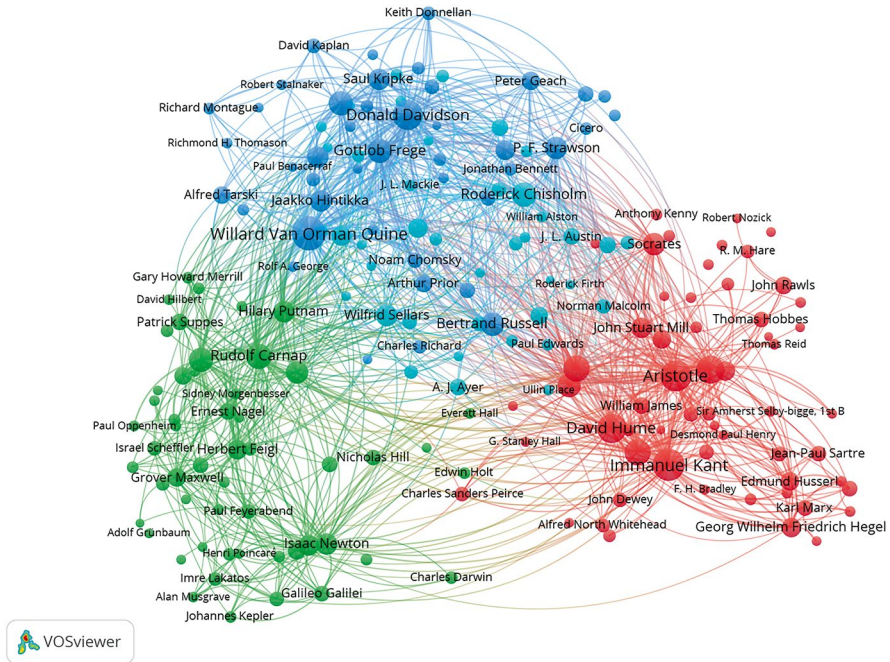


Fig. 7.9 Co-mention network of most-mentioned philosophers 1971–1979. (Complete interactive network available at <https://tinyurl.com/2xjsec4r>)

philosopher-logicians such as Putnam and Ramsey, while philosophers of science experimenting with historical approaches and post-positivist perspectives (e.g. Feyerabend, Hanson, Lakatos, and Kuhn) are located near the bottom.

7.6 Analysis 4: Journals and Institutions

All in all, the co-citation networks in Figs. 7.6, 7.7, 7.8 and 7.9 suggest that logical empiricism had a remarkably consistent and stable position within American philosophy—an intellectual niche of logicians, scientists, and scientific philosophers that already existed in the 1920s, before the logical empiricists played a role in US debates. It is important to note, however, that these results partly reflect our selection of journals. If one excludes specialist philosophy of science journals such as *Philosophy of Science* and *The Monist*, the green and blue clusters collapse into a single cluster in some (but not all) decades, such that logical empiricism seems more firmly located within analytic philosophy. This effect reflects the dual nature of logical empiricism’s reception in North America. For most of its history, logical empiricism was simultaneously treated as a movement in analytic philosophy and in scientific philosophy (later: philosophy of science) broadly conceived.

In order to explore the role of various journals in some more detail, Table 7.2 lists the top-15 most-mentioned philosophers in three journals in the 1950s, showing that these periodicals had remarkably different profiles in this period. While *Journal of Philosophy*'s top 15 mostly consists of historical figures and major pragmatists (Dewey, James, Lewis, Peirce, and Santayana), articles published in *Philosophical Studies* focused on an entirely different range of authors. Its top 15 includes very few historical figures (only Hume and Kant) and all contemporary philosophers belong to the analytic tradition broadly construed. Analyses of the same journals in the 1960s and 1970s reveal that *Journal of Philosophy* would soon move into a similar direction (see also Katzav 2018), suggesting that *Philosophical Studies*—a journal founded by a logical empiricist—was an important trend setter in this regard. *Philosophy of Science*, finally, had a still different profile. Its top-15 includes a mix of historical philosophers and scientists (e.g. Newton and Galileo), philosophers of science in various traditions (e.g. Reichenbach, Margenau, and Whitehead) as well as American pragmatists, confirming the aforementioned bifurcation between analytic philosophy and philosophy of science.

EDHIPHY can also be used to explore the role different departments of philosophy played in the reception of logical empiricism. Table 7.3 presents the most-mentioned authors in articles authored by philosophers affiliated with three departments of philosophy—Columbia, Princeton, and UC Berkeley—between 1951 and 1960.¹⁷ It reveals that these departments had rather different profiles, too. While philosophers at Columbia—the department of Dewey and his naturalist

Table 7.2 Top-15 most-mentioned philosophers in *Journal of philosophy*, *Philosophical studies*, *Philosophy of science*, 1951–1960. Historical figures are marked ***

Journal of philosophy		Philosophical studies		Philosophy of science	
***Kant	157	Carnap	46	Einstein	73
Dewey	149	Quine	32	***Newton	65
***Plato	146	Feigl	29	Carnap	60
***Aristotle	141	W. Sellars	29	***Kant	56
***Hume	139	Russell	29	***Aristotle	49
Russell	93	Black	19	***Plato	42
Whitehead	86	Reichenbach	18	Margenau	40
***Socrates	85	Wittgenstein	18	Russell	40
James	78	***Hume	18	***Hume	36
***Mill	76	Broad	18	***Galileo	35
***Hegel	75	Moore	17	Whitehead	34
***Descartes	72	Frege	14	Dewey	34
Peirce	72	Goodman	13	Reichenbach	33
Santayana	67	***Kant	13	Feigl	32
C. I. Lewis	63	Ayer	13	James	30

¹⁷An article published in year y was assigned to a department d iff (a) one of the authors was employed by d in y or $y-1$ or (b) one of the authors obtained their Ph.D. at d between $y-3$ and $y+3$.

Table 7.3 Top-10 most-mentioned philosophers by philosophers affiliated with Berkeley, Columbia, and Princeton, 1951–1960. Historical figures are marked ***

Columbia Univ.		Princeton Univ.		UC. Berkeley	
Dewey	20	Carnap	18	Carnap	9
***Plato	19	***Hume	10	Russell	6
***Aristotle	15	Goodman	9	Frege	6
***Kant	15	Quine	9	Wittgenstein	4
***Hume	13	Russell	8	Strawson	4
***Mill	11	***Plato	8	Quine	4
***Socrates	10	Feigl	8	Einstein	4
***Hegel	9	Wittgenstein	7	Tarski	3
***Descartes	8	***Socrates	7	Church	3
Russell	8	***Aristotle	7	Moore	3

students—predominantly mentioned their teacher and a series of historical figures, their colleagues at Berkeley were mentioning mostly analytic philosophers (broadly conceived). The logical empiricists were particularly well received at Princeton. Carnap, Feigl, Hempel, and Reichenbach are all included in the top-25 most-mentioned philosophers, reflecting the department’s shifting focus in the 1950s, when it hired Kemeny (1952), Putnam (1953), and Hempel (1955) and started to produce some more technically oriented graduate students (e.g. Nicholas Rescher, Richard Jeffrey, and Paul Benacerraf).

Naturally, these departmental profiles are the result of a variety of faculty and graduate students citing different types of philosophers. These internal differences can be studied with EDHIPHY as well. Table 7.4 presents an analysis of Yale’s department of philosophy in 1963, a period when its faculty started to become heavily split (see Kuklick 2004). We have analyzed which professors and graduate students cited some of the most-mentioned logical empiricists (Carnap, Feigl and Bergmann), pragmatists (Dewey, James, and Peirce), and phenomenologists/existentialists (Heidegger, Husserl, and Sartre), indicating which people belonged to which camp. In addition to large-scope analyses of American philosophy on the most general level, in sum, EDHIPHY can also assist historians in conducting more fine-grained reconstructions.

7.7 Conclusion

Logical empiricism played an important role in the development of American philosophy. This paper has tried to map its reception by quantitatively analyzing 10,190 articles published in six American journals between 1921 and 1979. We (1) explored the relative impact of 11 logical empiricists, (2) compared their influence with a number of contemporaneous philosophical movements, (3) mapped its evolving

Table 7.4 Mention-based analysis (1961–1970) of philosophers affiliated with Yale in 1963. Only faculty and graduate students (*) mentioning at least three of the nine philosophers are included.

	Carnap	Feigl	Bergmann	Dewey	James	Peirce	Heidegger	Husserl	Sartre
John Bacon*	X	X	X						
Henry Margenau	X		X		X				
Wilfrid Sellars	X	X	X			X			
Richard Bernstein				X	X	X	X		
John E. Smith	X			X	X	X			
Rulon Wells			X	X		X			
Kenneth Megill*						X	X		X
George Schrader				X			X	X	X
John D. Wild		X			X		X	X	X

place in American philosophy through a series of co-mention analyses, and (4) explored its reception on a more fine-grained level by analyzing differences between various journals and departments of philosophy.

Naturally, our maps and statistics depend on a number of contingent choices. The mention rankings and co-mention networks presented in Figs. 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, and 7.9 and Tables 7.1, 7.2, 7.3, and 7.4 would have looked different if we had decided to include book publications, reviews, and APA conference proceedings; or if we had selected a different set of journals. In this sense, quantitative historical research is not fundamentally different from traditional, qualitative inquiry, in which historians continuously face choices concerning the selection of sources, too. On the more technical side, we had to make various decisions regarding data cleaning, mention extraction, and mention disambiguation. In making these decisions, we always tried to put historical considerations first. EDHIPHY was developed in collaboration with historians of twentieth-century American, German, and French philosophy in order ensure that such choices were informed by existing research. In combining technological innovation with historiographical depth, we aimed to create an interesting new tool to explore different types of questions and generate new research ideas. The present paper took some first steps toward exploring the potential of EDHIPHY (and mention analysis more generally) concerning the study of the American reception of logical empiricism. We hope it will stimulate historians to develop more detailed analyses in the future.

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