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# THE FABRIC OF KNOWLEDGE

## TOWARDS A DOCUMENTAL HISTORY OF LATE ANALYTIC PHILOSOPHY

Tutors: Dr. Luca GUZZARDI
Prof. Marcello D'AGOSTINO

Tesi di Dottorato di
Eugenio PETROVICH

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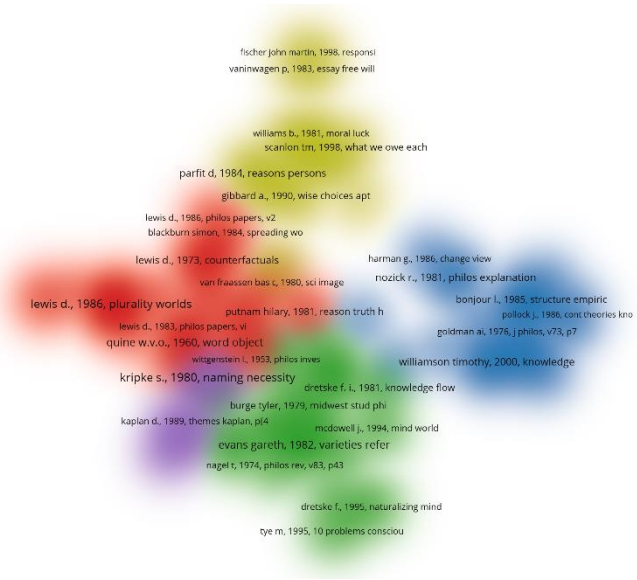
# The Fabric of Knowledge

## Towards a Documental History of Late Analytic Philosophy



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# Introduction

Socrates, the father of Western philosophy, left no written text. However, his choice has remained quite isolated in the history of philosophy. Plato already betrayed him, writing hundreds of pages of dialogues. In fact, from Plato onwards, philosophers have been extremely prolific writers. From a materialistic point of view, the history of philosophy *is no more than* a vast collection of texts.

That philosophy is a writing exercise is truer today than in the past two thousand years of the discipline. Today, philosophers write thousands of pages per year. The format of the written philosophical knowledge is no more confined to the book, but it has reached the article of the specialized journal, the standard medium of scientific knowledge. Article by article, issue by issue, journal by journal, book by book, philosophers probably produce more philosophical contents today than in the entire history of philosophy.

If we use the collective term 'literature' to denote the totality of the written items in which philosophical knowledge is disseminated, we can say that *the literature is the element in which the philosophers are continuously immersed*. In the same way that they are immersed in an intellectual context (a set of concepts and theories), in a social setting (usually, the academia), and, more generally, in a historical background, the philosophers are, at the same time, immersed in the literature.

In the last decades, it has become simply impossible for them to sever themselves from the collective medium of the written philosophical knowledge – and probably, it has never been possible to be isolated from it. Contemporary philosophy shows itself in the form of a complex web of documents (books, monographs, articles, journals, collections of papers, proceedings, syllabi) in which the individual philosopher *must* find its place. The meaning (and the normative force) of this 'must' is clear for anyone who is training to become a professional philosopher. Becoming a professional philosopher today *means* to contribute to the philosophical literature, adding your contribution (starting with the Ph.D. dissertation) to the pile. Note that it is not

enough to juxtapose your token to the stock: you must show at the same time innovation and conservation, finding the right balance between connectedness with other written items and your original ideas. *You must pay attention to stitch your thread accurately into the fabric of knowledge*.

Philosophers, when they are doing philosophy, usually do not pay great attention to the literature element in which they are immersed. The literature is treated as a communication facility and the publication as a mere shell, the material embodiment of the philosophical content. What matters – it is said – are 'ideas': philosophical problems, views, arguments, counter-arguments, and all the rest of intellectual stuff which populates the philosophical world.

The only moment in which the literature surfaces from the periphery of the material conditions of the philosophical work to the philosophers' attention is when they act in the academic institution. It is in the practices and rituals of the university that the literature element emerges: in the academic CVs, in the job interviews, in the editorial boards, in the scholarly societies, in the grants' applications, in the evaluation of research performance of individuals and departments. These are the contexts in which the literature element is isolated, refined, quantified, and its power becomes tangible. Publishing in the 'high-quality' journals decides whether you get your next fixed-term post-doc contract or drop out from the academia; whether you enter the gates of the professional, tenure-tracked, philosophy, or play another round in the game of precarious academic positions.

*This work is at the same time our contribution to the ritual accumulation of the philosophical literature and an analysis of the literature element of contemporary philosophy.* We aim to show that the literature is not a neutral medium, but an active force which shapes philosophy. Our main claim is that the literature has a life on its own, which influences the behavior of the philosophers and constraints their intellectual production. This thesis has a double status: it is at the same time a historiographical and a meta-philosophical claim.

From the historiographical point of view, it says that we should add a new factor to the explanation of the philosophical change, namely, the structure and the dynamics of philosophical literature. Until now, historians of philosophy have explained the history of philosophy mainly by pointing out the role of the main characters of the story: the Great Philosophers of the past and their theories. Sociologists and externalist historians of philosophy have added to the picture the social, political, and economic factors which shape philosophical doctrines. We aim at showing that, between the intellectual layer of philosophical systems and the sociological layer of philosophers as social agents, lays the level of the philosophical literature, and that it plays a central role, no less than the others.

The meta-philosophical status of the thesis derives from the fact that this work does not focus on the past of the discipline, but on the contemporary philosophy. Specifically, it analyzes the documental level of contemporary *analytic* philosophy, i.e., the analytic philosophy of the last forty years. From this point of view, it is not a classic historical work, regarding the distant past, but a *history of the present*. As such, it contributes to uncovering the *conditions of possibility* of contemporary analytic philosophy, i.e., to understanding what contemporary analytic philosophy *is*. Thus, we hope that it can help in clarifying one of the core issues of philosophy, which accompanies philosophers since the times of the Delphic maxim: *what is philosophy?*

## Outline of the dissertation

The first Chapter is devoted to a preliminary clarification of the notion of 'analytic philosophy', the subject of the subsequent Chapters. We will show that the term 'analytic philosophy' has no standard meaning in the contemporary debate and we will define better in what sense we use the notion within this work. In the second section of the Chapter, we will focus on the recent analytic philosophy – the so-called 'Late Analytic Philosophy' – and we will point out six features of it which pose a specific methodological challenge to the standard methods of the historiography of philosophy. The challenge comes first from the sheer dimension of Late Analytic Philosophical production, which exceeds by far the close-reading power of the historian. Secondly, from the fact that Late Analytic Philosophy seems to be characterized by several structural dynamics (such as specialization and fragmentation) that do not derive from any specific individual philosopher or philosophical view but belongs to Late Analytic Philosophy *as a field*.

Chapter 2 opens up by highlighting the need for a new method of investigation that can face the methodological challenge of Late Analytic Philosophy. We argue that *scientometrics*, i.e., the quantitative study of scientific production, can provide such a method. The main part of the Chapter is devoted to present scientometrics and to specify how scientometric methodologies can address the methodological challenge successfully. The main idea behind this Chapter is that we can shed light on the peculiar features of Late Analytic Philosophy *only if* we study the structure and the dynamics of Late Analytic Philosophical *literature,* i.e., only if we investigate what we will call the 'documental level' of Late Analytic Philosophy.

In Chapter 3, we will present four empirical studies of the documental level. They use different scientometric methodologies to study the literature element of Late Analytic Philosophy, or, better to say, *Late Analytic Philosophy in its literature element*. These studies are the core of the work: collectively, they aim at justifying our main theoretical claim, i.e., that the literature is an active force which shapes philosophy. At the end of Chapter 3, we will call 'documental

history' the approach to the history of philosophy that focuses on the documental level and describes its interactions with the intellectual and social levels of philosophy.

Chapter 4 discusses the theoretical status of the documental history by comparing it to standard historiography of philosophy and to sociology of philosophy. We will highlight three key issues that are discussed within the methodology of historiography and sociology of philosophy, and we will point out the perspective of the documental history about each of them. We hope that this will help to clarify the specific features of the documental history.

Lastly, in the Conclusions, after overviewing the structure of the dissertation, we will sketch several lines of future investigations for a research programme in the documental history of philosophy.

## A note on interdisciplinary work

Before starting with the analysis of the notion of 'analytic philosophy', we would like to say few words on a central feature of this dissertation: its *interdisciplinary nature*. In order to design the empirical studies and to set up the theoretical framework, we had to use material coming from a wide range of diverse disciplines. The list includes: history of analytic philosophy, meta-philosophy, methodology in the history of philosophy, social science methodology, philosophy of science, social studies of science, network theory, computer science, science policy, and, clearly, several sub-areas of scientometrics (the main ones being science mapping, citation theory, citation context analysis, mathematical models of scientific growth).

Interdisciplinarity has become a buzzword in the contemporary academia, along with its cousins 'multi-disciplinarity' and 'trans-disciplinarity'. Prestigious funding agencies such as the European Research Council actively foster interdisciplinary research programmes. It seems that the next groundbreaking discovery lies in the interstices between disciplines, more than in the articulation of existing disciplinary paradigms. We do not know whether the epistemological forecasting of ERC is well-founded or not, but what we can say for sure is that interdisciplinarity has a *cost*. As it frequently happens, the price of scope is a lack of depth. Each of the areas we mentioned above is a vast field of investigation on its own. Even if we did our best not to neglect any contribution that was needed to our work, it would be pretentious to claim completeness. We are sure that an expert in one of the fields mentioned above can find points of the dissertation where the discussion could have been more fine-grained or the technical details more advanced. We hope that such lacks concern only the minor parts of the work and that we did not skip any fundamental contribution.

Interdisciplinarity also presents another issue: the difficulty of finding a good balance between the *styles* of the different disciplines that contribute to the work. Styles are not only a matter of

writing (even if the way of writing is an essential part of any discipline, and every discipline has its *genre*) but regard more broadly the 'epistemic culture' of the disciplines. They determine what can be given for granted, what should be demonstrated, what is controversial and what is shared knowledge, what is a legitimate research question, what are the right methodologies, and so on. Find a balance between styles that push often in different directions is not an easy task, and we believe that we reached only a precarious equilibrium. In some Chapters, a philosophical style prevails, while in others we preferred a social-scientific style of writing. We even adopted the IMRaD structure (Introduction, Methodology, Results, and Discussion) for presenting the empirical studies of Chapter 3, the standard structure of *scientific* research articles. We leave the reader to judge whether we achieved some form of unity or only a patchwork of styles.

# Chapter 1

This Chapter aims to present the object of the present study: Late Analytic Philosophy. The Chapter comprises two sections. The first one is devoted to clarifying the very term 'analytic philosophy' since, as we will show, this term has no definite meaning in contemporary debates. We will survey two main debates in which the notion of 'analytic philosophy' is discussed: a) the Analytic-Continental Divide debate, and b) the discussions conducted within the burgeoning field of History of Analytic Philosophy. We will argue that the meaning of 'analytic philosophy' is «opaque» (Hardcastle & Richardson, 2003 : xv), in the sense that the notion is used, depending on the context, with a variety of *meanings* (individuating from time to time a set of intellectual commitments or a socio-professional entity) and *functions* (being used alternatively as a neutral-descriptive category and as a performative, meta-philosophical concept).

The second section focuses on Late Analytic Philosophy, which is the object of this study. A justification for the use of this category will be provided, and we will highlight the six features of Late Analytic Philosophy that will be investigated in this study: the growth of the analytic enterprise, the fragmentation of the field, the trend towards specialization, the increasing professionalization, the technicalization of the language, and the scientific style of intellectual production.

We begin with the survey of the relevant literature around the term 'analytic philosophy'. The following disclaimer has, however, to be kept in mind: this section does not mean to be an exhaustive survey of the state of the art of the discussions around 'analytic philosophy'. This because the literature on that topic in the last thirty years has reached a considerable extension and it would take too much space to review it in detail.[1] Furthermore, there already exist two book-length surveys of the matter: (Glock, 2008) and (Preston, 2010). Instead, the aim of this section is, on the one hand, to individuate some *recurrent themes* in this literature and, on the

[1] For an extensive account of the bibliography in History of Analytic Philosophy, see (Beaney, 2013).

other hand, to give an *intelligible order* to a material, that, frequently, goes in disparate directions.

## Uses and meanings of 'analytic philosophy'

Opening the *Blackwell Companion to Philosophy*, John Searle almost twenty years ago wrote that «the dominant mode of philosophizing in the United States is called 'analytic philosophy' […] Indeed, analytic philosophy is the dominant mode of philosophizing not only in the United States, but throughout the entire English-speaking world» (Searle, 2003a, p. 1). Two years later, Hacker opened the collection *The Story of Analytic Philosophy. Plot and heroes* (Biletzki & Matar, 1998) writing: «Analytic philosophy has been the predominant philosophical movement of the Twentieth century» (Hacker, 1998, p. 3). Ten years later, Glock echoed: «Analytic philosophy is roughly 100 years old, and it is now the dominant force within Western philosophy» (Glock, 2008, p. 1). And finally, the recent *Oxford Handbook of The History of Analytic Philosophy* begins with the following lines: «Analytic philosophy is now generally seen as the dominant philosophical tradition in the English-speaking world, and has been so from at least the middle of the last century. Over the last two decades its influence has also been steadily growing in the non-English-speaking world» (Beaney, 2013).

However clear these statements may appear, the *meaning* of their very subject, i.e., 'analytic philosophy', is not clear at all. Indeed, the very notion of 'analytic philosophy' is and has been highly debated and contested, from different perspectives and with different aims. The emergence in the last thirty years of the thriving sub-discipline of History of Analytic Philosophy did not put an end to the debate.[2] On the contrary, it contributed complicating the matter introducing, by detailed historical scholarship, new dimensions and nuances into the discussion.

Even if almost all commentators agree that there is *something* worth calling 'analytic philosophy', they divide on what this something is. The first thing to note is that 'analytic philosophy' recurs in two distinct, even if interrelated, areas of philosophical debate: the above-mentioned discipline of History of Analytic Philosophy, on one side, and the debates around the so-called 'Analytic-Continental Divide', on the other. The next two sections review some recurring themes that can be discerned, respectively, in the latter and the former debate.

### 'Analytic philosophy' in the Analytic-Continental Divide debate

To begin with the Analytic-Continental context, in this debate the discussion is often conducted with a distinct normative flavor. The literature on the Analytic-Continental divide rarely

[2] See (Floyd, 2009) and (Beaney, 2013) for an overview of the field.

remains at a descriptive level.[3] It does not limit to register a difference in the way philosophy is pursued in the English-speaking world and Continental Europe, with a purely sociological aim. Very often, the focus quickly shifts on the *desirability* of the Analytic-Continental Divide, a question that, in turn, raises the issue of how philosophy, in general, *should be* conducted, hitting classic *normative meta-philosophical* issues.[4] 'Analytic philosophy' is proposed (or opposed) as a model of philosophizing, and the focus of the discussion is on the strengths and weaknesses of such a model. (Engel, 1999) and (Wilshire, 2002) are representative examples of, respectively, a spirited defense and a forceful attack of analytic philosophy as a mode of philosophizing, conducted in a clear, meta-philosophical spirit: evaluation, appraisal, and meta-philosophical prescriptions abound.

When normative and evaluative issues are left in the background (note that they are rarely absent), we find the attempt to characterize the two traditions, highlighting what their distinctive intellectual traits would be. According to (Cooper, 1994) the difference between Analytic and Continental thinkers would lie in the fact that some philosophical themes («cultural critique, concern with the background conditions of inquiry, and […] the 'fall of the self'», (Cooper, 1994, p. 4)) are prominent amongst Continentals and almost absent among Analytic philosophers. Campbell more recently has argued that the difference between the two camps lies in the different role history and history of philosophy play in the two traditions: analytic philosophy would deny a proper role to history, thus adopting (even if covertly) a Platonist metaphysics, whereas a decisive turn to history, and thus a historicist metaphysics, would mark Continental philosophy (Campbell, 2001).[5] Donahue and Espejo have attempted to individuate the difference not in some substantive doctrine or metaphysical stance, but in the *style* by which the philosophers in the two traditions deal with philosophical problems (Donahue & Ochoa Espejo, 2016). Trakakis shares the attention for the style, but focuses on the *literary* style of the two traditions, showing how the way Analytic and Continental philosophers write and

[3] (D'Agostini, 1997) is probably one of the few studies aiming at describing quite neutrally the main philosophical tenets of analytic and Continental schools, aiming at offering to the reader a 'guide to the philosophy of the last thirty years'. However, the main limit of this study is that it totally overlooks the social dimension of the label, i.e. the fact that the labels 'analytic' and 'Continental' are currently used to individuate not only intellectual traditions, but social groups within the philosophical discipline. See below.

[4] Metaphilosophy is «the project of examining philosophy itself from a philosophical point of view – it is the philosophy of philosophy» (Rescher, 2014, p. xi). Following Rescher's account, metaphilosophy has two dimensions: one historical (or descriptive) and one normative (or prescriptive). Roughly, historical or descriptive metaphilosophy is concerned with how philosophical inquiry *is* conducted, whereas prescriptive or normative metaphilosophy deals with how philosophy *should be* cultivated (Rescher, 2014).

[5] See (Buckle, 2004) for a detailed analysis and criticism of Campbell's thesis.

organize their arguments is not neutral in relation to their philosophical positions (Trakakis, 2012).

A significative strand of the commentators addressing the Analytic-Continental Divide, however, tend to underplay the differences between the two traditions, aiming, in an ecumenic spirit, at reconciling the Divide, going «beyond» or «bridging» the two sides of the rift (see for instance the special issue of the *International Journal of Philosophical Studies* of 2001, devoted to «Bridging the Analytic-Continental Divide», (Biletzki, 2001) and the recent collection *Beyond the Analytic-Continental Divide: Pluralist Philosophy in the Twenty-First Century*, (Bell, 2016)).

The same ideal of reconciliation, the will of unifying again the «house divided» of philosophy (Prado, 2003), is often the underlying assumption of another stream of the Analytic-Continental Divide debate, the one which aims at *dissolving* the divide. This is done in two ways. On the one hand, it is argued that the division between analytic and Continental philosophy concerns the past but not the present of the discipline, and therefore should be not crucial in doing philosophy today. On the other hand, it is argued that the two terms were never useful as labels, because the objects they should denote have *never* been two distinct and uniform philosophical traditions, but a set of disparate and even mutually contradictory doctrines. In this second option, the Analytic-Continental Divide debate merges with historiographical topics that are prominent in the History of Analytic Philosophy debate (see the next section).

(May, 2002) is an instance of the first strategy. He claims that «the division between Anglo-American and Continental philosophy has become completely superficial. It is, as Francophone philosophers say, *passé*» (May, 2002, p. 401). According to May, these labels were useful in the past, but nowadays they have simply ceased to capture the structure of the philosophical discipline:

> During the first half of the Twentieth century, and even up to the 1960s, there were stark differences between the approaches of those on and those off the Continent. That period, to which the term *analytic* often appropriately applies to the philosophy done in the United States and Britain, saw a difference in philosophical scope and subject matter that did indeed make communication difficult. (402)

In the rest of the paper, he considers nine different criteria that may be proposed to support the idea that the divide is still present today, and discards each of them. The nine criteria comprehend four post-modernist themes (the loss of grand narratives, the relativism, the death of the subject, the consumerism, the media dominance, and the rise of transnational capitalism – these themes resonate with the ones mentioned by (Campbell, 2001) and (Cooper, 1994)), that would be prerogative of Continental philosophers and left aside by their Analytic counterparts;

and five general themes that would divide the two camps (Continental side first: a rejection versus an embrace of science, a leftist versus a liberal orientation, a concern with versus a rejection of the history of philosophy, creating versus limning reality, and obscurity versus clarity). May concludes that each of these criteria fails, because 1) interesting instances of the five post-modernist themes can be founded in both the analytic and Continental side; and 2) the opposition between the two poles in the five dichotomies do not capture a difference *between* the camps, but *inside* the camps: they are transversal to the divide (for example, there are Continental philosophers who engaged positively with science, such as French epistemologists, along with analytic philosophers that are not concerned with empirical issues, such as political philosophers like Rawls or Nozick) .

The other strategy to dissolve the Analytic-Continental Divide is more radical, and, as said above, merges with considerations about the history of Twentieth-century philosophy and the History of Analytic Philosophy in particular. It consists in denying that 'Analytic' and 'Continental' are proper labels, and in proposing the idea that they should be avoided. In the case of 'Continental philosophy, for instance, Critchley argues that:

> Continental philosophy is a highly eclectic and disparate series of intellectual currents that could hardly be said to amount to a unified tradition. As such, Continental philosophy is an *invention*, or, more accurately, a *projection* of the Anglo-American academy onto a Continental Europe that would not recognize the legitimacy of such an appellation – a little like asking for a Continental breakfast in Paris. (Critchley, 1997, p. 350)[6]

(Glendinning, 2006) is a book-length development of the Critchley's proposal that the very idea of a 'Continental philosophy', as something opposed to analytic philosophy, should be rejected because «there is no such thing as the tradition of Continental philosophy» (Glendinning, 2006, p. 7). Or, better to say, the notion of Continental philosophy individuates an «item in the conceptual armory of analytic philosophy; it is the idea of its own Other» (13), not a unified philosophical tradition. Continental philosophy would be then a part of the analytic 'ideology', not a historical phenomenon *per se*. According to Glendinning, even the idea of an Analytic-Continental divide should be rejected, because it amounts to nothing more than a rationalization of a «willingness not to read» (6) the philosophical production of the other camp. Talking of a divide is not simply to describe a situation: it is a symptom of a meta-philosophical *malaise*:

> In my view *appeals to the idea of division belong to what is so rotten here*. That is, in a situation where communication between different parts of our philosophical culture has

[6] See also (Critchley, 2001).

> all but broken down, the thinking about the breakdown that is an appeal to the idea of a division between analytic and Continental philosophy does not so much capture the scene as it is a *part of it*. It is itself a form of philosophical failure […]. (4-5)

The normative flavor of Glendinning's argument against the idea of the Analytic-Continental divide is clear. However, the intertwining of different levels is apparent as well. Glendinning's argument crosses at least three levels. Firstly, there is the *sociological* level of the *use* of the terms 'analytic', 'Continental' and 'Analytic-Continental Divide' within Anglo-American academia. At this level, Glendinning recognizes that the terms have currency, and accepts that they do represent distinct social realities (namely, their *use* within an academic community). The second level is the *historical* level: 'analytic' and 'Continental' are meant as historiographical labels to capture distinct and unified philosophical traditions. According to Glendinning, at least in the case of 'Continental philosophy', this is a mistake. From a historiographical point of view, 'Continental philosophy' is useless because there is no object that it can denote (or, more correctly, the collection of objects usually labeled by it are too diverse to constitute a *single* object). The third level is the normative meta-philosophical level: 'analytic' and 'Continental' from this point of view amount to *performative notions* used to *justify* a behavior (such as avoid certain readings or steer the hiring policy of a philosophy department). Glendinning opposes in particular *this* use of the terms: the talk of analytic and Continental philosophy as a sectarian meta-philosophical strategy aimed at restricting *pluralism* in philosophy.

This performative-political meaning of the labels became indeed palpable during the so-called 'pluralist revolt' that took place inside the *American Philosophical Association* (APA) in 1978. The struggle witnessed two factions opposed: the 'analysts' versus the 'pluralists', contending the presidency of the Eastern Division of APA and, more generally, the professional outlook of philosophy in the United States. During the 'revolt', it was clear that 'Analytic' philosophy was not used with a detached, descriptive historiographical aim in mind, but as a label to identify the academic establishment, that was perceived as dogmatic and sectarian (at least by the pluralist group).[7] Talking of 'analytic' and 'Continental' or 'pluralist' philosophy was at the time

[7] A detailed chronicle of the 'revolt' is provided, by a first-hand perspective, in (Wilshire, 2002). Lachs report that, prior to the 'Pluralist revolt' in 1978: «In the Association's dominant Eastern Division, disciplinary exclusivity was wedded to institutional nepotism in such a way that it became nearly impossible for philosophers who were not analytic in orientation and who did not serve in Eastern seaboard graduate schools to break into the power circle or even into the program. […] The system of exclusion worked perfectly with regard to the presidency and the other offices of the Division, as well; one by one, the senior members of the Harvard and Princeton departments took tums in leading the Division, leaving room for one or two colleagues from Pittsburgh only as an accommodation to the provinces» (Lachs, 2004, p. 8). The Pluralist obtained a change in the (quite unequal) voting procedure that regulated the elections of the APA's offices, but in 1981 «a collection of well-known Eastern Division presidents circulated a nasty letter

a precise *action* within a complex academic-political negotiation, not a purely historiographical question.[8]

That said, most of the literature about the Analytic-Continental Divide recognizes the 'political' import of the labels within academic struggle for power, but focuses more on the *intellectual* features of the two traditions, trying alternatively to display them (Buckle, 2004; Cooper, 1994; Donahue & Ochoa Espejo, 2016) or to argue that there is no intellectual feature typical of the two traditions (Critchley, 1997; Glendinning, 2006; May, 2002). Specific *sociological* studies of the Analytic-Continental Divide, as it emerges from job descriptions, departments' hiring policies, rankings, etc., are still lacking in the literature (but see the next section for an interesting study of the *ideological* use of 'analytic philosophy').

In focusing now explicitly on the case of 'analytic', we find in the literature several proposals that assess its use critically. Indeed, the question 'What is analytic philosophy?' has generated a veritable cottage industry of attempts to *define* analytic philosophy, starting with Dummett's famous definition:

> What distinguishes analytical philosophy, in its diverse manifestations, from other schools is the belief, first, that a philosophical account of thought can be obtained through a philosophical account of language, and, secondly, that a comprehensive account can only be so obtained […] Analytical philosophy was born when the 'linguistic turn' was taken. (Dummett, 2006)[9]

Criticisms have punctually matched each of the definitions (starting with the one advanced by Dummett), showing how they were inadequate to capture the phenomenon 'analytic philosophy'. Next section attempts to keep track of the destiny of the notion of 'analytic philosophy' within the History of Analytic Philosophy debate.

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accusing the pluralists of attempting to gain office in the APA by political means rather than on the basis of their philosophical accomplishments. Quine was one of the signatories. One would have expected him to form his opinion of the worth of pluralist publications on the basis of careful study. Yet when a reporter for the New York Times asked him if some of the pluralists might not deserve office after all, he replied: "I don't know their work"» (9). (Kuklick, 2007) provides a detailed historical reconstruction of the struggles over professional philosophy in America in 1960s, 1970s and 1980s, addressing briefly also the pluralist revolt (see in particular pp. 258-270).

[8] These performative-political uses of the labels recur today in the criticism of the Leiter Gourmet Report, a popular ranking of 'top' philosophy departments in English-speaking world. In it is worth noting that the APA, in its official 'Statement on Rankings of Departments' claims that it «does not rank departments of philosophy and their graduate and/or undergraduate programs nor does it sponsor or endorse any rankings of philosophy departments or programs that are compiled by others» (http://www.apaonline.org/page/rankings [accessed 18 April 2018]). For an up-do-date review of the criticisms of the Leiter's ranking, as well as a detailed critique based on data, see (Bruya, 2015).

[9] See also (Dummett, 1995).

## 'Analytic philosophy' in the History of Analytic Philosophy debate

In this domain, the balance between descriptive-historiographical and normative-meta-philosophical issue is different from the Analytic-Continental Divide debate, but it would be a mistake to expect that evaluative meta-philosophical issues are absent. In fact, they are constantly intertwined in any attempts to discuss the meaning of 'analytic philosophy', and many definitions advanced by historians and analytic philosophers dangerously oscillates between a neutral, descriptive aim ('analytic philosophy' as an historiographical category, 'analytic philosophy' as a tradition distinct from 'Continental' philosophy) and an evaluative, normative aim ('analytic philosophy' as good, or at least worthwhile philosophy, 'analytic philosophy' as a *progress* in history of philosophy). Føllesdal's definition of analytic philosophy as «very strongly concerned with argument and justification » (Føllesdal, 1998, p. 7) is typical of this oscillation, because, as it has been noticed (Glock, 2008), it equates analytic philosophy with good philosophy *simpliciter*, rendering the label utterly pointless as an *historiographical* category (even if quite useful as a *justification* for engaging in analytic philosophy).

The oscillation between a descriptive and an evaluative use of the term is coupled with another oscillation, concerning the very reference of the term 'analytic philosophy'. The reference oscillates between a 'mere' socio-professional reality on one side, and a philosophical tradition hold together by some intellectual commitments (doctrines, topics, methods, style) on the other side.

### *'Analytic philosophy' as a socio-professional entity*

Considering the first meaning, it seems that almost all commentators agree on the fact that 'analytic philosophy' can be used to refer to a *social structure* within the philosophical discipline, i.e., to refer to a social group inside the philosophical profession, which is made of philosophers that publish in certain journals, read certain literature, and attend certain conferences, and not others. As stated by Glock, «what goes on in the pages of the *Journal of Philosophy* is a distinctive intellectual activity, one that differs from the activities (themselves diverse) that the other figures [in Continental philosophy] engage in» (Glock, 2008, p. 9). Williams argues that analytic philosophy is «professionally distinguished (in job advertisements, for instance) from 'Continental' philosophy» (Williams, 2003, p. 23) and Glock, citing (Charlton, 1991) observes:

> From this perspective, analytic philosophy and continental philosophy are constituted as different traditions at least partly because 'they neither read each other's journals nor attend each other's conferences'. By contrast, analytic philosophers 'go to conferences together, read and write for the same journals and examine each other's pupils. (Glock, 2008, p. 221)

More recently, Skorupski remarks:

> If the term 'analytic philosophy refers to anything now, it is to a style of writing, a professional familiarity with and liking for some formal techniques, and a set of university philosophy departments in which the use of such techniques is well accepted. 'Analytic philosophy' in this institutional sense refers to as distinctive social praxis in academe. (Skorupski in (Bonino & Tripodi, 2018a, p. 40))

In the site of the *Philosophical Gourmet Report*, a popular ranking of graduate programs philosophy in English-speaking countries, it is claimed that:

> In the U.S., all the Ivy League universities, all the leading state research universities, all the University of California campuses, most of the top liberal arts colleges, most of the flagship campuses of the second-tier state research universities boast philosophy departments that overwhelmingly self-identify as 'analytic': it is hard to imagine a 'movement' that is more academically and professionally entrenched than analytic philosophy.[10]

The *professional* reality of analytic philosophy seems therefore to be an established sociological fact, as it was the widespread *use* of the terms 'analytic' and 'Continental' in the academia reported by (Glendinning, 2006) (see above).

### *'Analytic philosophy' as a set of intellectual commitments*

Still, attempts to define analytic philosophy usually do not stop to a socio-professional definition. Rather, they focus, alternatively, on finding some *intellectual* trait shared by all (or at least the majority of) analytic philosophers, or on denying that such traits exist, and arguing that other kinds of definitions (for instance, historical-genetic) should be advanced. We pass now to consider the attempts to find *intellectual-based* definitions of analytic philosophy.

Following (Glock, 2008), intellectual definitions of analytic philosophy (i.e., definitions aiming at highlighting some *intellectual* feature shared by all analytic philosophers) can be collected in two main groups:

a) *Material* definitions: intellectual definitions focusing on specific philosophical doctrines and topics, assumed to be typical of analytic philosophy. These would be the distinction between philosophy and history of philosophy, the rejection of metaphysics, the linguistic thesis (the view that an analysis of thought can and must be given by an analysis of language), and the idea that philosophy is continuous with the sciences.[11]

[10] http://34.239.13.205/index.php/analytic-and-continental-philosophy/ [accessed on 3 April 2018]
[11] These definitions are discussed in ch. 4 and 5 of (Glock, 2008).

b) *Formal* definitions: intellectual definitions focusing on more elusive intellectual traits, namely the method and the style of analytic philosophy. [12]

The most famous example of the material definitions is Dummett's definition of analytic philosophy as philosophy espousing and founded upon the linguistic thesis:

> What distinguishes analytical philosophy, in its diverse manifestations, from other schools is the belief, first, that a philosophical account of thought can be obtained through a philosophical account of language, and, secondly, that a comprehensive account can only be so obtained […] Analytical philosophy was born when the 'linguistic turn' was taken (Dummett, 2006, p. 4)[13]

As subsequent scholarship showed (Glock, 2008; Hacker, 1997; Monk, 1996; Sluga, 1997), however, this definition is inadequate because it is at the same time too large and too restrictive. It excludes paradigmatic analytic philosophers like Russell (Monk, 1996) and potentially includes paradigmatic non-analytic philosophers, like the late Heidegger (see Glock 2008, p. 132). Concerning the other doctrines assumed to be distinctive of analytic philosophy as a whole, it is quite simple to find important analytic philosophers that did not accept some of them. The rejection of metaphysics was limited to logical empiricism and rehabilitated within Oxford ordinary language philosophers by Strawson. In fact, metaphysics is nowadays one of the thriving sub-disciplines of analytic philosophy (Williamson, 2014). The idea that science and philosophy are continuous was harshly rejected by Wittgenstein and ordinary language philosophers, even if it was strongly supported from the Sixties onward under the Quinean banner of the 'naturalization of epistemology' (Glock, 2008, pp. 134–146).

In sum, historical scholarship on analytic philosophy has reached a sort of consensus in *denying* that there is some *philosophical doctrine* universally shared by all analytic philosophers:

> It has become *au courant* to reject stereotypes about 'analytic philosophy' as a whole and to shy away from the attempt to characterize core doctrinal commitments of the tradition apart from articulations of individual arguments and thinkers or carefully delineated themes. (Floyd, 2009, p. 173)

A more promising way of characterizing analytic philosophy comes from 'formal' intellectual definitions considering method and style. The *method* of analytic philosophy would amount to a *methodological toolbox* of formal methods comprehending, at least, quantificational logic as inaugurated by Frege, the method of paraphrasis firstly used by Russell, and modal semantics

[12] These definitions are discussed in ch. 6 of (Glock, 2008).
[13] See also (Dummett, 1995).

as used in possible worlds metaphysics (Tripodi, 2015). The typical *style* of analytic philosophers would consist not only in preferring clarity over obscurity, argumentative rigor over rhetorical ornaments but also in a certain approach to philosophical problems and the philosophical work (Donahue & Ochoa Espejo, 2016; Trakakis, 2012). Analytic philosophy would be characterized by a *piecemeal approach*, aiming at breaking down big philosophical problems into manageable 'puzzles', and a collaborative style of work, where philosophical progress is made possible by the collaborations of many 'peers'. Engel summarizes this kind of formal definitions:

> AP [Analytic Philosophy] is the tradition of philosophical argument, of objections, of descriptions, examples and counterexamples. It mimics the scientific style of inquiry, which proposes hypotheses and theories, tests them in the light of data, and aims at widespread discussion and control by the peers, it believes in the possibility of progress through criticism, which is made possible only if its formulations are clear, and aim at coherence, through respect for usual logical standards of argument. It aims to solve particular problems, puzzles and paradoxes, and to build theories in answer them. It prefers to work upon details and particular analyses, rather to produce general syntheses. (Engel, 1999, p. 222)

Still, it is possible to find counter-examples even to these methodological and stylistic definitions (most notably, Wittgenstein!).[14]

In the light of the difficulties in finding distinctive intellectual criteria for defining analytic philosophers, some commentators have given up the very idea of intellectual *definition*, in favor of the Wittgensteinian notion of 'family resemblance', coupled with a *genetical* criterion (Sluga 1998, Stroll 2000, Hylton 1998, Glock 2008):

> Analytic philosophy is to be characterized in terms of overlapping circles of family resemblances and of causal relations of 'influence' that extend in all directions and certainly far beyond the boundaries we hope to draw. (Sluga, 1998, p. 107)

> I do not think it is possible or useful to give a strict definition, with necessary and sufficient conditions, for being an analytic philosopher. Our understanding of the idea proceeds from certain paradigmatic figures and works and ways of conceiving philosophical problems. In all of this we have, as Wittgenstein said of games, overlapping strands, rather than one (or two or three) continuous threads. (Hylton, 1998, p. 54)

[14] Furthermore, it seems that this kind of passionate definition of analytic philosophy amounts more to a meta-philosophical normative *desideratum* than to a neutral, historiographical-descriptive category (being another instance the oscillation between the descriptive and the normative mentioned above).

> I want to argue in favor of *combining* a historical and a family resemblance approach. We learn most about analytic philosophy by regarding it as a tradition that is held together *both* by ties of influence *and* by a family of partially overlapping features. (Glock, 2008, p. 223)

Now, these characterizations of analytic philosophy, even if are not framed structurally as definitions (i.e. as a set of necessary and sufficient conditions), still are based upon *intellectual* factors: the overlapping thread of resembling doctrines/styles (family resemblance component) on one side and the thread of intellectual influences (the genetic-historical component) on the other. Even if these characterizations are more theoretically sophisticated than classic definitions, they still belong to the family of the *intellectual* attempts to individuate the reference of 'analytic philosophy'. The only difference with previous characterizations is, on the one hand, the way in which they *arrange* the similarities between intellectual traits, and, on the other hand, the addition of a genetic element consisting in links of influence among members of the network of analytic philosophy. Still, the intellectual nature of both the components is clear when we assess the table and the network proposed by Glock (2008, pp. 218, 227): all the factors listed in the table for being an analytic philosopher are *intellectual commitments* (linguistic turn, rejection of metaphysics, philosophy ≠ science, reductive analysis, formal logic, science-oriented, argument, clarity), and all the links in the 'family tree' of analytic philosophy track relations of influence, which is in turn, clearly defined by an intellectual element.[15] No *social* feature (e.g., being enrolled in an Ivy League university philosophy department, Ph.D. supervisor-Ph.D. candidate relation) appears.

The crucial difference in the individuation of the reference of 'analytic philosophy', therefore, is between approaches focusing on *intellectual* factors versus approaches focusing on *socio-professional* factors. Analytic philosophy can be individuated, thus, at two levels: the level of the intellectual contents or at the level of the social structure of the philosophical discipline.

### *The interplay of the social and the intellectual levels of 'analytic philosophy'*

However, we can recognize an interesting strand of research shedding light on the complex interplay between the *intellectual* and the *social* level of analytic philosophy. Considerations like the following adumbrate the underlying perspective of this kind of research:

[15] «We are entitled to state that *A* was influenced by *B* positively if there are clear affinities and convergences between the *ideas* of *B* and those of *A*, and *B* was familiar with the latter through reading or conversation. Replace 'affinities and convergences' with by 'disagreement and divergences', and you get a criterion for negative influence» (Glock 2008, p. 222, our italics). The stress on intellectual factors is pointed out by the references to «ideas».

> 'Analytic philosophy' denotes a social structure, a group held together not by any substantial philosophical commitments […] but by an amorphous group of issues, texts, and figures it *excludes*. […] From this perspective, 'analytic philosophy' as a term is used principally for boundary work, and it acquires its meaning in that use. (Hardcastle & Richardson, 2003, p. xv)

Hardcastle and Richardson take for granted the impossibility of defining *positively* analytic philosophy by reference to intellectual contents («philosophical commitments»). However, they do not follow the road of substituting family resemblance-based or genetical characterization to the classic definitions. They choose instead of giving up intellectual factors for focusing on the *social use* of the label 'analytic philosophy' has within the *social group* of analytic philosophers. They advance then the idea that the label 'analytic philosophy' is a device for *boundary work*, i.e., a tool for preserving the identity of the social group of analytic philosophers within the academia. Richardson and Hardcastle consider in particular the case of analytic philosophers of mind (xv-xvi). According to them, the use of the term 'analytic' by this group of philosophers aims mainly at building and preserving their own identity against groups they want to distance from: 'continental' philosophers studying the mind on the one hand, and scientists of mind on the other. The meaning of the label is *no more and no less* than this social function. In this account of 'analytic philosophy', then, 'analytic philosophy' is identified with a *social function* (erecting boundaries, preserving social identity) used by a *social structure* (the group of philosophers calling themselves 'analytic philosophers') within a specific *social setting* (a competitive academic environment).

The idea that analytic philosophy is a sort of 'social function' is fully articulated by (Preston, 2010). The main claim of this book-length study is that the commonplace image of analytic philosophy (comprehending both intellectual elements – such as the linguistic thesis – and a standard history of the analytic movement) is, in fact, the *ideology* of a socio-professional group of philosophers within US and UK academia. Preston, therefore, argues that analytic philosophy is a *social phenomenon unified by a set of (false) beliefs about its own identity*: «AP [analytic philosophy] has a nature, of course, but it is that of a social group rather than a philosophical group», (Preston, 2010, p. 159):

> AP exists now mainly as a set of stances, habits, and tendencies occupying a certain social space within the structure of the academy and of the philosophical profession (156)

Preston starts from the recognition that historical scholarship has shown that analytic philosophers lack any shared genuine intellectual commitments (such a method, a style, a topic). Neither historical figures standardly recognized as 'analytic philosophers', nor contemporary

self-proclaimed analytic philosophers have any intellectual trait in common. Especially analytic philosophy from the 1980s onward, Preston claims, is intrinsically «pluralistic» and «eclectic», sharing no unifying meta-philosophical vision (29).

Nevertheless, Preston argues that there is one thing that unifies this diverse group of people: it is what he calls the 'Traditional Conception' of analytic philosophy. The Traditional Conception comprehends several features «traditionally associated» with analytic philosophy («its turn-of-the-twentieth-century origin, its revolutionary character, its ahistorical attitude, and, at the heart of all this, the linguistic thesis […] together with its traditional anti-metaphysical stance», 31), along with a standard story of the analytic movement. The standard story begins with the revolt against Idealism undertaken by Russell and Moore, who embraced a linguistic conception of philosophy (namely the idea that the primary object of philosophy is language), and lately, a specific commitment to the use of mathematical logic. Here is where the ground-breaking work of Frege on quantificational logic comes on the stage. The story continues telling the development of the philosophy of logical atomism (championed by Russell and the early Wittgenstein) in the UK and logical empiricism on the continent by the members of the Vienna circle, during the period 1910-1930s. The next episode comprehends the forced emigration of logical empiricism's main exponents in America due to the rise of Nazism, and their becoming, thanks to their superior logical technique and scientific outlook, the most influencing philosophical school of US. At the same time, the story tells that in Britain flourished the ordinary-language analysis school, developed in various ways by the later Wittgenstein and Oxford analysts (such as Ryle, Austin, and Strawson). Finally, from the Sixties onwards, thanks to various intellectual events, such as the attacks of Quine to the positivist programme and the rehabilitation of metaphysics, the standard story recognizes that analytic philosophy ceases to be a distinctive research programme centered on the linguistic thesis, to enter in a more eclectic and pluralistic phase, where precise analytic philosophy commitments are absent but a general concern with logic, formal tools, and argumentative rigor still shapes the 'analytic' philosophy enterprise.

Now, according to Preston, the Traditional Conception has been revealed to be false by the rise of historical studies in the 1990s. As said above, it has been shown that the linguistic thesis was never fully endorsed by Russell nor Moore and that it did not lie at the heart of Frege's philosophical project. The rejection of metaphysics was a distinctive feature only of logical positivism and was widely shared only during the middle phase of analytic philosophy (roughly from the Interwar period to the Fifties): early analytic philosophers hold a positive stance towards metaphysical theorizing, and after Strawson's rehabilitation and the advancement in modal semantics fueled by Kripke and Lewis, metaphysics thrived considerably within analytic

philosophy community. Still, according to Preston, the Traditional Conception cannot be simply dismissed because it is false as historical reconstruction. In fact, the Traditional Conception has been endorsed by many analytic philosophers when they described their tradition.[16] It remains, therefore, a historical fact on its own. This poses to the historian a dilemma about the Traditional Conception: as part of the historical evidence she cannot reject it, but as a historical claim she must refuse it. Preston's solution to the «historian's dilemma» is the «illusionist thesis» or «illusionism»:

> Illusionism accepts that the TC [Traditional Conception] does not correspond, and never has corresponded, to anything in reality. Consequently it posits that, insofar as it has ever seemed to anyone that it did, that 'seeming' was an illusion. And yet illusionism also insists that it *did* seem that way to many – indeed, to many self-proclaimed analysts – during the early and middle years of the analytic movement. Consequently it posits that the illusion itself must be counted as part of the movement's history. (81)

Preston, thus, reframes the Traditional Conception as a sort of *ideology* shared by analytic philosophers, i.e., as a set of false beliefs conferring *identity* to a socio-professional group within academia. *'Analytic philosophy' as a set of intellectual contents is therefore identified by Preston as a social function of 'analytic philosophy' as a social structure, aiming at giving an «illusion of unity» to the social group itself*.

The ideology of Traditional Conception, Preston continues, is rooted in turn into a deeper ideological commitment, that he names «scientism»: «the scientistic mentality is the root cause of the illusion of unity, and hence of the illusory TC» (123). Preston distinguishes carefully between the explicit, theoretical endorsement of 'scientism' and 'scientism' as a particular style of conducting philosophy. Scientism as a doctrine is not a defining intellectual trait of analytic philosophy (as we have seen above, there seem to have been *no* defining doctrines for analytic philosophy at any point in its history). Scientism as a practice, instead, does not amount to an intellectual commitment, but to a *practical* commitment to a *way of philosophizing* that mimics scientific inquiry. Analytic philosophy would have modeled its practice on a Kuhnian normal science, taking a «paradigmatic turn» (134-136, see also (Levy, 2003) and the next section). Preston concludes that the adoption of science-modeled practice has allowed analytic philosophy to gain credentials for finding a place within an academia increasingly driven by a 'scientistic' culture. The scientistic ideology has therefore accomplished its function of stabilizing a respectable socio-academic identity for analytic philosophy. Preston remarks that gaining such an identity was particularly needed in the first phase of analytic philosophy (the beginning of

[16] See the literature cited in (Preston, 2010, Chapter 2)

the Twentieth century) when the birth of scientific psychology contended the traditional object of philosophy (the inner world), jeopardizing the rationale of its very existence.[17]

In sum, (Preston, 2010) is an interesting account that sheds light on the interaction between the *social* and the *intellectual* level of analytic philosophy, advancing the thesis that analytic philosophy is primarily a *socio-professional* entity that is held together by an *ideology* (a set of intellectual contents he dubs the Traditional Conception of analytic philosophy). The ideology plays, in turn, an essential *social function*, consisting in conferring both *professional identity* and *academic respectability* to the social group of analytic philosophers.

A final study that goes in the same direction (unveiling the interaction between the social and intellectual layers of analytic philosophy) is (Akehurst, 2010). This study focuses on how nationalist beliefs and the ideology of 'Britishness' shaped during the Second World War the way in which leading British analytic philosophers (like Russell, Hare, and Ryle) conceived both their philosophical enterprise and the philosophy done 'on the Continent' (mainly in Germany, the war enemy). Akehurst advances the thesis that the idea of an Analytic-Continental Divide was essentially a product of the political climate, and in particular, of the Second World War that saw the United Kingdom opposed and isolated from a Continent dominated by the fascist ideology. Furthermore, he explores, in a way similar to Preston, how a standard story of analytic philosophy (that aimed essentially at connecting it to noble, British ancestors, namely the British empiricists, and at severing it from German-influenced schools, namely British Idealism) was forged to provide an identity to the analytic movement in UK, often discarding historical evidence (such as the influence that British Idealism indeed had on both Russell and Moore). Akehurst is then another example of research devoted to assessing the interplay of intellectual factors and social factors, showing how intellectual traits are forged in reaction to the social environment. Compared to Preston, Akehurst enlarges the focus from the academic setting to the larger political context of analytic philosophy. In this context, two other studies are worth mentioning to end the survey of the literature: (Reisch, 2005) and (McCumber, 2001). They are both detailed studies investigating the impact of the Cold War climate on middle analytic philosophy (especially logical positivism) in America. As in the case of Akehurst, these studies broaden the scope of the History of Analytic Philosophy to include political and social factors in the picture. However, it must be noted that 1) they focus on philosophy of science more than analytic philosophy in general, and 2) they consider a limited portion of time (the middle decades of the Twentieth century). These two studies are therefore more interesting from a

[17] «Already surrendering its historic linkage with 'mental science' or psychology, and no longer remembering its former claim to be the science of things transcendental, philosophy looked like losing is credentials as a science of anything at all» (Ryle 1963 : 4, quoted in Preston 2007 : 148)

methodological point of view (see Chapter 4) than as attempts to define or capture the phenomenon of 'analytic philosophy'.

### Sum up

In sum, within the literature concerning the Analytic-Continental Divide and the History of Analytic Philosophy, two main uses of the term 'analytic philosophy' can be distinguished: the *referential* use and the *performative* use. According to the referential use, 'analytic philosophy' denotes an *entity*, whereas according to the performative use, 'analytic philosophy' denotes a (social) *function*.

Within the *referential* use, the reference of the term 'analytic philosophy' is individuated by *social* criteria or *intellectual* criteria. In the first case, the reference of 'analytic philosophy' is primarily a social structure, more precisely a socio-professional group of philosophers within the academia. The meaning of the term 'analytic philosophy' is therefore fixed by reference to socio-institutional practices occurring in the academic settings (such as job descriptions, departments' profiles, institution rankings, etc.). In the second case, the meaning of the term 'analytic philosophy' is fixed by reference primarily to intellectual criteria, i.e., according to a set of intellectual commitments that would distinguish 'analytic' philosophers from other kinds of philosophers (typically, 'Continental' philosophers). In this case, 'analytic philosophy' refers mainly to a set of intellectual factors (commentators then divide on which factor is the crucial one in identifying 'analytic philosophy': doctrines, methods or style).

Within the *performative* use, on the other hand, 'analytic philosophy' is interpreted mainly as a 'rhetorical' move, used by a group of philosophers to acquire some social aim in the academic environment. These aims comprehend: a *stable* identity, through boundary work (Richardson and Hardcastle), a *legitimate* identity, consistent with a general academic or political climate (Preston, McCumber, Reisch), an *academic power* to rule the discipline (Preston, Wilshire). According to the performative use, then, 'analytic philosophy' is meant to correspond to a precise social function within the academia.

It is important to point out that commentators often use 'analytic philosophy' without distinguishing these meanings analytically. They use the term with multiple meanings at the same time or jump from one meaning to another in the space of the same paragraph. Consider for example the following passage from Putnam:

> I see the tendency to think of analytic philosophy as a "movement" (a tendency that has led to the creation of new – and exclusionary – associations of analytic philosophers in several European countries) as a bad thing. […] Analytic philosophy has been around a long time, and it is certainly one of the dominant currents in world philosophy. Making

> it into a "movement" is not necessary, and it only preserves the features I have deplored. […] Why can we not just be "philosophers" without an adjective? (Putnam, 1997, pp. 202–203)

In this passage, the term 'analytic philosophy' recur both in its referential and performative meaning. When Putnam says that «analytic philosophy […] is certainly one of the dominant currents in world philosophy», he is using the term in its referential use. It is, however, unclear if he refers to a social phenomenon or an intellectual phenomenon: the 'dominance' of analytic philosophy has to do with the number of Philosophy Departments self-describing as 'analytic' within the academia, or with the broad acceptance of the intellectual traits (doctrines, topics, methods, style) of analytic philosophy among philosophers? This is not clear in Putnam's passage. However, in the rest of the paragraph, he shifts abruptly from the referential to the performative use of 'analytic philosophy', pointing out that the label is strategically used as a rhetorical banner to advance exclusionary 'analytic philosophy' associations. Furthermore, Putnam does not limit to register the fact that 'analytic philosophy' has a performative meaning: he also judges (negatively) this fact, leaving the descriptive level for the evaluative level. As said above, the entanglement of descriptive and prescriptive consideration is a constant feature of debates around 'analytic philosophy'. Even if prescriptive statements are more diffuse within the Analytic-Continental Divide debate (where scholars are engaged in defenses, attacks or ecumenical proposal of the reunification of the two traditions), the History of Analytic Philosophy is not immune to evaluation and appraisal, as reminded above. Evaluation is not only directed towards specific episodes or figures within the analytic tradition but also interests analytic philosophy as a whole. Glock, for example, ends his book with a heartfelt defense of the importance of analytic philosophy as a stronghold of rationality in the contemporary world:

> At a time where religious ideologies and economic dogmas are ruling the planet with scant regard to either logic or science, analytic philosophy might even have beneficial effects in a wider sphere, provided than is wielded to slay a few intellectual monsters (Glock, 2008, p. 261)

Beaney even explicitly links analytic philosophy to the advancement of democracy:

> A major reason for its global success […] is its relatively democratic and meritocratic nature. There is no ideological baggage to acquire […]. It is no surprise that analytic philosophy has taken off in those countries that have shed or are shedding their Marxism-Leninism. The turn to analytic philosophy in Eastern Europe, for example, happened almost immediately after the communist regimes crumbled in 1989. And analytic philosophy is gradually growing in China. (Beaney, 2013, p. 27)

It would be an error, then, to see historians of analytic philosophy as Weberian value-free investigators of historical facts concerning a historical phenomenon labeled 'analytic philosophy'. They are often actively engaged in pursuing the «cultural politics» (Akehurst, 2010) of analytic philosophy itself. This is the reason why the Analytic-Continental Divide debate and History of Analytic Philosophy often overlap: because they both share a mix of evaluative, normative and descriptive elements (even if with different emphasis).

At this point, three essential features of the present study are worth highlighting. Firstly, this study aims at leaving aside, as far as possible, any evaluative or prescriptive concerns. This study aims at the description, not the evaluation of 'analytic philosophy'. Furthermore, 'analytic philosophy' will be used in its *referential* use, not as a *performative* category. The focus will be on an *entity* called 'analytic philosophy', not on the strategic use of the label 'analytic philosophy' in the advancement of some sort of action (from conquering academic predominance to fostering intellectual reunification with 'Continental' traditions). Thirdly, the focus will be on *Late Analytic Philosophy*, i.e., analytic philosophy of the last forty years, not on analytic philosophy *tout court*.

The next section is devoted to explaining the notion of Late Analytic Philosophy and to pointing out the features of it that we will consider in this study, whereas in Chapter 2 we will return on the problem of the reference of 'analytic philosophy'.

## Late Analytic Philosophy

The notion of 'Late Analytic Philosophy' is borrowed from (Tripodi, 2015) and (Bonino & Tripodi, 2018b). This notion (firstly suggested by (Weatherson, 2014)) is advanced in the *Preface* of (Tripodi, 2015) to provide a working periodization of the history of analytic philosophy:

> The history of analytic philosophy can be divided into three phases: a first phase, characterized by a pioneering, revolutionary and optimistic spirit (the so-called *"early" analytic philosophy,* 1899-1936); an intermediate phase of growing skepticism and pessimism, when a normalization process (to be intended as the process of stabilization of a method and a scientific paradigm) took place (*"middle" analytic philosophy,* 1936-1973); and a recent phase marked by a strong professionalization of philosophy and a tendency towards specialism and fragmentation (*"late" analytic philosophy,* 1973-2014)." (Tripodi, 2015, p. 10, *our translation*)[18]

[18] «La storia della filosofia analitica possa essere suddivisa in tre fasi: una fase delle origini, pionieristica, rivoluzionaria e ottimistica (la cosiddetta *"early" analytic philosophy,* 1899-1936); una fase intermedia di maggiore scetticismo e pessimismo, ma anche di normalizzazione, intesa come il processo di "fissazione" di un metodo e di un paradigma scientifico (*"middle" analytic philosophy,* 1936-1973); e una fase più recente di marcata professionalizzazione della filosofia, caratterizzata dall'adesione a un "canone" e a

Late Analytic Philosophy is therefore chronologically defined as *analytic philosophy developed approximately over the last forty years*. The use of the term 'late', however, may engender the impression that this phase of analytic philosophy is negatively characterized as finishing or waning.[19] Bonino and Tripodi, however, remark that the term «must […] be understood in a purely chronological way, as a stage of development that simply succeeds the early and middle stages» (Bonino & Tripodi, 2018b, p. 8). In accordance with the aim of avoiding evaluative stances stated above, this study follows Bonino and Tripodi in this direction. Every evaluative overtone is therefore absent in the use of the formula 'Late Analytic Philosophy' in what follows.

As Bonino and Tripodi observe, literature in History of Analytic Philosophy has been mainly focused on Early and Middle Analytic Philosophy. This is confirmed by a recent review of the field (Floyd, 2009), that highlights how the attention of scholars have been mainly attracted by figures in the early phase of analytic philosophy (mainly Russell, Wittgenstein, and Frege) and the middle phase, until the Fifties.[20] The study of the history of logical empiricism, thanks to the development of the field of the history of philosophy of science, has been particularly fruitful, also as driver of methodological reflections about the methods of the historiography of philosophy (Galison, 1996; Giere & Richardson, 1996; Hardcastle & Richardson, 2003; Richardson, 1997, 2008; Stadler, 2001; Uebel & Richardson, 2007). Late Analytic Philosophy, however, has not been extensively studied by historians of analytic philosophy.[21] As it will be shown in Chapter 2, a set of peculiar features of this phase of analytic philosophy partly explains why the systematic study of Late Analytic Philosophy has turned out to be difficult for historians. These features are: a) the substantial *growth* of the analytic enterprise, b) the *fragmentation* of Late Analytic Philosophy, c) a strong trend towards *specialization*, d) the marked *professionalization* of contemporary analytic philosophers, e) the *technicalization* of Late Analytic Philosophy language, and f) the tendency to adopt a *scientific style* of intellectual production.

In the rest of the Chapter, we will review several observations addressing these six peculiar features of Late Analytic Philosophy that can be found in the literature. In Chapter 2, we will

standard di ricerca largamente condivisi, e dalla tendenza allo specialismo e alla frammentazione (*"late" analytic philosophy*, 1973-2014).» (Tripodi, 2015, p. 10). See also (Priest, 2003) from which Tripodi borrows the terms 'optimistic' and 'pessimistic'

[19] Baldwin for example notes: «to describe a stage in some temporally extended process or event as 'late' is normally to imply that it comes shortly before the end» (Baldwin in (Bonino & Tripodi, 2018a, p. 20)). Williamson laments the misleading consonance of 'late analytic philosophy' with 'late capitalism', that gives to the term an apocalyptic flavor (Williamson in (Bonino & Tripodi, 2018a, p. 45)).

[20] See also the extensive cited bibliography in (Beaney, 2013).

[21] The Special Issue of *Philosophical Inquiries* (*Philosophical Inquiries* 2018, vol. 6, n. 1) is probably the first collection of articles explicitly devoted to investigating Late Analytic Philosophy.

highlight the reasons why these features render Late Analytic Philosophy a peculiarly tricky object to investigate using the traditional methods of the historiograpy of philosophy.

Before moving to the detailed discussion of the six features, however, a couple of general points about them are worth making. First, these features are (at least *prima facie*) neither purely *intellectual* nor purely *sociological* characteristics of Late Analytic Philosophy. They are not purely intellectual features because they do not concern specific intellectual contents of Late Analytic Philosophy, but *the way in which* intellectual contents are produced in Late Analytic Philosophy. They are not purely sociological features because they do not seemingly concern classic sociological variables of late analytic philosophers (such as gender or economic position) or 'external' factors influencing philosophical theories (e.g., the political climate), but *the mode of* philosophical production in which analytic philosophers find themselves. Still, as we shall see, they have something 'sociological' in so far as they are not the result of the action of the isolated individual, but are the outcome of the aggregate action of a collective of subjects. Second, the six features will be presented without articulating a system of inter-dependence amongst them. That is to say that no cause-effect relation will be traced, for instance, between the increase of philosophical production and the trend towards specialization (as (Marconi, 2014) for instance does[22]), or professionalization and specialization (as (Bonino & Tripodi, 2018b) suggest[23]). For the moment, the six features will be presented as independent, not because they are taken to be really independent phenomena, but for the sake of the clarity in presentation.

### The growth of the analytic enterprise

Both historians of analytic philosophy and analytic philosophers agree on the fact that, at least from the Second World War, the sheer quantity of analytic philosophy *contents* has significantly increased. As Rescher observes: «The most striking feature of professional philosophy in North America at the close of the 20th century is its scope and scale» (Rescher, 2005 : 2). Quinn echoes this statement:

> When I think about developments in American Philosophy since World War II, one thing that strikes me quite forcibly is the immense growth during that period in the sheer number of professional philosophers. Also noteworthy is the increase in the scale of professional activity […]. This growth is not as spectacular as the transition from little

[22] «The trend toward specialization is imposed by the proliferation of the scholarly literature, which is in turn a consequence of the huge expansion of higher education occurred during the Twentieth century and in particular after Second World War» (Marconi, 2014 : 13, *our translation*).
[23] «extreme fragmentation of late analytic philosophy, […] in turn likely depends on sociological factors such as professionalization and specialization» (Bonino and Tripodi 2018 : 10).

> science to big science. It is impressive, though, and it is unprecedented for philosophy. (Quinn, 1987 : 109)

Glock talks of a «veritable analytic industry» (Glock, 2008, p. 246), Tripodi of a «manifold of sub-disciplines [and] countless specialized research programmes» (Tripodi, 2015, p. 216) and Soames, in the last chapter of the monumental *Philosophical Analysis in the Twentieth Century*, remarks:

> The number of philosophers has exploded, the volume of publication has swelled, and the subfields of serious philosophical investigation have multiplied. Not only is the broad field of philosophy today far too vast to be embraced by one mind, something similar is true even of many highly specialized subfields. (Soames, 2005, p. 463)

In commenting the differences between the earlier phases of analytic philosophy and Late Analytic Philosophy, Skorupski notes:

> In terms of sheer number of researchers, philosophical activity is much bigger now, and that in itself makes a difference. Ever more philosophy academics are writing ever more papers, and chasing ever larger grants of money. (Skorupski in (Bonino & Tripodi, 2018a, p. 42))

Three dimensions of the growth of Late Analytic Philosophy can be distinguished: the increase in the number of professional philosophers, the rise of the volume of philosophical production (i.e., the outcomes of philosophical activity, such as books and papers) and the proliferation of sub-fields (closely related to the phenomena of specialization and fragmentation).

The increase in the number of professional philosophers can be appreciated by looking at the growth of the members of the American Philosophical Association (APA) during the Twentieth century.[24] The exponential (or, better to say, logistic[25]) trend of the curve is patent (Figure 1):

[24] Even if APA does not comprehend only analytic philosophers, still analytic philosophers constitute an important part of it. Therefore, the growth of analytic philosophers can be reasonably extrapolated from the general trend of APA members.

[25] Logistic curves (easily recognizable by their being s-shaped) are typical of population growth phenomena. The initial stage of growth is approximately exponential (in our case, the period 1940-1990), then, as saturation begins, the growth slows, and at maturity, growth stops (in our case, around 2000).

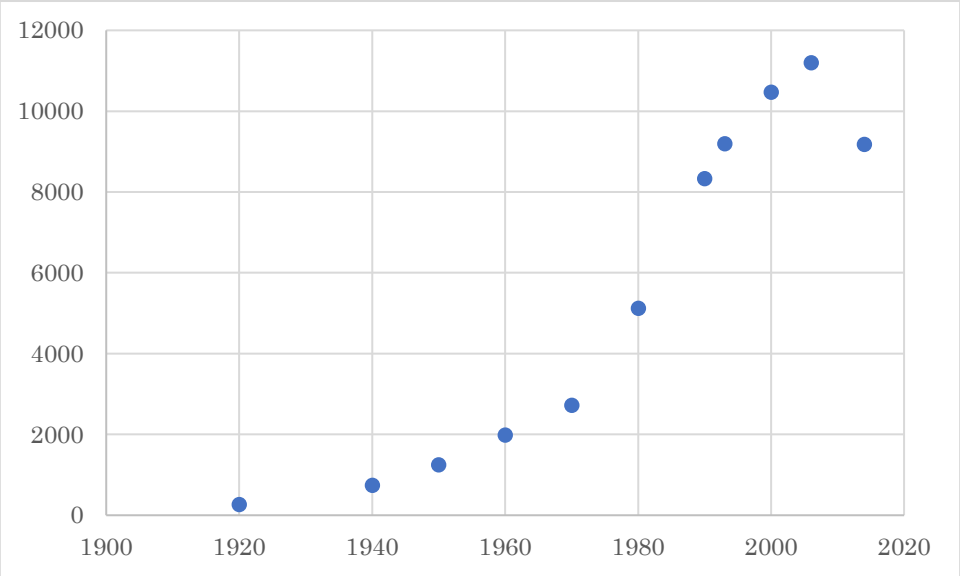


*Figure 1. APA membership over time. Source: elaboration from (Soames, 2008) and (Schwartz, 1995)*

The growth of the population shown in Fig. 1 is coherent with Rescher's claim that «after the Second World War there was an enormous burgeoning of the field» (Rescher, 2005, p. 2).

Concerning the second dimension of the analytic enterprise (the growth in the analytic production), unfortunately, no detailed quantitative study is, to this day, available. However, some anecdotal statistics can be found:

> American philosophers are quite productive. They publish well over 200 books per annum nowadays. And issue by issue they fill up the pages of over 175 journals. Given that almost 4000 philosophical publications (books or articles) appear annually in North America, and a roughly similar number of symposium papers conference presentations and the like, the line between teaching and substantive contribution is anything but hard and fast. To be sure, the aggregate published output of philosophers [is] some 120.000 pages per annum. (Rescher, 2005, p. 10)

> The number of journal articles and book chapters in Philosopher's Index (PI) doubled every five years between 1945 and 1965, doubled again at seven-year intervals from 1966 to 1980, and doubled again in the next ten years (an exponential growth rate of 7% a year) – to about 156,000 works. By 1995 the number exceeded 173,000. Publication output of monographs having Philosophy as a Library of Congress subject descriptor shows a rather steady growth rate: it doubled every 25 years between 1900 and 1975 and doubled again in the past 18 years, approaching 174,000 books in 1995. (Schwartz, 1995, p. 147)

> The number of philosophical publications has grown enormously not only compared to the times of Kant and Hegel but also compared to those of Croce and Heidegger. To give

> a partial example, in the Sixties of the last century, 44 new philosophical journals were founded in the United States, that is the same number of journals that had been founded in the previous sixty years. In the Italy of the early twentieth century, philosophy journals could be counted on the fingers of one hand, or, to be generous, of two; today, Italian philosophy journals classified by ANVUR for evaluating research – that is, not all philosophy journals, but only those considered top – are more than 90. (Marconi, 2014, p. 11), *our translation*)[26]
>
> One observer noted that in the first half of the twentieth century the United States, Britain, and Canada founded thirty philosophy journals. Fifteen more were added between 1950 and 1960, and forty-four in the 1960s—as many as in the previous sixty years—and then about 120 in the next twenty years! By 2000 close to ninety institutions in the United States awarded students the doctoral degree in philosophy. At the end of the twentieth century, the sheer number of publishing 'philosophers' had changed the activity and made it impossible for philosophers to monitor what when on in their profession. (Kuklick, 2007, pp. 259–260)

The third dimension of growth of analytic philosophy (the proliferation of sub-disciplines) is strongly connected with the *fragmentation* and *specialization* of Late Analytic Philosophy.

### Fragmentation

Fragmentation is a commonly recognized hallmark of Late Analytic Philosophy. The final chapter of the above mentioned (Soames, 2005) is tellingly titled 'The era of specialization', bearing 'Specialization and fragmentation' as the title of the first section (Soames, 2005, p. 461). Talking generally of American philosophy, Rescher remarks that «the most striking aspect of contemporary American philosophy is its fragmentation» (Rescher, 2005, p. 4) and Priest subsumes the last phase of Twentieth-century philosophy under the banner «Fragmentation» (Priest, 2003, p. 94), adding an interesting passage from Monk about the fate of Routledge Encyclopedia of philosophy:

> As Ray Monk, reviewing the Routledge Encyclopedia in the *Times Higher Education Supplement* (Sept. 11th, 1998), put it: «The encyclopedia fails to provide any coherent view of its subject. If philosophy lost its nimbus in the heyday of the analytic tradition,

[26] «Il numero di pubblicazioni filosofiche è enormemente cresciuto non solo rispetto ai tempi di Kant e di Hegel, ma anche rispetto a quelli di Croce e di Heidegger. Per fare un esempio del tutto parziale, negli anni '60 del secolo scorso furono fondate negli Stati Uniti 44 nuove riviste filosofiche, cioè quante ne erano nate nei precedenti sessant'anni. Nell'Italia del primo Novecento le riviste di filosofia si contavano sulle dita di una mano, o a essere generosi, di due; oggi, le riviste di filosofia italiane classificate dall'ANVUR in vista della valutazione della ricerca – cioè non tutte le riviste di filosofia, ma solo quelle considerate migliori – sono più di 90» (Marconi 2014, p. 11)

it now seems to have lost its center. Where Edward's work presented a clear and strong single vision of the discipline, the view here is refracted through the lenses of a plethora of widely divergent specialisms» (96)

Bonino and Tripodi echo this assessment, talking of the «extreme fragmentation of Late Analytic Philosophy» (Bonino and Tripodi 2018, p. 10). Haack has written that the fragmentation of contemporary philosophy (not only analytic) is «intellectually disastrous» (Haack, 2016, p. 5).[27] Sometimes, the more politically correct notion 'pluralism' is used instead of 'fragmentation', but the substance of the matter remains the same:

> It is likely less helpful to talk about one or another movement in philosophy after 1965. No one method or doctrine dominated. […] Analytic philosophy has become highly pluralistic and in many ways hardly resembles what was done in the first half of the century. (Martinich & Sosa, 2001, pp. 4–5)

However, fragmentation is used by commentators to individuate two related but distinguishable phenomena: on the one hand, the lack of a recognized 'fundamental' discipline, a 'first philosophy' that would constitute the theoretical backbone of Late Analytic Philosophy; on the other hand, the proliferation of narrow-focused sub-areas and sub-disciplines typical of Late Analytic Philosophy. This paragraph focuses on the former phenomenon, whereas the next is devoted to the latter.

The claim that no discipline plays the role of '*philosophia prima*' within Late Analytic Philosophy is sometimes resisted pointing to the fact that philosophy of mind would have inherited the central role, previously held by the philosophy of language. Searle and Beaney for instance observe:

> The philosophy of mind has moved to the center of philosophy. Several other important branches of philosophy, such as epistemology, metaphysics, the philosophy of action, and

[27] Haack tells also a significant anecdote about the pressure to hyper-specialize that graduate students in analytic philosophy feels today on them: «Over dinner at a conference a few years ago, the graduate student sitting next to me solemnly announced that what *she* did was virtue epistemology; and what, she politely inquired, did *I* work on? I was partway through explaining how developing my foundherentist epistemology had got me thinking about the evidence with respect to scientific claims, which in due course led to my Critical Common-sensist account of scientific evidence and scientific inquiry and my Innocent Realist account of their metaphysical underpinnings, and how I was drawn from there to issues about legal proof generally, and about legal efforts to domesticate scientific testimony specifically, and from there to questions about the evolution of legal systems, and so on, when I realized she was looking at me as if I were a Martian. "You don't have an *area*?" she asked, in the incredulous tone in which people sometimes ask me, "you don't have a *cell-phone*?" This, naturally, set me thinking about how radically out of step I find myself with the hyper-specialized, quasi-technical work that, of late, seems to be (almost) ubiquitous in professional philosophy—and why this fragmentation is, to my way of thinking, so counter-productive» (Haack, 2016, pp. 3–4)

> even the philosophy of language, are now treated as dependent on, and in some cases even as branch of, the philosophy of mind. Whereas fifty years ago the philosophy of language was considered, 'first philosophy', now it is the philosophy of mind (Searle, 2003b, p. 14)
>
> If philosophy of language has often been seen as central in early analytic philosophy, then philosophy of mind is sometimes taken to have usurped its place in later analytic philosophy. (Beaney, 2013, p. 16)

Most commentators, however, disagree on the centrality of the philosophy of mind and insist on the absence of a unifying center of contemporary analytic philosophy:

> Despite early hopes or fears, philosophy of mind has not come to play the organizing role in philosophy that philosophy of language once did. No single branch of philosophy does: philosophy is no more immune than other disciplines to increasing specialization. (Williamson, 2007, p. 18)
>
> For the past several decades, *no* branch of philosophy has played the fully-fledged role of first philosophy within analytic philosophy. To some extent, that reflects the increasing specialization of academic research in general (Williamson, 2014, p. 35)
>
> Philosophy of language seems now to lack the privileged role it used to have in the middle period, and no other sub-discipline took a comparable position, not even metaphysics (Bonino & Tripodi, 2018b, p. 10)

In sum, the first feature of Late Analytic Philosophy described under the label 'fragmentation' is the lack of a unifying and theoretically fundamental discipline that would be commonly accepted as the *center* of analytic philosophy. In the absence of such vertical organization of sub-disciplines, the structure of Late Analytic Philosophy would be better described as a *horizontal scattering* of philosophical sub-disciplines, forming each one mutually independent (even if not totally isolated) areas of philosophical debate («the discipline itself – philosophy as a whole – has become an aggregate of related but semi-independent investigations, very much like other academic disciplines» (Soames, 2005, p. 467)).

The second, closely related, facet of fragmentation, is the proliferation of sub-disciplines. It will be discussed in the next paragraph, under the heading of 'specialization'.

### Specialization

As Schwarts points out, «the trend toward research specialization is fairly clear-cut» (Schwartz, 1995, p. 148). Beaney talks of a 'ramification' of analytic philosophy during the century:

> The growing dominance of the analytic tradition, however, does not mean that there has been any convergence of aims, methods, or views. If anything, the reverse is true: analytic philosophy now encompasses a far wider range of approaches, ideas, and positions than it ever did in its early days. From its original concern with epistemological and metaphysical questions in the philosophy of logic and mathematics (in the case of Frege and Russell) and in ethics and the theory of judgement (in the case of Moore), it has ramified – via the linguistic turn (taken first by Wittgenstein) – into all spheres of philosophy. (Beaney, 2013, p. 4)

What appears as fragmentation from a synchronical point of view, turns out to be the result of a process of *specialization* from the diachronic point of view: as Priest notes, «The fragmentation is witnessed not only by the fact that so many of these philosophers had such diverse interests, but by the number of new philosophical areas and topics that blossomed in that period» (Priest, 2003, p. 95). The contemporary fragmented landscape of analytic philosophy is then the outcome of the proliferation of sub-disciplines occurred in the last thirty years. Glock remarks the «proliferation of epicycles on epicycles on quasi- or would-be scientific 'research programmes'» (Glock, 2008, p. 247) and Rescher observes:

> Specialization and division of labor runs rampant, and cottage industries are the order of the day (Rescher, 2005, p. 7)

> Philosophy, like other scientific and scholarly disciplines, is in fact involved in an ongoing proliferation of units and subunits. For here as elsewhere, specialization and division of labor confront us at every turn. (79)

Specialization is seen as closely linked to *professionalization*, i.e., as associated with the building of distinct, specialized, kinds of *expertise* among analytic philosophers (mainly consisting in the mastering of specialized technical languages). Contemporary contributions to analytic philosophy result consequently narrow-focused and highly specialized in their content:

> The variety of formal and informal methods of argument […] demand expertise that is not widely shared, with the result that many important new contributions to analytic philosophy command only a small readership (Baldwin in (Bonino & Tripodi, 2018a, p. 19))

Professionalization will be the topic of the next paragraph. What is worth pointing out now is that an important effect of the increasing specialization of Late Analytic Philosophy is the *weakening of the information flows* amongst different philosophical sub-disciplines. This results in the 'thickening' of sub-disciplines in semi-independent branches of inquiry:

> Philosophy, almost as much as most other disciplines, has become so specialized. Epistemology, metaphysics, philosophy of language, moral philosophy, and so on are pursued as separate branches of inquiry, though with some interesting interactions between them. (Williamson in (Bonino & Tripodi, 2018a, p. 48))

The complexification of the sub-disciplinary structure of Late Analytic Philosophy (specialization) turns then to an increasingly fragmented structure (fragmentation) where no area can claim to be central or fundamental (lack of 'first philosophy') and separate sub-disciplines are progressively reinforcing their mutual autonomy by the building of narrow, highly specialized expertise (professionalization). Rescher stresses this dynamic as one of the key differences between early and Late Analytic Philosophy:

> The prime difference between early and Late Analytic Philosophy is the product of increasing specialization and fragmentation that has resulted from the growth of the philosophical profession. The resultant technicalization of investigations has transformed philosophy into an aggregation of specialties and of specialists given to investigating minute issues in highly technical ways. (Rescher in (Bonino & Tripodi, 2018a, p. 39))

Thus, the phenomenon of specialization is closely connected with professionalization and technicalization.

### Professionalization and Technicalization

By 'professionalization' of Late Analytic Philosophy, four distinct (but interrelated) phenomena can be intended.

a) The institutionalization of analytic philosophy within the university system.
b) The redefinition of the target of the scholarly production from the educated public to the scientific community of experts (exoterization).
c) The building of an auto-perception of the analytic philosopher as 'experts' and analytic philosophy as a 'profession'.
d) The definition of a set of skills and techniques that would be prerogative of analytic philosophy (the idea of technical expertise leading to *technicalization*).

The institutionalization of analytic philosophy is part of the institutionalization of philosophy within the university system in general. This process began earlier in Europe than in the United States. The Nineteenth century witnessed the institutionalization of philosophy in Europe, as part of the process of reform of higher education known as the Humboldtian model (begun in 1810 with the foundation of the Humboldt University in Berlin). From the middle of the Nineteenth century, the label 'philosopher' in major European countries (Germany, UK, and

France) become co-extensive with the occupation of 'professor of philosophy in the university' (R. Collins, 2002; Rüegg, 2004, 2011). In the United States the process started later, and in the second half of the Nineteenth century, it was still possible to be recognized as a philosopher without being titled with a chair in a university (Kuklick, 2007; Misak, 2010). The Twentieth century, however, saw the end of such amatorial figures also in the United States and the equivalence of the philosopher with the philosophy professor. Analytic philosophy has followed this general trend, and no contemporary analytic philosophy does not hold a chair in some university. Already at the beginning of the century, when the *Philosophical Review* was founded in 1892, the journal's founder James E. Creighton included almost only contribution from philosophers from universities (Katzav, 2018).

The exoterization of analytic philosophy, i.e., the redirection of the expected public of scholarly communication from the educated (but not specialized) public to the inner circle of specialized experts, has been on the other hand a distinct trend of analytic philosophy, which is particularly evident in its late phase. As Diamond notes, «Late Analytic Philosophy has carried much further than middle analytic philosophy the professionalization of philosophy and (along with that) its specialization» (Diamond in (Bonino & Tripodi, 2018a, p. 24)). Stroll refers to the exoterization of communication flows when he remarks that «analytic philosophy is self-contained in the sense that it is almost wholly academic activity» (Stroll, 2000, p. 247) and Rescher describes American philosophy in general by the famous metaphor of the 'ivory tower': «American philosophy is oriented to academia and academics […] its increasing specialization has impelled philosophy toward the ivory tower» (Rescher, 2005, pp. 20 - 21). Leiter observes:

> It is true, to be sure, that philosophy is now a 'profession' – just like psychology, linguistics, sociology, physics, and mathematics – and it is also true that the discipline is often technical and unintelligible to the layperson (Leiter, 2009, p. 19)

The third way in which analytic philosophy has become professionalized is the development of self-image of professionalism, by a) the establishment of communitarian practices aiming at monitoring the quality of philosophical production (the *peer-review* system); and b) the development of technical skills (building of distinct expertise). Marconi summarizes the effects of these two moves in terms of perceived legitimacy of the field:

> The analytic philosopher can identify herself – as the natural scientists do – as a professional contributing to the solution of a problem to which many other analytic philosophers work. Furthermore, the community control that is intrinsic to her activity makes her feel part of a community with its standards, hierarchies, and distinct techniques. Even if this structure can sometimes be oppressive, it is nevertheless

> strongly identifying and legitimizing (once again, as in the case of natural sciences and mathematics). (Marconi, 2014, p. 24, *our translation*)[28]
>
> [Analytic philosophers] conceive themselves as professionals and specialists. As professionals, they do not say or write the first thing that crosses their minds, but seek to conform to some standards, to which, in any case, they are constrained by the community to which they belong, i.e., their *profession*. (85, *our translation*)[29]

We will return on this communitarian features of Late Analytic Philosophy when we focus on the scientific style of intellectual production that characterize it. For the moment, it is worth noting the legitimizing function of the 'profession'-driven talk spread within Late Analytic Philosophy.

Finally, the last dimension of professionalization concerns the building of a peculiar *expertise* of the analytic philosopher. This expertise renders her discourse *technical* and exoteric. Namely, it can be fully understood only by her peers, i.e., the other experts. Leiter remarks that «the professionalization of the discipline of philosophy has multiplied the number of 'self-supporting communities of experts' » (Leiter, 2009, p. 20). The increasing technicalization of analytic philosophy («in much analytic philosophy today there is […] a keenness for jargon and technical sophistication», Beaney, 2013, p. 25, «the level of technical competence among professional philosophers has never been higher», Quinn, 1987, p. 110) is connected to the advancement in the methodological toolbox of analytic philosophers:

> "This broadening of analytic philosophy has gone hand-in-hand with an extension of its methodological toolbox. […] enlargement and refinement of these techniques and their application to more and more philosophical problems and domains of thought" (Beaney in (Bonino & Tripodi, 2018a, p. 21))

Bonino and Tripodi talk explicitly of a process of «formalization» of philosophical language occurring in Late Analytic Philosophy, noting that it would be interesting to compare it to similar processes that took place in social and human sciences, such as sociology and linguistics

[28] «Il filosofo analitico […] può identificarsi – al pari degli scienziati naturali – come un professionista che prova a dare un contributo alla soluzione di un problema a cui molti altri lavorano. Per di più il controllo comunitario che è intrinseco alla sua attività […] contribuisce a farlo sentire parte, appunto, di una comunità con le sue regole, le sue gerarchie e i suoi strumenti: e tutto ciò, se può essere a volte opprimente, è però anche fortemente identificante e legittimante (di nuovo, come nel caso delle scienze naturali e della matematica).» (Marconi, 2014, p. 24).

[29] «[i filosofi analitici] si concepiscono come dei professionisti e degli specialisti. In quanto professionisti, non dicono né scrivono la prima cosa che viene loro in mente, ma si preoccupano di conformarsi a certi standard, a cui, comunque, sono vincolati dalla loro comunità di appartenenza o *professione*» (Marconi, 2014, p. 85).

(Bonino & Tripodi, 2018b, p. 14). Rescher explicitly links the technicalization to the professionalization of Late Analytic Philosophy:

> American philosophy has become increasingly technical in character […] philosophical investigations make increasingly extensive use of the formal machinery of semantics, modal logic, compilation theory, learning theory, etc. Ever heavier theoretical armaments are brought to bear on ever smaller problem-targets in ways that cause to wonder whether the important principle that technicalities should never be multiplied beyond necessity has been lost sight of. The is little doubt that the increasing technicalization of philosophy has been achieved at the expense of its wider accessibility – and indeed even to its accessibility to members of the profession (Rescher, 2005, p. 19).

In sum, the five features of Late Analytic Philosophy so far analyzed (the growth of the analytic enterprise, the fragmentation of the field, the process of specialization, the increasing professionalization, and the technicalization) are well summarized by Soames in the following passage:

> In my opinion, philosophy has changed substantially in the last thirty or so years. Gone are the days of large, central figures, whose work is accessible and relevant to, as well as read by, nearly all analytic philosophers. Philosophy has become a highly organized discipline, done by specialists primarily for other specialists. The number of philosophers has exploded, the volume of publication has swelled, and the subfields of serious philosophical investigation have multiplied. Not only is the broad field of philosophy today far too vast to be embraced by one mind, something similar is true even of many highly specialized subfields. (Soames, 2005, p. 463)

In the next section, it will be showed how many commentators recognize that these features coalesce into a general style of intellectual production typical Late Analytic Philosophy: a scientific, or quasi-scientific style that renders Late Analytic Philosophy a case of 'para-science'.

## A scientific style of intellectual production

Several commentators recognize in analytic philosophy in general (not only late) a drive towards a scientific or quasi-scientific style of intellectual production, as well as a scientific, as opposed to humanistic, self-conception shared by its practitioners. Putnam remarks that «the self-image of analytic philosophy is scientific rather than humanistic» (Putnam, 1997 : 201). Similarly, Weatherson: «[analytic philosophers] see philosophy as continuous with the sciences than the humanities» (Weatherson in (Bonino & Tripodi, 2018a, p. 44)) and Williamson: «Late Analytic Philosophy is slightly ill at ease in the humanities […] because its methodology is more scientific in spirit» (Williamson in (Bonino & Tripodi, 2018a, p. 49)). Rescher: "The 'Analysts' [...] adopts a

scientific model of philosophizing and look to the sort of detailed investigation by logico-linguistic methods of analysis that was introduced into Anglo-American philosophy in the era of G.E. Moore and Bertrand Russell" (Rescher, 2005, p. 18).

In addressing the topic of the scientific style of Late Analytic Philosophy, however, we have first to disentangle it from another topic that is often confused with: the topic of the 'naturalization of philosophy', frequently associated with the name of Quine. 'Naturalization' or 'naturalism' in contemporary debates are umbrella terms covering a set of different positions in epistemology, philosophy of mind and metaphysics. This is not the place to discuss these topics (see (Keil, 2008) for a review and systematization of the literature). What is to be stressed, here, is that the positions falling into the category 'naturalism' are philosophical *doctrines* concerning specific *philosophical sub-disciplines*. They have to be carefully distinguished from a) the debate about the proper organization of the philosophical inquiry (a *meta-philosophical* matter), and b) the *procedural* (rather than theoretical) aspects of analytic philosophy.

In talking of a 'scientific style of intellectual production', the focus is *only* on these latter aspects of (late) analytic philosophy. Traditional topics currently discussed under the label 'naturalism' thus lie outside the scope of the present study.

We begin from the meta-philosophical side. Richardson (Richardson, 1997, 2008) has convincingly shown that the proposal of conducting philosophy in a scientific style (i.e., the project of a scientific philosophy, a *wissenschaftlische Philosophie*) was part of a broader historical process (taking place approximately between 1850 and 1940) of finding a new identity and mission for philosophy, in an epistemological landscape increasingly dominated by the sciences:

> The era between roughly 1850 and 1940 […] was an era in which there was a self-conscious search among philosophers of many persuasions for a new method of philosophy. […] Scholars in several quarters held philosophy in ill repute, thinking it had been superseded or at least embarrassed by the progress of the sciences. Throughout Europe and Britain, a central theme of this era was the enunciation of a new *scientific philosophy*. (Richardson, 1997, pp. 423–424)

Many philosophical schools shared the project of the scientific philosophy at the beginning of the twentieth century, including neo-Kantian schools, phenomenology (remember Husserl's project of turning philosophy into a *strenge Wissenschaft)* and, what is of interest for the present study, both Russell and the logical empiricists felt to be committed to such a project.

Russell saw the adoption of a *piecemeal approach*, which he considered central in scientific inquiry, as the key to transforming philosophical inquiry into a cumulative, scientific discipline. The adoption of such a step-by-step, *analytic* style of work was, according to Russell, a true

revolution in philosophy, because it amounted to abandon the Nineteenth-century image of the philosopher as the solitary genius in favor of a *collective and collaborative* style of work.

> What is feasible is the understanding of general forms and the division of traditional problems into a number of separate and less baffling questions. 'Divide and conquer' is the maxim of success here as elsewhere (Russell, 1981, p. 86)

> Philosophy, unlike the sciences, has hitherto been unprogressive, because each original philosopher has had to begin to work again from the beginning, without being able to accept anything definite from the work of his predecessors. A scientific philosophy such as I wish to recommend will be piecemeal and tentative like the other sciences. (85)

Logical empiricists emphasized even more the need for a collaborative and communalist style of inquiry in 'philosophical research' (a term explicitly coined by Reichenbach to mimic 'scientific research', see (Richardson, 2008)**)**. The emphasis on the collective was after all consistent with the broader socialistic and modernist project pursued by the members of the Vienna Circle[30]: in their manifesto, they argue that «the goal ahead is *unified science* […]. From this aim follows the emphasis on *collective efforts*» (Neurath, Carnap, & Hahn, 1973, pp. 305–306), and in preface to *Der logische Aufbau der Welt*, Carnap insisted on the need for an «achievement through cooperation in which each individual plays his part» (Carnap, 2003, p. xvii). Collective work is explicitly recommended by Carnap as the solution to transform philosophy into a respectable, scientific discipline:

> In philosophy we witness the spectacle (which must be depressing to a person of scientific orientation) that one after another and side by side a multiplicity of incompatible philosophical systems is erected. If we allot to the individual in philosophical work as in the special sciences only a partial task, then we can look with more confidence into the future: in slow careful construction insight after insight will be won. Each collaborator contributes only what he can endorse and justify before the whole body of his co-workers. Thus stone will be carefully added to stone and a safe building will be erected at which each following generation can continue to work. (Carnap, 2003, p. xvii)

What is interesting, is that both Russell and the logical empiricists saw the sciences not only as a model of knowledge but primarily as a model for *organizing the inquiry*. They saw in the sciences (especially in physics and mathematics) a style of *intellectual production* that was able

[30]«Especially In the work of the Vienna Circle and Reichenbach's Berlin group, scientific philosophy became an explicitly socialist, technocratic project to the production of rational, expert knowledge to be used in the service of society's needs» (Richardson, 1997, p. 434). Unfortunately, this is not the space to delve into this very interesting topic, that has been extensively studied by recent scholarship on logical empiricism. See (Galison, 1990, 1996) for the reconstruction of this fascinating story.

to reach, in a disciplined way and without the use of brutal force, a *consensus* among researchers – exactly what philosophy, in their eyes, had failed to achieve in its whole history. As Richardson claims:

> Science was conceptualized [by logical empiricists] as a collaborative discipline in which each coworker provided a small bit of the whole by relying on the similarly piecemeal results of his fellows. (Richardson, 1997, p. 438)

> The scientific philosophers saw science as an intrinsically collaborative project, built by workers relying on the methods and results of their fellows, striving to produce clear, intersubjectively understood and accepted results. […] Scientific philosophers were to be specialists in a narrow range of philosophical problems and concerns. (434)

It should be now clear that the project of scientific philosophy has been at least partially realized in the *practices* of analytic philosophy, especially in its late phase. As Richardson himself remarks: «we can only conclude that Russell's hope of founding a philosophy that operated like a technical science has been at least partly realized» (433) and, more recently: «in many ways the vision of the philosophical research community endorsed by the scientific philosophers has been achieved within the community of analytic philosophers» (Richardson, 2008, p. 93). In the previous sections, it was showed how contemporary analytic philosophers do correspond to the 'scientific philosopher' adumbrated by Russell and logical empiricists: they *are* highly specialized researchers, working on narrow-focused topic with specific technical skills.

> Analytic techniques clearly land themselves to piecemeal approaches and to collaborative work of the kind familiar in science [that] can be presented in brief articles (Beaney, 2013, p. 27)

> AP [analytic philosophy] is at its core a culture driven by puzzles, rather than by large-scale, systematic theoretical goals. Russell recommended stocking up on puzzles from as early as 1905; *Analysis* was founded as a puzzle-solving journal (Mulligan, Simons, & Smith, 2006 : 65)

> [analytic philosophers] nowadays incline to focus their investigations on issues of small-scale detail (Rescher, 2005, p. 8)

Moreover, the mimicking of scientific models is sometimes explicitly noted and deplored as a form of 'scientism':

> Scientism […] inhabits some regions of analytic philosophy. This is reflected, for example, in views of philosophical research based on scientific models: to work at the 'cutting-edge' of the discipline involves reading the very latest articles published in, say,

> *Mind* or *Analysis*, and coming up with criticisms, counterexamples, further arguments, or alternative theories in response (Beaney 2013, pp. 58-59)

Note that the 'scientism' Beaney deplores does not consist in a sort of 'reverence' towards scientific knowledge but in the adoption of behaviors and practices spread in the sciences, such as reading only the most recent literature in the most prestigious journals. These behaviors concern the style of *production* of Late Analytic Philosophy, not the intellectual *product* of this activity.

Two other features of the current practice of analytic philosophy that mimic the scientific style are the following:

1) the adoption of the *peer-review system* (what Ryle calls the «new professional practice of submitting problems and arguments to the expert criticism of fellow craftsmen», (Ryle, 1965, pp. 3–4)), designed to guarantee the quality of the philosophical production by a communalist system of control.
2) the centrality of the *journal literature* in Late Analytic Philosophy. The brief, technical and specialized article, almost incomprehensible for the layperson outside the profession, is more and more the principal way in which analytic philosophy is communicated. As Levy remarks: «It is easy to think of important philosophers in the analytic tradition whose reputation rests on journal articles alone, or whose books tend to consist of collections of previously published articles – Frank Ramsey, Bernard Williams, and Donald Davidson spring to mind. Gettier would be an extreme example» (Levy, 2003, pp. 294–295).

The similarity between analytic philosophy and science, not in terms of intellectual content but in the style of intellectual production, has been further investigated by Richardson (2008) and Levy (2003). Richardson has proposed to conceptualize analytic philosophy as a «marginal science»:

> Analytic philosophy is, indeed, much more interesting than, say, astrology or phrenology as an example of marginal science, since it has been more successful in adopting certain aspects of the scientific research organization and ethos; it retains a place within the academic world, and, thus, a degree of epistemic authority, and the figure of the philosophers still has a certain cultural resonance and significance (for example, occasions for eloquence and edification, such as graduation speeches, often bristle with philosophers, but rarely or never with astrologers and phrenologists, historical or contemporary). (Richardson, 2008, p. 95)

In the present study, the term *para-science* will be preferred to that of 'marginal science', because it is more neutral in tone and more direct in highlighting the similarity of Late Analytic Philosophy to the sciences, but the essence of the matter remains the same.

The para-scientific nature of analytic philosophy in general is stressed by Levy, who explicitly compares analytic philosophy to a Kuhnian normal science, noting that «AP has successfully modeled itself on the physical sciences […] and the discipline is reproduced in something akin to the way in which the sciences are reproduced» (Levy, 2003, p. 291), whereas Tripodi, focusing specifically on Late Analytic Philosophy, uses an explicit Kuhnian terminology:

> [From 1970s onward], analytic philosophy has often presented itself as a case of normal science, in contraposition with the revolutionary and pioneering science of the beginning, that is as a discipline extremely specialized, and therefore fragmented, characterized by a widely-shared methodological and stylistic canon and by an increasing number of narrow-focused debates, each one of them comprehending specific, intra-paradigmatic researches. (Tripodi, 2015, pp. 215–216) *our translation*)[31]

Indeed, several features of Late Analytic Philosophy fall coherently within the theory of science developed by Kuhn, not only in *The Structure of Scientific Revolutions* (the main reference of Levy 2003) but also in his later production. In his later works (see the writings collected in Kuhn, 2000), Kuhn developed the insights of the *Structure*, partly revising his model of scientific change. In particular, he highlighted how the outcome of a scientific revolution could be of two types: a) the replacement of the old paradigm with the new one, or b) the branching of the original specialty into two new, almost independent, sub-specialties. If the *Structure* focused only on the first kind of outcome, highlighting the classic dynamic of normal science-crisis-revolutionary science-new paradigm[32], in the later works Kuhn analyzed the second outcome, insisting that the production of new specialties (*specialization*) is a key component of scientific change (see in particular Kuhn, 1991). Kuhn argued thus for 'branching model' of scientific development (Mulkay, 1975).[33]

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[31] «In questo periodo la filosofia analitica ha spesso presentato se stessa come un caso di scienza normale, in contrapposizione alla scienza rivoluzionaria e pionieristica delle origini, cioè come una disciplina estremamente specializzata, e pertanto, frammentata, caratterizzata da un canone metodologico e stilistico largamente condiviso e da un numero sempre crescente di dibattiti settoriali, ciascuno dei quali è caratterizzato, al suo interno, dalla presenza di discussioni e ricerche particolari di tipo intraparadigmatico» (Tripodi, 2015, pp. 215-216)

[32] In the light of the criticisms to the *Structure* (Lakatos & Musgrave, 1970), Kuhn revised the notion of paradigm. In its later works, he prefers the notions of scientific lexicon or taxonomy. See (Wray, 2011) for a detailed reconstruction of the essential role that specialization play in the philosophy of science that Kuhn developed in his late writings.

[33] A variant of the branching model, focused on a fractal pattern of evolution, has been proposed by Abbott to account the history of social sciences (Abbott, 2001).

Late Analytic Philosophy seems to fit Kuhn's model both in its early (the *Structure*) and revised (the later writings) versions. Professionalization, technicalization and the scientific style of intellectual production are indeed coherent with the concept of normal science, that is after all explicitly used by commentators in describing Late Analytic Philosophy. The processes of specialization and fragmentation, on the other hand, fit with the branching model of scientific change endorsed by later Kuhn. The phenomenon of sub-disciplinary proliferation seems in particular well-fitting the model.

In sum, the fact that several features of Late Analytic Philosophy fit the Kuhnian models of both normal science and scientific change, provide further justification to the claim that Late Analytic Philosophy can be legitimately addressed as a *para-science*.

## Sum up of Chapter 1

The main purpose of this chapter was to clarify the subject of the present study: Late Analytic Philosophy. The first section addressed the general notion of 'analytic philosophy', whereas the second section focused specifically on Late Analytic Philosophy.

The main result of first section, obtained by the survey of two literatures (the Analytic-Continental Divide debate and the History of Analytic Philosophy debate), was that 'analytic philosophy' is a multi-purpose term, that is used both to refer to a phenomenon (referential use) and to elicit some action (performative use). In the first case, analytic philosophy is used to denote two kinds of phenomena: a set of intellectual traits (intellectual level) or a socio-professional entity within the academia (social level). It was shown how the intellectual and the social layers of analytic philosophy are complexly related (some commentators attempt to show, for instance, that intellectual commitments are the ideology of a socio-professional group). At the end of section one, it was argued that, in this study, analytic philosophy would be used in its referential use (evaluative and normative issues, in particular, will be left aside). However, it remains to be determined if analytic philosophy will be individuated as a primarily intellectual or social object.

The second section of the Chapter moved the focus to *Late Analytic Philosophy*. For the moment it was left open if Late Analytic Philosophy is intended as a social or intellectual phenomenon. Instead, we provided a general definition of Late Analytic Philosophy in purely chronological terms (as analytic philosophy developed in approximately the last forty years), and we highlighted six features of this phenomenon:

1. The *growth* of the analytic enterprise (in terms of professionals, philosophical production and philosophical sub-disciplines)

2. The *fragmentation* of the field (lack of a first philosophy, the proliferation of partly independent, narrow-focused sub-areas)
3. The process of *specialization* taking place in Late Analytic Philosophy (with the weakening of the informational flows among philosophical sub-specialties)
4. The *professionalization* of Late Analytic Philosophy (full institutionalization in the university system, exoterization of the communication flows from the educated public to the community of experts, the development of a self-image as 'professionals')
5. The *technicalization* of late analytic language (development of formal methodologies and languages comprehensible only by the peers of the community)
6. A *scientific style* of intellectual production (comprehending: the focus on well-delimited puzzles, the dissemination of the research products in the form of papers in the professional journals, the implementation of communalist features of intellectual production, such as the peer-review and a co-operative style of work)

In the next Chapter, it will be highlighted why the detailed investigation of these features call for new methodologies, different from the standard close-reading approach familiar in the historiography of (analytic) philosophy. Then, the problem of *individuating* Late Analytic Philosophy will be reconsidered, and the strategy to address it (operationalization) will be discussed.

# Chapter 2

This Chapter presents and justify the methods that we will use to investigate Late Analytic Philosophy. These methods come from the field of scientometrics, i.e., the discipline studying the quantitative aspects of science. In the first section, we will introduce the main methodological challenge that the historian of Late Analytic Philosophy has to face (we will call it the 'Rescher's Methodological Challenge'), and we will argue that scientometrics can successfully address it. The second section is devoted to present scientometrics itself and its main method, namely citation analysis. After a brief summary of the history of the field, we will focus on the theoretical aspects of citation analysis, in order to clarify the theoretical framework that we will use in the present study. The third section of the Chapter returns to the problem of defining Late Analytic Philosophy that we have left pending from Chapter 1: we will argue that scientometrics offers a new kind of 'operational definition' of Late Analytic Philosophy as a *set of documents*. Lastly, in the last section we will discuss some of the standard shortcomings of using scientometrics for investigating a humanistic field, and we will explain why they do not regard our object of study.

## Rescher's Methodological Challenge

At the end of Chapter 1, six features of Late Analytic Philosophy, as commonly perceived by both historians and analytic philosophers, were highlighted. This section aims to assess the methodological consequences that the recognition of such features has at the level of the historical description, i.e., their *historiographical* import. The main claim of this section is that the six features of Late Analytic Philosophy challenge the traditional method commonly used to write the history of philosophy, i.e., the method of close reading.

The idea that the study of Late Analytic Philosophy constitutes a methodological challenge to the historians, pushing them towards new methods and even new research practices, has been clearly pointed out by Tripodi. In the introductory remarks to his *Storia della filosofia analitica*, he asserts that «a collective work, as well as non-standard methods, will be needed [to write the

history of late analytic philosophy]» (Tripodi, 2015, p. 12).[34] The main motivation for the adoption of such «non-standard» methods is directly linked with the first feature of Late Analytic Philosophy that was highlighted in the previous Chapter, namely the *significative growth* of analytic philosophy in the last fifty-forty years. The number of documents (i.e., philosophical texts) that the historian has to confront with in order to reconstruct the history of Late Analytic Philosophy has raised to such an extent that they are *unmanageable* by the single scholar. The growth of the 'primary literature', i.e., the mass of historical evidence, has reached a point that it overcomes the cognitive resources of the individual, calling thus for a *collective* organization of the historical research.

However, the simple turn from the individual to the team is not sufficient for addressing the challenge. According to (Bonino and Tripodi 2018b), two other features of Late Analytic Philosophy, namely its specialization and fragmentation, constitute *kinds of phenomena* that are difficult to grasp and study by the traditional categories of the historiography of philosophy:

> The sheer quantity of philosophical production in the recent phase of analytic philosophy, together with its progressive specialization and fragmentation, makes is peculiarly difficult to pursue the traditional of (internal) history of philosophy. (Bonino and Tripodi 2018b, pp. 10-11)

As noted in Chapter 1, specialization and fragmentation are not intellectual contents of Late Analytic Philosophy *per se*, but seems to be more conditions, or constraints, in which intellectual contents are produced. They are not philosophical theories or arguments, but ways in which philosophical theories and arguments are organized in the intellectual and social space. Since history of philosophy focuses traditionally on intellectual contents (that is, it is a form of 'internal' history, as Bonino and Tripodi say[35]), it seems that it lacks both the *categories* to conceptualize phenomena like specialization and fragmentation, as well as proper *methods* to describe their temporal structure and impact on intellectual contents. These are the reasons why Bonino and Tripodi propose to turn to conceptual frameworks and research methodologies that have been developed outside the historiography of philosophy:

> We are convinced that the contribution of the sociology of knowledge, the institutional history of science and of education, the social epistemology, etc. would be of considerable help in tackling the complicated tasks and questions involved in investigating the history of Late Analytic Philosophy (Bonino & Tripodi, 2018b, p. 11)

[34] «Sono convinto che dovrà trattarsi di un lavoro collettivo e, probabilmente, di una ricerca basata su metodi meno convenzionali» (Tripodi, 2015, p. 12)

[35] We will return on the distinction between 'internalist' and 'extarnalist' approaches to the history of philosophy in Chapter 4.

It is worth noting that one of the few studies addressing the phenomenon of *specialization* in contemporary philosophy (not only analytic) has been pursued by a philosopher of science (not a historian of philosophy) using a methodology borrowed from the social sciences (data analysis instead of close reading of texts), and published in a social science journal (*Scientometrics,* not a journal of history of philosophy). This study (Wray, 2014) begins by noting that «scientific specialization has been studied quite extensively, primary by sociologists and historians of science […] But specialization and specialty formation in philosophy have not been studied» (Wray, 2014, p. 1763), highlighting the fact that the very research question about specialization stems from history and sociology of science, more than history of philosophy. The method Wray uses to investigate the phenomenon is a post-hoc statistical analysis of data gathered by a survey amongst professional philosophers (the *PhilPapers Survey* conducted in 2011, see (Bourget & Chalmers, 2014) for a detailed description of the survey and its main results). This is a traditional social scientific method, very distant from the close reading approach typical of the historiography of philosophy. Still, this method provides precious insights on specialization, because it allows 1) to conceptualize the phenomenon by a specific *operationalization* of it, i.e. by transforming an abstract concept into an empirical, testable subject of research (Calhoun, 2002)[36]; and 2) to map the degree of specialization on specialty sub-areas of contemporary philosophy, discovering that the size of a specialization is correlated (via a power law relation) with the degree of specialization.

Thus, Wray (2014) is an excellent example of how the study of a feature of contemporary philosophy (specialization) calls for methodological innovations in the historiography of philosophy in at least three directions: a) the adoption of *theoretical frameworks* developed outside historiography of philosophy (in this case, history and sociology of science); b) the use of *epistemic operations* that are not traditional tools of the historian of philosophy (such as operationalizing concepts); c) the adoption of new *research methods* to study phenomena (such as surveys and data analysis).

However, the main call for methodological innovation remains the first feature of Late Analytic Philosophy, namely the sheer growth of the philosophical production. Rescher has lucidly pointed out the methodological consequences that this phenomenon has for the historian of philosophy. According to him, the first effect of the growth of philosophy is that the individual philosopher cannot anymore follow the whole production of her colleagues:

[36] Wray calculates the degree of specialization of an area as the ratio between the number of people who claim the areas as their *primary* area of specialization and the number of people who claim the area as *an area* of specialization. Clearly, this index can range between 0 and 1 (Wray, 2014, p. 1764).

> The growth of the discipline has forced it beyond the limits of feasible surveillance by a single mind. After World War II it becomes literally impossible for American philosophers to keep up with what their colleagues were writing (Rescher, 2005, p. 8)

This state of affairs has significant consequences on the role that the individual philosopher has in *shaping the discipline*, i.e., in the part that the individual *can have* in generating philosophical change:

> The nature of the philosophical enterprise is changing, with the earlier heroic phase of a small group of important thinkers giving way to a phase of disaggregated production in a scattered industry of diversified contributors (1)

The power that the individual philosopher has to shape the entire discipline is considerably reduced, and in fact, its intellectual action can affect only a sub-discipline or a sub-area of the field. This is expressed by Rescher in a passage that is worth quoting in extent because the metaphor of contemporary philosophy as a fragmented, feudal system has met a certain success among historians of analytic philosophy (it was mentioned for example by Soames at the end of (Soames, 2005)):

> For better or for worse, in the late twentieth century we have entered into a new philosophical era where what counts is not just a dominant elite but a vast host of lesser mortals. Great kingdoms are thus notable by their absence, and the scene is more like that of medieval Europe – a collection of small territories ruled by counts palatine and prince bishops. Scattered here and there in separated castles, a prominent individual philosophical knight gains a local following of loyal vassals or dedicated enemies. But no one among the academic philosophers of today manages to impose their agenda on more than a minimal fraction of the larger, internally diversified community. Given that well over ten thousand academic philosophers are at work in North America alone, even the most influential of contemporary American philosophers is simply yet another – somewhat larger – fish in a very populous sea. (Rescher, 2005, pp. 5–6)

What are the methodological consequences of this situation for the historian of philosophy, at the level of the historical description? If the aim of the historian is to reconstruct the philosophical change, i.e., to trace the intellectual innovation in philosophy, Rescher argues that such innovation in philosophy today should *not* be conceived as «the response to the preponderant effort of pace-setting individuals, but [as] a genuinely collective effort that is best characterized in statistical terms" (7). Hence, the key methodological proposal advanced by Rescher lies in the adoption of a *statistical approach to philosophical change*.

This suggestion has far-reaching implications on the plain of historical method, because

> it indicates a situation with which no historian of philosophy has yet to come to terms. In the "heroic" era of the past, the historian of the philosophy of a place and time could safely concentrate upon the *dominant* figures and expect thereby to achieve a certain completeness with respect to "what really mattered". But such an approach is grossly unsuited to the conditions of the present era. Those "dominant figures" have lost control of the agenda. To accommodate the prevailing realities, the story of present-day American philosophy must be presented in a much more aggregated and statistically articulated format. (24)

Therefore, a *statistical* approach, not centered on individual but collective actors, seems to be the only method that can account for the present configuration of philosophy (and of Late Analytic Philosophy in particular):

> The condition of American philosophy today is a matter of trends and fashions that go their own way without the guidance of agenda-controlling individuals. This results in a state of affairs that calls for description on a statistical rather than biographical basis (24)

The call for a description on a «statistical rather than biographical basis» of Late Analytic Philosophy, originating primarily from the quantitative dimension of Late Analytic Philosophy, is what we propose to name the *Rescher's Methodological Challenge*. This Chapter aims to take up Rescher's Challenge. In particular, we want to advance *Citation Analysis* as a fruitful answer to the challenge.

In the next section, Citation Analysis will be presented and the discipline from which it stems, i.e., scientometrics, will be introduced, whereas in section 3, we will provide a first glance at how Citation Analysis can provide the statistical approach called by Rescher. However, the main justification of the method's fruitfulness will lie in the results and insights it can offer when applied to the object under study. These will be presented in Chapter 3, where empirical citation analysis-based studies will be presented, and the results discussed.

## Scientometrics and Citation Analysis

According to the standard definition, scientometrics is defined as developing «the quantitative methods of the research on the development of science as an informational process» (Nalimov & Mulchenko, 1971, p. 2). Its cognate fields are *bibliometrics* («The application of mathematics and statistical methods to books and other media of communication», (Pritchard, 1969, p. 349)) and the more general *informetrics* («The study of the application of mathematical methods to the objects of information science» (Nacke, 1979, p. 220)) (De Bellis, 2014; Mingers & Leydesdorff, 2015). The history of the origins of scientometrics has been reconstructed in detail by Wouters, whereas De

Bellis has inscribed the scientometric project into a broader positivist tradition in the study of social facts, that dates back at least to the 19th century and the birth of statistics (De Bellis, 2014; Wouters, 1999b). For the purposes of the present study, we are not interested either to tell the whole history of the field nor to overview its main sub-areas systematically (see (Mingers & Leydesdorff, 2015)). Rather, we shall focus on some key aspects of scientometrics, which we deem crucial to understand how some scientometric methods will be used in this study.

The first thing to notice is that, even if scientometrics can study many other aspects of the quantitative dynamics of science (and technology), in practice it has developed around one core notion – that of *citation*. Thus, scientometrics and citation analysis can be considered in practice as synonyms. Citations are the references to previous work that scientific papers exhibit, usually at the end of the text, in sections variously called 'Bibliography', 'References', etc. They are a form of «manifest intertextuality» (Hyland, 1999), since they are usually presented in a shorter format in the body of the text (typically, as the combination of the name of the author with the year of publication of the referenced text), that points out to a full bibliographic record at the end of the paper, which, in turn, points out to the referenced document.

In the form of explicit references, citations are a relatively recent feature of scientific texts, since they appeared almost two centuries after the scientific revolution, in the context of the specific organization of the sciences in the late 19th century (Leydesdorff, 1998). Clearly, the tradition of referring to previous texts is much older and goes back (at least) to the scholastic tradition of Middle-ages commentaries. In the humanities, the use of footnotes for reporting primary sources is a crucial aspect of the modern historiographical method, as developed by Leopold von Ranke in the first half of the 19th century (Grafton, 1997). Nonetheless, citations in scientific texts play a different role compared to these two traditions, since they point to the works of other scientists, as opposed to authoritative texts or historical materials. Thus, scientific citations are a manifestation of the *collective* character of scientific achievements, in which each scientist builds on the works of previous scientists. During the 19th century, references were still directed to authors, not to specific dated texts. It is only in the 1910s that citations reached their modern format, in the same time that the scientific article reached its contemporary structure (Bazerman, 1988).

The standard format of citations, organized in the bibliographies of scientific articles, made them particularly suitable for being processed and counted automatically. This was the intuition of Eugene Garfield, who can be rightly considered the father, if not of scientometrics in general, at least of its main tool, namely the *citation index*. A citation index is basically a *list* that couples a set of cited items (namely scientific papers, in the case of a *scientific* citation index) with all

the documents citing them in their respective bibliographies. In a certain way, it can be considered as the *opposite* of the bibliography of a scientific article. A bibliography lists all the sources of an article, and following the references, it is possible to 'travel back in time' reconstructing the history of scientific claims. A citation index *inverts* the time axis and shows all the *subsequent* articles that cited a target paper, reconstructing the history of its 'reception' (Wouters, 1999b). An important feature of a citation index is that it makes possible to *count* the citations a document collects after its publication, producing a 'citation score'.

Garfield established the first science citation index (the Science Citation Index, SCI) in 1964 in Philadelphia (USA) and founded at the same time a private company to maintain it, the Institute for Scientific Information (ISI). Garfield main purpose in building the SCI was to improve *information retrieval* in science. As Wouters has shown, the creation of the SCI is related to the wider context of science in the 1950s and, in particular, to the so-called 'information crisis' (Wouters, 1999b, Chapter 3). After the Second World War, science had increasingly been felt to grow too fast, delivering an amount of literature that was more and more difficult to handle for the scientists. This explosion of scientific information was an outcome of the advent of the so-called 'Big Science', i.e. the new kind of science, inaugurated by the Manhattan Project, in which the scientific progress increasingly came to rely on large-scale projects funded by huge amounts of public money and involving big teams of researchers (Elzinga, 2012; Godin & Schauz, 2016).[37] In this context, information retrieval became a prominent concern of the scientific community. Garfield, by the SCI, aimed at offering a solution to this problem. He reasoned that the citations a scientific paper receive from following papers can be considered analogous to *subject headings* used classically by librarians to classify scientific documents, because scientists cite papers that are (at least, in general) *relevant* to the research they report in their papers. Citations could be therefore used to collect documents dealing with the same topic. Thus, the SCI was proposed, initially, as a tool for improving information retrieval. However, Garfield quickly realized that the SCI had, potentially, other applications, for example of historical nature. It is worth quoting the passage where he motivates this, because it contains, *in nuce*, what the main use of the SCI will turn out to be:

> This would clearly be particularly useful in historical research, when one is trying to evaluate the significance of a particular work and its impact on the literature and the

[37] The term 'Big Science' was coined by Wienberg in a famous article in *Science* (Weinberg, 1961). This is how Price depicts the advent of Big Science: «Not only are the manifestations of modern scientific hardware so monumental that they have been usefully compared with the pyramids of Egypt and the great cathedrals of medieval Europe, but the national expenditures of manpower and money on it have suddenly made science a major segment of our national economy. The large-scale character of modern science, new and shining and all-powerful, is so apparent that the happy term "Big Science" has been coined to describe it» (Price, 1963, p. 2).

> thinking of the period. Such an "impact factor" may be much more indicative than an absolute count of the number of a scientist's publications. (Garfield, 1955, p. 109)

Therefore, the SCI promised to be not only a tool for information retrieval but also a sort of 'sensor' able to monitor the impact of scientific articles in the scientific community. Furthermore, the SCI allowed measuring a vague notion such as impact, transforming it into a number, namely a *citation score*. A citation score is the number of citations that a paper collects after its publications. The history of scientometrics is, in a way, the history of the meanings that have been attributed to citation scores, or, otherwise said, the history of the *interpretations* of citation scores.

### Scientometrics and science evaluation

The SCI allowed not only to count the number of citations a *paper* collected but also to aggregate the citations a *scientist*, considered as the author of scientific papers, receives by colleagues. Thus, not only documents could be weighted, but also authors, as well as aggregates of authors (a research team, a university department, even the scientific staff of an entire nation). In this manner, scientists with different citation scores can be compared, and the distributions of scientists relative to the citation scores can be calculated, opening an entire range of quantitative questions: who are the most cited researchers? How many scientists are cited over a certain threshold? Are citation scores of scientists distributed in a Gaussian way or not? The answers to these questions are particularly relevant if citation scores are intended as *proxies or indicators of research quality*. In fact, it seems plausible to think that a scientist that is widely cited is someone whose work has been widely used in the scientific community because she has produced some important scientific achievement. On the other hand, a scientist who is poorly cited is probably someone whose work has not been judged as particularly relevant or useful by the scientific community. According to this line of reasoning, citation scores seem then to be linked with scientific quality (in so far as this is conceived as the impact a scientific work has on the scientific community). Indeed, this reasoning paves the way to the application of citation data in the context of research(ers) evaluation, i.e., to what is known as *evaluative scientometrics* (Moed, 2005, 2009, 2017; Whitley & Gläser, 2007, Chapter 5). Evaluative scientometrics uses citation scores (or, more precisely, statistical elaboration of citation scores) to assess and evaluate the research performance at various levels of aggregation (from the individual university to the nation). Its core assumption is that citations are somehow correlated with the recognition of scientific quality by the scientific community.

In the context of contemporary Big Science, the idea of having a quantitative measure of the research quality, such as the one evaluative scientometrics provides, sounds very appealing in

the context of science policy, that is in the context of the management and assessment of research activities.

Since the Seventeenth century, science had been an auto-referential activity, internally controlled by the scientists themselves. For the most of the history of science, the scientific achievements were evaluated by other scientists, through the mechanism of peer-review, not by actors external to the scientific community. The idea of 'academic freedom', developed in the wake of the Humboldtian reform of university at the beginning of the 19th century, was closely linked to the ideal of the *autonomy* of science (in the broad sense of *Wissenschaft*) from the rest of the society (and, in particular, the religious and political power) (Ben-David, 1984).

However, the advent of Big Science after the Second World War put under tension this ideal, because of the huge quantity of public money that was increasingly poured into the research system. Moreover, the war had patently shown the Western governments the *strategic* importance of science and technology. Antibiotics, radar and, obviously, the nuclear weapons were decisive in assuring the victory and military supremacy to the United States. Figures like Vannevar Bush, head of the United States Office of Scientific Research and Development (OSRD) during the war, strongly advocated the importance of delivering a huge budget to scientific research (Bush, 1945; Schauz, 2014). The Cold War pushed even more pressure on science, with the 'space race' between the United States and the Soviet Union between the Fifties and the Seventies being one of the key episodes (Bucchi, 2010). The huge investments needed for the large-scale scientific projects on one side, and the strategic importance of science for military supremacy on the other, imposed a new kind of *accountability* to the scientific community. Furthermore, the economic crisis of the middle Seventies caused important cuts to the public budgets. The *efficient* use of resource become a key need of governments, also in the management of scientific activities (Elzinga, 2012).

The crucial outcome of this complex historical process was the idea that the managing and organization of science could not be any more in the hands of scientists alone. In particular, the evaluation of science and scientists could not anymore rely only on peer-review and expert judgment. Evaluative scientometrics seemed to offer a solution to this problem: citation data, gathered through the citation index, promised to be an *objective measure* of scientists' performance that was understandable by non-scientists: in particular, by science managers and policymakers (Wouters, 1999b). From the 1970s citation data started to appear in policy contexts: ISI data were included in the (US) National Science Board's *Science Indicators Reports* in 1972 and were used by OECD. The advent of neo-liberal New Public Management (NPM) in the 1980s finally put citations and citation metrics at the center of the science-policy stage, taking scientometrics from relative obscurity to a major (and often much criticized) role in the social

and political life of the scientific community (Daniel, Hug, & Ochsner, 2016; De Bellis, 2014; Elzinga, 2012; Whitley & Gläser, 2007). Today, in some European countries such Italy, citation data play a crucial role in the assessment of the research quality, directly affecting the carriers of scientists and the destiny of universities and research centers (Baccini & De Nicolao, 2016; Bonaccorsi, 2015; Galimberti, 2012; Wouters, 2018).

Now, this sketchy account of the history of the relationship between scientometrics and science policy did not aim at providing a complete historical reconstruction of science policy development in the second half of the Twentieth century. Rather, it aimed at highlighting the fact that scientometrics has always had, almost from his foundation as a discipline (the journal *Scientometrics* was founded in 1978), a clear inclination towards *applied* matters, in particular towards the *evaluative* context of science: «an important area of application of citation analysis since the very beginning of citation indexing has been evaluation of performance» (Luukkonen, 1997, p. 28).

This is particularly evident if we compare scientometrics to other disciplines that, during the 20th century, had studied science, namely philosophy of science, history of science, and sociology of science. With the partial exclusion of sociology of science, all these areas of research had no impact on the organization of scientific enterprise, let alone its evaluative practices. Furthermore, they remained based in the academy, with almost no relation with policy organization and governments. Scientometrics, on the contrary, besides having some academic entrenchments (especially in the Netherlands), has increasingly had strong connections not only with government and universities administrations, but also with private companies (as reminded above, the ISI was founded as a private company; today the main science citation index is produced by Clarivate Analytics, a huge *private* multi-national enterprise). Being aware of these features of scientometrics is very important because it allows to understand better and contextualize the different strands of the theoretical debate about the meaning and function of citations that have crossed the field since the Sixties. In fact, the interpretation of citation scores as indicators of research quality has been only one of the interpretation of citations that have been proposed, and it rested on several assumptions that have been criticized in the scientometric debate.

## The recurrent call for a theory of citation

Even if, as reminded above, scientometrics has always been to a certain extent more an 'applied' than 'pure' science, the theoretical reflection on citations has not lacked among its practitioners. This is true for Garfield himself, who, as we have seen above, promoted the SCI not only for improving information retrieval but also as a tool for reconstructing in a new way the history of

science (Garfield, 1955, 1979). In fact, citation data attracted the attention of historians of science and sociologists of science very soon.[38] In particular, the historian of science Derek de Solla Price boarded citation data on his quantitative approach to the history of science (Price, 1963, 1986b), opening several research venues that are still lively parts of scientometrics research today (e.g., the study of literature aging in science, (Price, 1986a), or the study of networks of authors and papers to detect 'invisible colleges' of scientists, see (Price, 1965) and (Crane, 1972)). In sociology of science, citation analysis was widely used by the school of sociology of science gathered around Robert K. Merton at the Columbia University, developing the so-called 'institutional' approach to sociology of science (Bucchi, 2010). The Cole brothers (Stephen and Jonathan), in particular, contributed with a series of studies to advance the idea that high citation counts are correlated with high reputation in the scientific community and high-quality research output (e.g. (Cole & Cole, 1967, 1973, 1975), see also (Cole, 1992)). They showed for example that Nobel laureates had citation scores significantly higher than the average scientist. Robert Merton himself, in a volume called *Towards a Metric of Science. The Advent of Science Indicators*, explicitly endorsed Garfield's SCI as a reliable source for data about science and scientific performance (Elkana, Laderberg, Merton, Thackray, & Zuckerman, 1978).

Given the role that citations had in these sociological works, it is not a surprise that the first attempts to provide a theoretical foundation for citation analysis came from sociology of science. Indeed, the first call for a 'theory of citation" was launched by the sociologist Kaplan in 1965, just one year after the first publication of the SCI (Kaplan, 1965). The call for the theory was soon joined by criticisms of citation analysis, often aiming at limiting (or completely avoiding) the use of citation data in evaluative contexts. (Gilbert, 1977) is the ancestor of a long tradition of criticisms of citation analysis and scientometrics, that is today still alive (MacRoberts & MacRoberts, 2018). From the Sixties onwards, the call for a theory has been a recurrent theme in scientometrics (Cozzens, 1989; Cronin, 1981, 2000; Leydesdorff, 1998) and in 1998, the journal *Scientometrics* devoted a whole special issue to it. According to the defenders of citation analysis, a comprehensive citation theory should be able to provide a theoretical foundation of citation analysis and justify, at the same time, the use of indicators in science policy (Wouters, 1999b).

In the next section, the main perspectives by which a citation theory has been searched for will be presented. Rather than providing a chronological account of *all* the theories that have been proposed since the Sixties (see (Moed, 2005, Chapter 15) and (Bornmann & Daniel, 2008)), we prefer

[38] Philosophers of science, on the other hand, were not particularly impressed by the SCI. Leydesdorff argues that the scarce attention Neo-positivist philosophers of science payed to the SCI was motivated by the idea that citations were part of the 'context of discovery' and not the 'context of justification' of science (Leydesdorff, 1998, p. 14).

to offer a personal organization of the theories, grouping them in three big approaches. Once again, the aim of this Section is *not* to provide a full historical reconstruction of the development of scientometrics or a complete survey of all the theoretical options on the market in matters of citation theory. Rather, we aim to highlight, within the debate, a perspective that we take to be fruitful for addressing the Rescher's Methodological Challenge. Such a perspective will be the one that will underlie the empirical analyses of Late Analytic Philosophy of Chapter 3. The three perspectives we distinguish in the debate about citation theory are the following:

a) Social and psychological theories of citing behavior
b) Theories of indicators
c) Epistemological theories of citation

### Sociological and psychological theories of citing behavior

As reminded above, Kaplan launched the first call for a theory of citation in 1965, remarking that, notwithstanding the increasing use of citation data in historical and sociological studies of science, «little is known about the norms and behavior surrounding citation practices in science» (Kaplan, 1965, p. 179). Kaplan framed the problem of citation theory in a specific light: he argued that a citation theory had to be a theory of «citation practices», i.e., a theory able to account for a specific behavior of scientists, that of providing references to other articles in their works. Thus, the kind of theory he asked for can be characterized as a *theory of citing*, i.e., a theory of the reasons why scientists cite, a theory of the *act* of citing.

Kaplan' argument begins by remarking that the «most important fact» emerging from the (at the time) pioneering statistical analysis of citations was that they presented some discernible «patterns» (e.g., the average number of citations per paper, the ratio of self-citations). The presence of such patterns suggests that they are not produced by a random behavior, but by a sort of rule-governed practice:

> The existence of these statistical regularities suggests some underlying, but as yet ill-defined, set of norms governing the behavior of scientists communicating their results in the periodical literature (Kaplan, 1965, p. 180)

Thus, the existence of norms guiding the scientific behavior of citing is deduced from the fact that citations are not *randomly* distributed.[39] Kaplan argues that, if citation behavior is norm-guided, then its explanation should take the form of a *normative* theory. At the times of Kaplan,

[39] The observation of the non-random distribution of citations (especially when they are aggregated in big sets) will be reiterated by scientometricians, and it will be a central feature of indicator theories (see next paragraph).

the most refined theory of this kind was the *normative theory of science* developed by the sociologist of science Robert Merton and his school.

The pillars of Mertonian theory, which are rooted in the structuralist-functionalist paradigm in sociology developed in the Fifties by Talcott Parsons (Jedlowski, 2009), may be summarized as follows: 1) science is considered as an institution having a significant degree of *autonomy* from other spheres of the society; 2) As an institution, science has an internal *system of reward* that steers the behavior of scientists by distributing rewards and sanctions; 3) Thanks to the reward system of science, scientists behavior conforms to an *ethos*, i.e., to a set of *norms*. The norms of science Merton pointed out (often referred as the 'CUDOS' norms) are the following (Merton, 1974):

a) Communalism: scientific knowledge should not remain private property of the scientists but should belong to the entire scientific community. Therefore, scientists must share their findings by communicating them in the form of publications.
b) Universalism: in science, knowledge claims should be judged regardless of the social and personal attributes of scientists proposing them; in other terms, scientists should judge scientific outcomes in a universalistic, instead of particularistic, manner.
c) Disinterestedness: scientists should not act for personal gain (including money), but for the sake of knowledge. More precisely, science does not reward scientific achievements with money, but by conferring *prestige* (a central notion of the Mertonian sociology of science) to their authors, in the form of prizes (e.g., the Nobel), prestigious chairs (e.g., Collège de France) and eponymous achievements (e.g., the Planck constant).
d) Organized Skepticism: scientists should scrutinize knowledge claims critically, avoiding a dogmatic stance and the influence of religious or political prejudices.[40]

It is important to underline that, according to Merton, scientists follow these norms of behavior not because they have some special moral quality as persons, but because 1) following these norms scientists can *benefit* of the works of others scientists (this is the reason why Disinterestedness as a social norm should not be confused with Altruism, a psychological feature); 2) science as an institution has an internal *system of reward* that sanctions scientists not following the norms, and that rewards with prestige scientists following them.

Now, Kaplan argues that the citation behavior of scientists can be successfully explained by the hypothesis that scientists conform to the Mertonian norms. In particular, he argues that the

[40] In later works, Merton added the norm of Originality.

citation is a social device whose function is to *balance* the aspiration of the individual scientist for recognition (prestige) with the norm of Communalism:

> The citation is probably among the more important institutional devices for coping with the maintenance of the imperative to communicate one's findings freely as a contribution to the common property of science [the norm of Communalism] while protecting "individual property rights" with respect to recognition and claims to priority (Kaplan, 1965, p. 181)

According to this picture, scientists cite for paying their «intellectual debts» to other scientists and, by citations, they distribute recognition and prestige. It is scientist's self-interest to give credit to others because only by recognizing others' work her own work will be recognized. If credit, in the form of citations, is not given, other scientists «are likely to spread the word that there has been an infringement of the norm to acknowledge the help of other» (181), isolating the non-citing scientist. Moreover, from the norm of Universalism, it follows that citations are given by scientists, not for particularistic reasons, but where proper credit is due.

Merton endorsed Kaplan's theory of citation assimilating the citation to a «pellet of peer recognition» and recognizing it as an essential part of the reward system of science:

> The reference […] registers in the enduring archives the intellectual property of the acknowledged source by providing a pellet of peer recognition of the knowledge claim. (Merton, 1988, p. 622)

The Kaplan-Merton normative theory of citation behavior is particularly appealing for the applied side of scientometrics because it can provide a theoretical foundation to the idea that highly cited scientists are also high-quality scientists, i.e., that citation data can be reasonably used for evaluative purposes, as Kaplan himself noted.[41] Indeed, if a) scientists cite for distributing prestige, and b) prestige is given for universalistic rather than particularistic reasons, it follows that a scientist that has been widely cited in the community is a scientist whose work had been recognized as highly useful by her colleagues. Thus, the highly-cited scientists are the ones who have reached highly-valued scientific achievements, not the ones who occupy, for example, high places in the academic hierarchy. Hence, the big advantage of the normative theory of citation is the fact that, by maintaining that the ethos of science guides the citing behavior of scientists, it can provide a theoretical foundation to the use of citation scores in evaluation practices. As it was noted in the previous paragraph, the evaluative side of

[41] «Perhaps when we learn more about the actual norms and practices involved, we will be in a better position to know *whether* (and in what ways) it makes sense to use citations for different evaluation problems or as an index of quality at all.» (Kaplan, 1965, p. 181)

scientometrics is always present in the debate, also in the supposedly theoretical topic of citation theory.

The normative theory of citing, however, was not the only theory developed for explaining citation behavior. In 1977, Gilbert published a seminal paper that paved the way to an opposite interpretation of citations, the *persuasion theory* of citation (Gilbert, 1977). With the decline of the normative school and the rise of different forms of socio-constructivism in sociology of science during the 1970s, such as the Edinburgh Strong Programme or Sociology of Scientific Knowledge (Bloor, 1991; Bucchi, 2010), this theory was particularly consonant with the new image of science that emerged from the micro-sociological studies of science, inaugurated by Bruno Latour and Steve Woolgar (Latour & Woolgar, 1986). In fact, Latour himself endorsed a similar theory of citation in (Latour, 2003) (Luukkonen, 1997).

Both Gilbert and Latour consider the scientific paper as a «tool of persuasion», i.e., as a device used by the scientists to persuade, *by any means necessary*, her audience (the scientific community):

> I shall consider scientific papers as 'tools of persuasion'. A scientist who has obtained results which he believes to be true and important has to persuade the scientific community […] to share his opinions of the value of his work. (Gilbert, 1977, p. 115)

Citation plays an essential role in increasing the persuasiveness of the paper because they allow to «enroll», as Latour says, the authority of other scientists in support of it. It must be noticed that the persuasion hypothesis does not amount to the weak claim that scientists use citations as rhetorical resources, but to the stronger claim that persuasion in science relies on manipulation *indistinguishable* from that used in commercial advertising (Nicolaisen, 2007, p. 620). Thus, Gilbert argues that scientists cite preferably authoritative papers, trading on their acknowledged adequacy:

> Not all the relevant articles which might be cited are equally valuable in providing such support. In order to justify an argument to an audience of potentially interested readers, it is most effective to cite a selection of those papers which the intended audience believe present well founded, valid results. (Gilbert, 1977, p. 116)

This behavior has an important consequence: papers that acquire a favorable reputation, i.e. the ones that become particularly valuable as a reference, will be cited more and more, in a dynamic of "success breed success". This dynamic is analogous to the Matthew effect[42] and is

[42] The term 'Matthew effect' was coined by Merton and takes its name from the parable of the talents in the Gospel of Matthew, in which it is said that «the rich get richer and the poor get poorer». In sociology

supposed to explain the highly-skewed distribution of citations per papers that are familiar in biblio- and scientometrics.[43]

In his version of the persuasion theory of citing, Latour compares references in scientific papers to «successive defense lines» (Latour, 2003, p. 48) that the authors dispose to defend their claims from attacks of adversary scientists. The more references a scientific paper has, the more difficulties will face an opponent to deconstruct its claims. Latour argues that scientists *distort* and *re-interpret* the content of the cited references, bending them to their purposes (Latour, 2003). Furthermore, the real citing behavior of scientists would constantly violate the Kaplan-Merton normative picture, because the real motivations for citing would not be universalistic but *particularistic*: in deciding their references, scientists would consider primarily authoritativeness in the scientific community, instead of the scientific merit of scientists, because 'big name' provides better defenses against adversaries. If in the normative theory of citations scientists are meant to cite other scientists based on *what* they say, in the persuasion/socio-constructivist approach scientists cite other scientists considering first *who* they are (Baldi, 1998). The most important consequence of this approach is that citation scores cannot be used as proxies of *scientific merit*: at best, they are indicators of the authoritativeness of some scientists in the social network of the scientific community.

At the end of the Eighties, Cozzens attempted to synthesize the normative and the persuasion theories of citing behavior in the «rhetoric first model» (Cozzens, 1989). Once again, it is worth noting that Cozzens stresses the need for a clear theory of citation because of the increasing relevance of citation counts in the evaluation of basic research activities:

> Research managers who are considering the use of evaluative bibliometrics want to know what citations measure and how well they measure it, but there are no simple answers to these questions. (Cozzens, 1989, p. 437)

Cozzens argues that sociological theory has considered citations from two perspectives: as part of the reward system of science (Kaplan, Merton and the Cole brothers) or as part of the persuasion system of science (Gilbert and Latour):

> Citations stand at the intersection between two systems: a rhetorical (conceptual, cognitive) system, through which scientists try to persuade each other of their knowledge claims; and a reward (recognition, reputation) system, through which credit for achievement is allocated. (440)

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of science, the Matthew effect describes the dynamics of cumulative advantage by which eminent scientists tend to increase their prestige faster than unknown scientists (Merton, 1974, 1988).

[43] We will return on the topic of the skewness of bibliometric properties in Chapter 3.

Then, Cozzens contends that both systems *interact* in determining the number of citations an author collects so that the citation score of a scientist cannot be considered as resulting *only* from the intellectual recognition of her peers, as the normative theory asserts. On the contrary, rhetorical, persuasion-related factors are the *primary* determinants of the score (hence the qualification of "rhetoric-first" given to her model):

> Citations should be seen primarily as rhetoric and only secondarily as recognition. […] The familiar measures that help us tap into aspect of the reward system must be relegated to the role of accounting for the variation which is left after all measurable effects of rhetoric and communication have been taken in account. (445)

Now, it can be remarked that the phenomenon Cozzens attempts to explain is slightly different from the phenomenon Kaplan and Gilbert focused on. In the case of Cozzens, the explanandum is the *citation scores* of scientists, whereas, in the case of normative vs. persuasion theories, the explanandum is the *referencing behavior* of the citing author. In the former case, the focus is on the *cited* authors, in the latter, on the *citing* authors. This is an important difference, because the first perspective leads to the development of *indicator theories* (which will be examined in the next section), whereas the second perspective has been developed, mainly by Cronin, in the direction of the *psychology of citation practice*.

Before passing to the psychological or phenomenological approach to citation theory, it is worth reviewing, briefly, the studies that attempted to assess the merit of the two competing models (the normative theory and the persuasion model) *empirically*. It is important to underline the fact that it is not easy to design empirical tests for them because the two theories often make very similar predictions (Baldi, 1998; Small, 1998). For instance, they both predict that highly prestigious scientists will also be highly *cited*, but they differ on the interpretation of this result. In the normative perspective, the highly prestigious scientist will be widely cited because other scientists recognize her scientific merit and reward her contribution by citing her work. On the other hand, in the socio-constructivist perspective, the highly prestigious scientist will be widely cited because of her dominant position in the stratified structure of the scientific community, i.e., because citing scientists aim to enroll her authoritativeness to support their claims.

Since in the literature there are already some comprehensive reviews of the empirical studies undertaken to assess the competing theories (Bornmann & Daniel, 2008; Cronin, 1984; Liu, 1993b), we prefer to focus on the main empirical *methodologies* that have been employed by researchers, more than reporting all their findings. These methods can be divided into three main groups (Bornmann & Daniel, 2008; Cronin, 1984; Small, 1982; White, 2004):

a) citation *context* analysis,

b) citation *content* analysis

c) surveys/interviews of citing authors.

We present now the first two methods, whereas we will present the third one after the psychological approach to citation theory will be introduced since it is directly linked to that theoretical perspective.

### *Citation context analysis*

The methodology of citation context analysis focuses on the portion of text surrounding the citation in order to determine the function the citation plays in the *citing* document, or, more generally the *relationship* between the citing and the cited documents (Chubin & Moitra, 1975; Frost, 1979; Moravcsik & Murugesan, 1975; Spiegel-Rosing, 1977). The analysts have developed several classificatory schemes to this purpose, and between 1965 and 1979 their production become a little cottage industry within citation analysis, delivering no less than 10 different classificatory schemes (Baldi, 1998, p. 831). (Moravcsik & Murugesan, 1975) investigated citations in 30 articles in theoretical high energy physics and devised a classificatory scheme that considered five functions of the citations. The first (conceptual versus operational citations) and the third function (evolutionary vs. juxtapositional citations) were meant to provide insight into the type of connectedness of scientific communication, whereas the second (organic versus perfunctory) and the fourth dimension (confirmative versus negational citations) addressed the quality of the citations directly. The fifth dimension (valuable versus redundant) was related to the importance of the cited work for the citing work. The study of Moravcsick and Murugesan aimed to assess the use of citation scores as measures of scientific quality. According to the authors, the high percentage of perfunctory citations found in the papers (41%) casts «serious doubts» on the use of citations as an indication of quality. (Chubin & Moitra, 1975) followed up on Moravcsick and Murugesan's work and also studied citations in physics. They examined citations in letters and articles in major physics journals and devised a classificatory scheme which focused on defining citations as either affirmative or negative. They found that citations made by physicists were most frequently affirmative citations, whereas negational citations represented only a small fraction.(Spiegel-Rosing, 1977) is the first study of citation context outside the field of physics. Spiegel-Rösing examined citations in the first four volumes of the journal *Science Studies* and found that the most frequent function of references is to substantiate a statement made in the citing text or point out to further information. In fact, supportive citations represent 80% of the total. (Frost, 1979) is the first study to investigate the function of citations in a humanitistic area, i.e., German literary research. Frost discusses the differences as well as the similarities in the citation usage of sciences and humanities, highlighting the fact that in the humanities there is a clear difference between references pointing to primary literature and

references to secondary literature (i.e., research produced by other scholars). Finally, (Peritz, 1983) proposed a general scheme to classify citation roles (designed mainly for social sciences), which includes the following 8 categories of citations: setting the stage citations, citations providing background information, methodological, comparative, speculative, documentary, historical, and casual citations.

The method of citation context analysis requires the analyst to carefully read the citing documents, as well as an in-depth knowledge of the discipline under study. These requirements pose severe practical limits on the dimension of the samples that can be analyzed. Furthermore, since it is the analyst and not the citing author who is in charge of the classification, it can be said that these studies suffer of excessive subjectivity and, hence, lack of reproducibility (Cronin, 1984). These limits are particularly evident if the analysis of the citation context is meant as a method to investigate the citing author's *motivations* for citing a reference. Since we have to do with a private mental process, to accomplish this aim, we would need, to put it crudely, «to step inside the individual's head» (Cronin, 1984, p. 50).

### *Citation content analysis*

The second method is *citation content analysis*. It can be considered the reverse of citation context analysis, for it focuses on the function that a cited reference plays in the subsequent literature citing it (Y.-W. Chang, 2013; Garfield, 1978; Hooten, 1991; Leydesdorff & Amsterdamska, 1990; Oppenheim & Renn, 1978). Distinguishing analytically between the reference and the citation (Wouters, 1999b), citation context analysis can be characterized more precisely as the study of *reference* functions, whereas citation content analysis is directly concerned with *citations*. (Oppenheim & Renn, 1978), for example, examined a sample of 100 articles that cited the highly-cited paper by Watson and Crick on the discovery of the structure of DNA and classified the reasons citing author had for citing his paper. More recently, Chang has analyzed how the same source (namely Price's classic *Little Science Big Science*) is used differently in humanities and natural sciences (Y.-W. Chang, 2013). In so far as it is meant to capture citing authors' *motivations* for citing, citation content analysis shares many the limits of citation context analysis (limited dimension of the sample, subjectivity of the classification, time-consuming procedure, need for expert judgment):

> Each of the methodologies employed depends on inference rather than motivational analysis. None of the approaches mentioned is, or could have been, capable of providing us with privileged insights into the cognitive processes employed by citing authors. (Cronin, 1984, p. 49)

*The psychological approach (surveys and interviews)*

The psychological approach to citation theory considers citation as the public outcome of a complex psychological process taking place in the minds of the citing authors (this is the reason why this approach is sometimes dubbed 'phenomenological'). According to this approach,, developing a theory of citation amounts to investigate the *motivations* authors have when they cite, taking into account the diverse factors (from biographical to cultural) that influence their act of citing:

> Citations need to be thought of as a process. The outcomes of this process […] are lists of citations attached to scholarly papers. The character and composition of the lists reflect authors' personalities and professional *milieux*. […] We need, in effect, to move into the 'unexamined psychology of science' [reference omitted] if further progress is to be made. (Cronin, 1984, p. 83)

Cronin advances the idea that citations need to be situated at the intersection of the «habits, attitudes, experiences and expectations» (60) of four (analytically distinct but empirically often overlapping) groups of actors: the Quality Controllers (journal editors, referees and editorial board advisers), the Educators (senior scientists and teachers that transmit the 'tacit knowledge' of citation practices to the junior member of the scientific community), the Consumers (the readers of scientific literature), and the Producers (scientists as producers of scientific publications). All these different groups of people should be inquired in order to understand the citation process because they all have a part in it. At the end of the day, the theory of citation should answer, according to Cronin, the following key question:

> What motivated A to reference T1 rather than any other candidate text, whether written by B or another? What social-psychological variables come into play, in the shaping of an author's referencing behavior? (Cronin, 1998, p. 47)

At the level of the empirical methodology, the natural implication of the psychological approach is the direct questioning of authors (by surveys and interviews), if not micro-sociological studies of citing practices in the spirit of Latour and Woolgar ethnography of laboratories. (Brooks, 1986) has been the first attempt in this direction. He compiled a list of citer motivations and asked to a multi-disciplinary sample of authors at the University of Iowa to classify their own citations according to the list. The most remarkable result of the study was that «persuasiveness achieved remarkable success as a motivation» (Brooks, 1986, p. 227), as it was ranked as first motivation by humanities scholars and very close to the top in the science subset. Critics of citation analysis often mention this result because it seems to show that the persuasion hypothesis is the right explanation of scientists' citing practices (MacRoberts & MacRoberts, 1986, 1987b). However,

subsequent studies reported different results, producing no coherent picture. (Vinkler, 1998) surveyed authors of articles on chemistry and found that 'professional' (i.e., related to the intellectual content of the cited work), as opposed to 'connectional' (i.e. social-networking) motivations, were the most frequent citers' motivations. (Bonzi & Snyder, 1991) investigated the motivations authors have for citing both themselves and others, discovering that there are no significant differences between self-citations and citations to other works: both seem to be made for scientific, instead of social-networking, reasons. (Liu, 1993a) surveyed Chinese scientists and discovered that only a minority of them considered that more than 80% of their citations were essential, apparently undermining the normative claim that scientists cite for paying *all* their intellectual debts. This study then conformed previous citation context analysis studies such as (Moravcsik & Murugesan, 1975) that found a high percentage of 'perfunctory citations' in scientific articles.

Hence, the results obtained by interviews and survey did not coalesce into a coherent picture. In general, the very methodology of surveying or interviewing can be said to suffer from several *methodological* shortcomings (Bornmann & Daniel, 2008). First, one could argue that scientists may not be fully aware of (or candid about) why they cite a given reference (Baldi, 1998). Second, it is possible that scientists' memory is at fault, and the motivation provided is only a post-hoc rationalization. Third, there is no warrant that the interviewed scientists are consistent in their understating of the typology of reasons presented to them (Brooks reports that the historian and the pathologist had difficulties in adapting their motivations into the taxonomy proposed: the pathologist described many of his references simply as 'facts')

In the light of the methodological shortcomings of citation context analysis, citation content analysis, and surveys above mentioned, Baldi designed a new method to test the competing theories of citing behavior, based on a network-analytic approach and a multivariate statistical analysis (Baldi, 1998). He assigned to each paper in a set of papers in astrophysics several features, divided into *normative* relevant factors (such as the cognitive content the article and their scientific quality) and *social constructivist* relevant factors (such as the position of the author in the stratificatied structure of science). Then he used logistic regressions to determine the extent to which normative and social factors influence the *probability* that a citation exists between the papers.[44] The results identify the statistically significant positive effect of cited article cognitive content and quality, providing support for the normative theory. In contrast, indicators of an author's position within the stratification structure of science fail to improve the fit of the model significantly. Baldi's work provides significant empirical support to the

[44] Citations are conceptualized as dyadic relation in a network of documents, hence the definition of the method employed by Baldi as 'network-analytic'.

Kaplan-Merton theory of citation, but it may be remarked that his approach does not address scientists' motivations for citing directly. Rather, it *infers* an explanation of scientists' behavior from the *probability* that a citation exits between two papers. Thus, it could be taken to be insufficient for the researchers, such as Cronin, who are interested in the direct observation of the motivations that scientists have for citing.

### *Common features of sociological and psychological theories*

Although the citation theories examined so far (normative theory, persuasion theory, rhetoric-first model, psychological approach) differ under many respects, they share a common perspective on what a theory of citation should be. They all share the following assumptions on the form a theory of citation should have:

a) A theory of citation should be conceived as a theory of *citing behavio*r. All the three theories agree on the *explanandum*: it is the act of citing of the scientists that should be explained. From this common ground, they differ on the *explanans* proposed: Kaplan and Merton propose the norms of science, Gilbert and Latour the will of individual scientists to persuade her audience, Cozzens a combination of cognitive and social reasons, Cronin a complex range of psychological and cultural motivations.

b) *Methodological individualism*: the theoretical focus of a theory of citation should be the *individual authors* in the act of citing. The meaning of citation scores and other citation-based indicators is taken to be determined by the original motivation(s) citing authors had to cite. From this point of view, citations are taken to be the mere specular image of references.

c) The citation is conceived more as the *act* of citing than as the *product* of the action. This is the reason why Cronin talks of a citation «process», where multiple factors intervene in shaping the citing practices of authors: the focus is on the action of citing.

The second assumption of citing theories (methodological individualism) is particularly evident in the stream of criticism MacRoberts and MacRoberts advanced to citation analysis in the last thirty years (MacRoberts & MacRoberts, 1986, 1987b, 1987a, 2018). Their main point is that citations are *imperfect* indicators of intellectual influence because scientists just do not cite *all* the contributions that influenced their work (see also (Zuckerman, 1987)). They argue that the list of cited reference in a scientific article cannot be taken as a faithful record of all the works the author *de facto* used to produce it. MacRoberts and MacRoberts even calculated that an author, in average, cites only 30% of the references she should cite (MacRoberts & MacRoberts, 1986, p. 167). Therefore, they conclude, citation counts should not be used for evaluative purposes since many works that should be cited in fact are not. In particular, they claim that the equation "not cited = not used" simply does not hold. A low citation score does not mean automatically that a

scientist did not contribute to the scientific enterprise, but merely that citation data are inadequate indicators of scientific impact.[45]

Now, the criticism that the MacRobertses advance is meaningful only within a framework focusing on the citation behavior of individual authors, i.e., within a citation theory conceived as a theory of citing. The second and the third perspective on citation theory, i.e., indicator theories and epistemological theories of citation, both reject the three main tenets of such a framework. They are therefore immune to the MacRobertses criticisms, at least in their standard format. Next section discusses indicator theories, whereas the following one addresses epistemological theories.

### Theories of indicators

With the label 'indicator theories' we designate approaches that reject the idea that citation theory should be based on a theory of the citing behavior of individuals. In contrast, indicator theories focus on citation-based *indicators* and aim at understanding what they can say about science, i.e., as Wouters says, the way in which they *represent* science (Wouters, 1999a).

These approaches rely crucially on the idea that indicators are *aggregates* of citations. Thus, a theory of indicators should account for *aggregates* of citations, not for the *single* citation. The single citation, intended as the product of an act of citing by an individual scientist, is not the focus of indicator theories. As we shall see, the focus on aggregates of citations involves two important consequence: a) Theoretically, citations are considered meaningful only when they occur in *big numbers*; b) Methodologically, citations have to be treated *statistically*.

Indicators are an essential part of evaluative scientometrics: more precisely, they are the concrete outcome of the scientometric research, the one that is offered to policymakers (Moed, 2005, 2009). Thus, indicator theories can be considered as the theoretical foundation of evaluative scientometrics, in a way that the sociological and psychological theories previously discussed cannot. These latter theories relate to indicators only *indirectly* and assume that the meaning of the indicators is determined, eventually, by the motivations of the citing scientists. Both the support and the criticism they provide to the use of indicators rely on considerations about the behavior of scientists. Indicator theories, on the contrary, are concerned primarily with indicators themselves and, in fact, are not interested in the individual behaviors (if not indirectly, i.e., as aggregates).

[45] In the case of *high* citation scores, the MacRobertses tend to explain the scores by a persuasion theory of citation behavior (MacRoberts & MacRoberts, 2018).

We shall consider now two variants of indicator theories, the thermodynamic model proposed by Van Raan and the reflexive theory advanced by Wouters.[46]

### *Van Raan's 'thermodynamic' model*

Van Raan's crucial idea is that citation analysis should be considered analogous to thermodynamics, i.e., as an essentially *statistical* description that regards big aggregates of entities, and not the individual elements. This idea dates back to Price and to his project of a «science of science» (Price, 1963). Price proposed to «turn the tools of science on science itself», advocating the use of statistical procedures to measure science:

> My approach will be to deal statistically […] with general problems of the shape and size of science and the ground rules governing growth and behavior of science-in-the-large. […] The method to be used is similar to that of thermodynamics, in which is discussed the behavior of a gas under various conditions of temperature and pressure. One does not fix one's gaze on a specific molecule called George […]; one considers only and average of the total assemblage in which some molecules are faster than others […]. On the basis of such an impersonal average, useful things can be said about the behavior of the gas as a whole, and it is in this way what I want to discuss the analysis of science as a whole. (Price, 1963, p. v)

Van Raan inscribes scientometric indicators based on citations into this 'thermodynamic' perspective on science. He recognizes that at the level of the individual paper, many peculiarities (even biases) can be discovered: references that should be cited are missing, exaggerated attention is given to authors for social rather than scientific purposes, and so on. Thus, Van Raan does not reject the idea that the reference list of an *individual* paper is often incomplete, as MacRoberts and MacRoberts claim. However, he notes, the individual paper with its references is *never* the real object of scientometrics, because the scientometric indicators that are of interest for scientometrics (especially in evaluative contexts) are calculated on the basis of *thousands* of papers and references. Van Raan's main point is that biases and peculiarities *cancel out when we consider large aggregates of papers*. This is what is expected, from a statistical point of view, when we deal with big numbers. He remarks that the canceling out of errors would not happen only in two cases: if references were given by authors completely randomly, or if some structural bias would affect referencing practices. The first alternative seems quite absurd, whereas the empirical studies of citation distributions do not warrant the second:

[46] Anthony Van Raan was the (founding) Director of the Center for Science and Technology Studies (CWTS) of Leiden, whereas Paul Wouters is the current Director of the Center. The CWTS is the leading center for scientometrics in Europe.

> If one looks at references in an individual paper, many peculiarities may be found […]. Indeed if just *this one* paper with its peculiar references would be analyzed, a seriously mistaken picture of the field concerned will be obtained. Bus as soon as further paper are added, similar but also other irregularities will be discovered in their reference lists. Does this mean that one would never be able to get any sensible idea of the most important work in the field? This is statistically only the case if *all* researchers refer to earlier work *completely arbitrary*. But nobody can seriously maintain that the references in, for instance, *this* paper are totally unreasonably and completely arbitrary. […] Furthermore, it is statistically very *improbable* that *all* researchers in a field share the same distinct reference-biases. (van Raan, 1998, p. 134)

Van Raan argues that it is statistics that matter in scientometrics, not individuals. Therefore, the analysis of referencing behavior of citing authors is not the most appropriate way to check the reliability of citation analysis and citation-based indicators. Moreover, evaluative scientometrics is concerned with the cited side, not with the citing author. For instance, when we are interested in finding the top-cited authors in a scientific discipline, the focus is on the *cited* scientists, not on the *citing* ones. Even if it is true that the citation score results from the aggregation of multiple citing actions, still the target is the cited-side, not the citing-side:

> In a reference analysis (the 'citing side') we have *one citer and different cited papers* 'per unit of analysis'. However, in citation analysis as used for research performance analysis, there are *many citers and just one cited paper*. This is the most important reason why the sociological theorizing on citations does not work. Most of this theorizing is fixed at the role of the *citing author* […]. This is not a very successful approach to explain the consequence 'at the other side', the *cited author*. (136)

Here it is where the thermodynamic metaphor comes into the play:

> It is if a physicist would strive for creating a framework of thermodynamics by making a 'theory' on the behavior of individual molecules. Certainly there are crucial 'behavior characteristics' of molecules: magnitude and direction of velocity, angular momentum. But *only* a statistical approach in terms of distribution-functions of these characteristic variables brings us to what we need: a thermodynamic theory. […] Likewise, citation analysis is at the 'thermodynamic side': it concerns an *ensemble of many citers*. (136).

Thus, the citing authors play only a statistical role, and the knowledge of their individual motivations is irrelevant for the theory of indicators in the same way it the knowledge of the individual mechanic characteristics of molecules is irrelevant to the thermodynamic theory of gas.

It is clear that the applied side of scientometrics drives van Raan's perspective on citation theory. It is only in the context of science policy that indicators play a relevant role, and the study of the (citing) behavior of scientists is subordinate. Once again, we see how the applied side of the discipline is crucial in determining the theoretical concerns. If citing behavior could be seen as an important topic in sociology or psychology of science, from the perspective of evaluative scientometrics it is only a peripheric matter, being indicators the real stake.

### *Wouters' reflexive theory*

Paul Wouters has proposed a 'reflexive theory' of citation that, even if can be ascribed to the group of indicator theories, still it is theoretically more sophisticated than Van Raan's thermodynamic model.

The first step of Wouters' argument is to underline the difference between the reference and the citation at the *semiotic* level: Wouters remarks that the reference and the citations are two different *signs*. The reference R belongs to the citing article B and points to the cited text C. Its referent is the cited document C. The citation index, by transforming references into citations, i.e., by making them an attribute of the cited text, performs a crucial semiotic operation on references: *it turns them upside down*. Citations, as opposed to references, become attributes of the *cited* instead of the original, citing text. They do not 'belong' anymore to the citing text, but to the *cited* text. Wouters calls this operation «inversion» and takes it to be the fundamental operation of citation analysis:

> This inversion process is the basic symbolic act of producing a citation index and, actually, its fundamental operation. (Wouters, 1999b, p. 11)

The difference between the reference and the citation has many important consequences. First, at the level of citation theory, it implies a difference between theories of citing behavior (that should be more correctly considered *theories of referencing practices* since they concern references) on the one hand, and theories of citations (that concern the function of the citations). The tasks of the two theories are different: theories of references aim at explaining the citing behavior of scientists, whereas theories of citation aim at interpreting the meaning of scientific indicators (mainly within science policy). Second, the difference between the reference and the citation implies that the justification of citation analysis is different from the study of citation behavior:

> Because of the difference between the reference and the citation, the legitimation of citation analysis should be analytically distinguished from the study of citing behavior in science (Wouters, 1999a, p. 576)

According to Wouters, the search for a comprehensive theory of citing behavior has been a *dead end* for scientometrics and sociology of science, even if it has been considered the 'Holy Grail' of the discipline. This failure is a crucial consequence of the loss of information that is associated with the inversion of references into citations. When references are turned into citations by the citation index, all the variety of psychological and sociological processes behind the references disappear, and it is almost impossible to restore them *a posteriori*:

> The main reason that sociologists of science feel that this perspective has not produced the needed encompassing citation theory, is the variety of behavioral characteristics underlying the citation patterns found in the literature. This is, however, the consequence of the semiotic inversion of the reference into the citation. This inversion is asymmetrical: whereas the references have very different characteristics (both textually and behaviorally), citations are all the same. The citation no longer betrays from what type of reference it was produced. This is why one should expect it to be difficult or even impossible to recreate this variety by citation analysis […]. (574)

Instead of a theory of citation behavior, Wouters proposes a *reflexive theory of citation indicators*. This theory should account for the meaning of citation indicators, i.e., it should understand what features of science can be captured by indicators:

> One could call this a proposal for a reflexive indicator theory relating to two levels. First, it is a theory about indicator theories because it explains how they can be related to one another and why the quest of the last thirty years for 'the citation theory' has not been fruitful. Second, it is a theory about the indicator themselves, starting from the analytical distinction between the reference and the citation. (576)

To sum up, indicator theories, such as the ones developed by Van Raan and Wouters, reject all the three tenets of socio-psychological theories of citations:

a) They reject the idea that a theory of citation should be conceived as a theory of citing behavior. What matters are citations as basic components of the *science indicators* that are used in science policy contexts. The aim of the citation theory is not to account for the behavior of scientists, but to understand the meaning of the indicators, as well as their reciprocal relationships.
b) Instead of the methodological individualism, indicator theories adopt a *statistical point of view*: the focus is on the aggregated outcome, not on the individual. The meaning of citation scores and other citation-based indicators is taken to be independent of the intentions of the citing authors because particularities cancel out in big aggregates

c) The citation is analytically *distinct* from the reference. The former is the product of the citation index, the second the outcome of the scientists at the desk. Citations are significant only in big numbers.

Since indicators are essentially entrenched in the evaluation contexts, indicator theories can be considered as the theoretical foundation of evaluative scientometrics.

### Epistemological theories of citation

The third approach to citation theory considers citations as a part of the mechanism by which science, *considered as a body of knowledge*, develops over time. Instead of focusing on citations as social acts of scientific actors or as molecular components of science indicators, this approach focuses on the role that citations have in the *cognitive system of science*. In contrast with the sociological and psychological theories of citation, it can be termed an 'epistemological' approach, since it focuses on the structure and organization of *science*, and not on the behavior of *scientists*. In contrast with the indicator approach, the epistemological perspective is less concerned with the evaluation of science and more with the *description* of its structure and the *explanation* of its dynamic.

This perspective highlights the crucial epistemic/cognitive role that citations plays in scientific papers: they *link* new knowledge claims with the body of accepted scientific knowledge. Thus, citations are one of the ways by which scientific innovation is «woven into» the context of previous research. They can be considered as traces of the on-going process of *accumulation* of science. Clearly, citations are not the only signs of knowledge accumulation that scientific papers bear. The use of a technical language and the phenomenon of OBI (obliteration by incorporation) are other important signs. The technical language used by scientists in communicating their research embodies the theoretical and methodological knowledge typical of their scientific disciplines, whereas the OBI, i.e the phenomenon by which scientists do not cite anymore the original paper in which a theory or concept was advanced by the first time, but simply refer to it by eponymous terms (e.g., the Planck constant), is another sign of the accumulation process (Merton, 1988).

Taken together, technical languages, OBI, and citations point out an essential feature of science: its being a *collective achievement*, in which new pieces of knowledge have to be integrated into the previous scientific fabric. The process of knowledge production in science does not begin *de novo* each time a scientist designs an experiment or writes a scientific article. On the contrary, it is always placed in a broader context, that is extended not only in the present (the scientific community to which the scientist belongs) but also in the past (the scientific literature on the

topic the scientist is investigating).[47] Hence, scientists have always to do with a «sedimented knowledge» that plays a fundamental role in the research (Amsterdamska & Leydesdorff, 1989).

From this point of view, science is a social achievement, but the sense of the term 'social' is different from the idea of social construction of scientific facts that we find in the socio-constructivist sociology of science (Bloor, Latour, Knorr-Ketina). 'Social' should be intended as a reference to the fact that scientific claims are never isolated, but always woven into a context. The scientist does never begin from zero but is always confronted with a background: «in academic writing, the message presented is always embedded in earlier messages» (Hyland, 1999, p. 352). This confrontation can take the form of *negotiation* or even conflict with other scientists or the previous knowledge – and here it is where the micro-sociology of science and laboratory studies come into the play (e.g., with the studies of closure mechanisms of scientific controversies, (H. M. Collins, 1985)). Still, the notion of science as a collective achievement refers to a more fundamental feature of science, namely the fact that scientists always have *a context and a background*, they never start with a *tabula rasa*. The social construction of scientific facts is a further dynamic that builds on this more basic property of science.

As said before, citations play a crucial part in the process of continuous waving of scientific innovations into the background, because they relate new papers to old papers:

> Explicit reference to prior literature is a substantial indication of a text's dependence on contextual knowledge and thus a vital piece in the collaborative construction of new knowledge between writers and readers. The embedding of arguments in networks of references not only suggests a cumulative and linear progression, but reminds us that statements are invariably a response to previous statements and are themselves available for further statements by others. (Hyland, 1999, p. 343)

Thus, citations become interesting not because they are part of the scientists' behavior (as in sociological and psychological citation theory) or because they can be taken as measures of the scientists' quality or impact (as in indicator citation theories), but because they shed light on the *epistemic structure of science*:

> Consider first a scientific paper. The author cites earlier documents in an attempt to embed the ideas of other authors in his or her work. These references, let us presume, stand for ideas that are part of the author's argument. Since the cited works each contain arguments, we have in effect an argument punctuated by digressions into other arguments. […] As more authors cite either the original paper or the subsequent citing

[47] And we could say, also in the future, in the sense that the *expectations* scientists have for their research programmes contribute to shape their research.

> papers, an interdependent web of arguments evolves […]. This is what makes the name of ISI's new citation search product, the *Web of Science*®, so apt: authors are embedded in a web of reasoning and argumentations, represented by the citation links between the papers. (Small, 1998, p. 145)

Hence, being explicit links among scientific paper, citations are the edges of the vast *epistemic network* of science (the « web of reasoning and argumentations»). Science, from this point of view, can be represented as a citation system (Fujigaki, 1998), i.e., as a network where scientific papers (the nodes) are connected through citations (the edges):

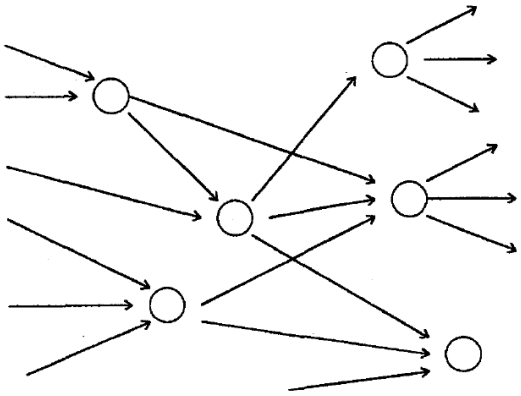


*Figure 2. Representation of science as a citation system. O = paper, → = citations (Source: Fujigaki 1998, p. 79)*

As we shall see in the next paragraph, this is the basic insight on which science mapping techniques build on. Before passing to that, however, in the rest of this paragraph, we present in further details the epistemological perspective on citations, by presenting key studies in scientometrics that contributed to developing it.

The first study that highlighted the cognitive role of citation is (Small, 1978), where the theory of citations as «concept symbols» is developed. Small's point of departure is the consideration that the references to previous literature are embedded in the text of the scientific article. They do not appear only in the reference list at the end of the paper but are surrounded by a textual context. According to Small, this context plays an important function: by embedding the reference into the argument developed in the paper, it provides at the same time a sort of *description* of the cited reference. Thus, when scientific authors cite another paper, they label it by attaching a short text around the citation.[48] An important consequence is that, in this way, the citing authors also state the *meaning* they attribute to the cited reference:

[48] As we saw above, the idea that citations can be used as subject headings was the basis idea also of the citation index when Garfield designed it.

> For example, if I use Lowry's method of protein determination and cited his paper, I am not only telling the reader where he can find a description of the method, but I am stating what his paper is about, i.e., a method for protein determination (Small, 1978, p. 328)

Referencing is a *meaning-building practice*: citing authors contribute to shaping the meaning of the references they cite: «As a document is repeatedly cited, the citers engage in a dialogue on the document's significance» (338). What is interesting, Small notes, is that in science this process leads to the creation of what he calls «concept symbols». By analyzing patterns in citation contexts in chemistry, he showed that these patterns *converge* to a sort of standard, i.e., the meaning of the most cited papers in chemistry tend to become standardized: «recurring patterns of terminology used by citing authors when referring to these documents show that they have become standardized in their usage and meaning» (337). The standardization also implies a *narrowing* of the meaning of the cited reference, a phenomenon particularly evident in the case of papers and less in the case of books, which generally convey more information.

Small thus concludes that to understand citations we cannot ignore their *cognitive* function, that is expressed by their being used as symbols for scientific concepts.[49] What is worth pointing out, is that Small claims that his approach to citations is different (even if complementary) to the study of the motivations behind citing (what he calls a causal explanation of citation behavior):

> I have not attempted to give a causal explanation of why author-scientists cite certain papers and not others. Such reasons might include the desire to persuade, to curry favor, to publicize, to avoid offending, to favor one approach over another, to give credit, and so on. None of these, however, appear to be adequate to explain the full range of motivations for citing. What does appear to be more nearly universal is the citation as a symbol for an idea. […] The concept symbol interpretation of citation practice does not contradict the functional, social or political interpretations, but is complementary to them. (337)

In so far as Small's study focuses on the role of citations in the building of shared scientific knowledge, and not on the practices of scientists in referencing, it is a first example of the epistemological approach to citation theory.

A second important contribution to the epistemological perspective comes from a stream of paper by Leydesdorff published at the end of the 1980s (Amsterdamska & Leydesdorff, 1989; Leydesdorff, 1987, 1998; Leydesdorff & Amsterdamska, 1990). (Amsterdamska & Leydesdorff, 1989) highlighted the idea that citation analysis sheds light on the epistemic structure of science, or,

[49] From this point of view, Small notes that highly cited reference can be compared to Kuhnian exemplars.

as they say using a phrase by Quine, on the «fabric of knowledge» (451). References have a crucial role in the process of construction of the 'fabric' since they represent the way in which new claims are explicitly integrated into the body of existing knowledge, in a complex balance between originality and adherence to the tradition:

> As texts, experimental articles in the natural sciences can be seen as a series of arguments which together serve not only to introduce and justify a new knowledge claim but also to demonstrate that the innovation which is being proposed belongs to a particular body of knowledge […]. Articles […] place and integrate innovations into the context of 'old' and accepted knowledge […]. References which appear in the text are the most explicit manner in which the arguments presented in an article are portrayed as linked to other texts, and thus also to a particular body of knowledge. (451)

Amsterdamska and Leydesdorff point out that this perspective on reference open a different *kind of questions* than the ones raised by the sociology of citing behavior because it focuses on the building of science, not on the motivations of scientists:

> Thus it is necessary to ask why – for what cognitive reasons – an article is being cited? What role do the cited claims play in the arguments which are being constructed in the citing articles? […] Answers to these questions will not necessarily inform us about the motives or intentions of individual authors as they choose to refer to particular articles. Instead, by asking these questions about the functions of citations in text we expect to gain a better insight into the ways in which particular bodies of knowledge are structured and restructured (452)

In (Leydesdorff & Amsterdamska, 1990), the difference between sociological and epistemological perspectives on citations is grounded in the analytical distinction between the *social* and the *cognitive* system of science. These levels are both represented by the citation and can be both addressed by citation analysis, but still are different aspects of science. When the citation is taken to be a relation between two scientific articles, i.e., between two documents, the relation pertains to the *cognitive* level: the network of scientific documents is thus a representation of the epistemic structure of science. When the citation is taken to be a relation between two scientific authors, i.e., between scientific actors, the relation pertains to the social system of science: the resulting network of scientific authors is thus a representation of the social structure of science. Note that when citations are used in evaluative contexts, i.e., as components of science indicators, the social network of science is interpreted as a reward system, and the most-cited nodes of the network are taken to be the top researchers. The

cognitive, social, and reward systems of science are practically intertwined. However, they have to be analytically distinct in order to comprehend what features of science citations capture:

> When citations are seen as establishing links of whatever nature between two *texts*, what is being analyzed is the *cognitive* content of this relation; when citations are regarded as establishing links between *authors*, what is being studied is the *social* organization of scientific communities. In practice, the two aspects of citations are, of course, thoroughly intertwined. Their analytical separation, however, is necessary if we want to appreciate clearly the underlying assumptions about the relation between the social and the cognitive aspects of science in various forms of citation analysis (307)

The possible relations between the different levels are summarized by Amsterdamska and Leydesdorff in Table 1:

| | **Citing Author** | **Citing Text** |
|---|---|---|
| **Cited Author** | Professional relation | Reward |
| **Cited Text** | Cognitive resource | Discursive relation |

*Table 1. Relation between the cognitive and the social aspects of science (Source: Amsterdamska and Leydesdorff 1990, p. 307)*

In the table, the cognitive system is represented by the couple (Citing Text – Citing Text) and the social system by the couple (Citing Author – Citing Author). The mixed couples (e.g., Citing Author – Citing Text) represent *translations* between the systems, as the ones realized when considering citations as a measure of research quality:

> The particular interest that citation analysis has had for science studies and for the evaluation of the performance of groups or individuals stem from the fact that citations appeared as a particularly useful indicator of links between the social and the cognitive dimensions of science. For example, the number of times and article was cited could be seen as an indicator of the performance of the cited author(s), and thus a translation was made form the cognitive use of citations in a text to the social system of rewards operating in the scientific community. (307)

At the same time, these translations are seen as problematic by critics of citation analysis: «how can we tell when citation reflects a *cognitive* debt and when it is mainly a reflection of a *social* hierarchy within the scientific community?» (307). The main point, however, is that the two layers of science (the social vs. the cognitive system), and consequently the two perspectives on citations (the sociological and the epistemological), should be distinguished. The epistemological use of citations for tracing the epistemic structure of science should not be conflated, nor taken to be dependent by, a sociological theory of citation behavior:

> The function of citations in propelling the networks of substantive knowledge contents [= epistemic system of science] is different from, yet constrained by their propagation through networks of textual and social relations [= social system of science] (Leydesdorff, 1998, p. 9)

In the practice of citation analysis, the *unit of analysis* is crucial in determining if the focus of the analysis is on the cognitive or the social system of science. Choosing documents[50] as the unit of analysis sheds light on the cognitive-epistemic structure, whereas choosing authors reveals the social-reward structure.

(Fujigaki, 1998) presents a further articulation of the epistemological perspective, in which references are considered as «compasses». Fujigaki argues that the citation system can be defined as a chain of citations in which each component of the system (the scientific paper) leads to the production of the next one, in an autopoietic manner (i.e., the system operates continuously following its internal logic). At the same time, each new paper, by citing only a fraction of previous papers, *redistributes* the citation scores of the previous papers. Hence, the citation network is constantly reshaped by the recursive action of the new papers on the old ones. New contributions to science then operate as a sort of *selection mechanism* toward the population of the citable papers of the past. From this point of view, a highly cited paper is a paper that has survived the selection mechanism of subsequent papers. But what is its function in the citation system? According to Fujigaki, the highly cited papers are the ones that are used by scientific authors to *localize their own contribution within the citation network*: they provide the coordinates of the field, by which the authors position themselves. Thus, highly cited references are used by scientists as *compasses* to orient in the network of previous papers:

> According to the citation system theory mentioned above, citation itself is an orientation of the paper, in a map of the previous papers. Therefore, the papers which are cited often, can be considered as those which are utilized in this mapping process through repetition and exaggeration of the underlying differences. In citation system theory, the frequently cited paper is considered as important, since it is often used as a compass. (Fujigaki, 1998, p. 81)

The interpretation of highly cited references as *compasses* echoes the notion of Orienting Reference List (ORL) advanced by Hargens in his study of the use of the literature in scientific disciplines (Hargens, 2000). Hargens remarked that the references appearing in introductory sections of scientific papers have a distinctive function: they serve to *contextualize* the work, providing the coordinates in the scientific landscape. Thus, they provide an essential *orientation*

[50] Or aggregates of documents, i.e. journals (Leydesdorff, 1987).

to the paper in the field, hence the term he coined to characterize this kind of reference (Orienting Reference List):

> My examination of papers' introductory sections revealed a distinctive referencing convention that authors sometimes used to contextualize their work – the listing of papers as examples of a general perspective, methodological approach, or topic. […] By using this convention, which I call an "orienting reference list" (ORL), authors provide a framework for their work and imply that the framework constitutes an acknowledged scholarly position. […] ORLs signals authors' attempts to contextualize and justify their work, and authors often include well-known "classics" in these lists. (Hargens, 2000, p. 858)

The use of geographic terms, like 'compass' and 'orienting', in the context of the discussion of the epistemological functions of citation, links quite naturally the epistemological perspective on citations with another important area of scientometrics: the maps of science.

### *Science mapping*

The term 'science mapping' refers to several techniques that have been developed, since the Sixties, to 'map' different features of science at different levels (from the individual publication to the flow of scientific information between nations). Science mapping aims to reveal the *structure* of science using a 2- or 3-D visualization, that is the 'science map'. In the last decades, science mapping has attracted considerable attention and the last ten years have seen a «Cambrian explosion of science maps» (Börner, Theriault, & Boyack, 2015, p. 13). An important cause of the success of science maps is the rising importance that techniques of information visualization have in facilitating the understanding of large amount of data (Börner et al., 2015).[51] Since 2005, there is also an annual exhibit, called *Places and Spaces: Mapping Science* (http://scimaps.org/), that travels the world showing the public different types of science maps, that are often impressive from an aesthetic point of view (Börner, 2010).

For the purpose of this section, we will focus on a specific kind of science maps, the ones that are based on bibliometric data of publications. In fact, science can be represented as a *network*, consisting of nodes and edges (the links between the nodes). The nodes can be, for instance, publications, journals, researchers or keywords. The edges, which are the relations between the nodes, can be citations, keyword co-occurrence or co-authorship relations (Waltman & van Eck, 2014). The aim of this kind of science mapping is to obtain a «spatial representation of how disciplines, fields, specialties, and individual papers or authors are related to one another as

[51] See (Börner, Chen, & Boyack, 2005) for an introduction to science mapping in the larger field of information visualization.

shown by their physical proximity and relative locations, analogous to the way geographic maps show the relationships of political or physical features on the Earth» (Small, 1999, p. 799).

In its basic form, a citation network is a network where publication constitute the nodes and the citations the links between the nodes (Figure 3).

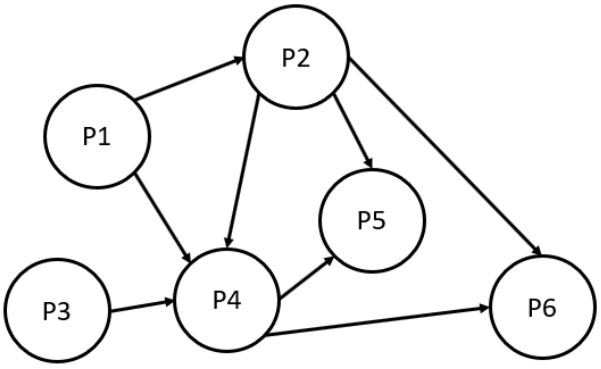



*Figure 3. Example of a citation network*

From this basic idea, more refined techniques of mapping have been developed. The idea behind these techniques is that publications can be grouped based on their *similarity* and that the similarity between publication can be calculated based on citations' frequencies. These techniques are bibliographic coupling (firstly introduced by (Kessler, 1963)) and co-citation analysis (firstly introduced by (Small, 1973)).

The basic idea behind bibliographic coupling is that the similarity between two documents is proportional to the number of bibliographic references they *share*. The more references two documents have in common, more 'similar' they will be, in the sense that they will be about similar topics. Therefore, two documents are bibliographically coupled when they both cite (at least) one common publication (Figure 4).

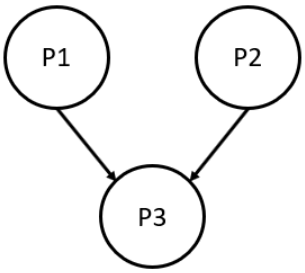



*Figure 4. Bibliographic coupling: P1 and P2 are coupled because they both cite P3 in their cited references*

The strength of the bibliographic coupling between two publications is calculated in a similarity matrix. A similarity matrix is an N×N-type matrix, in which publications are arranged in the rows and the columns of the matrix. Their corresponding bibliographic coupling strength are calculated as the number of references they share.

| | P1 | P2 | P3 | P4 | P5 | P6 |
|---|---|---|---|---|---|---|
| **P1** | | 1 | 1 | 0 | 0 | 0 |
| **P2** | 1 | | 1 | 2 | 0 | 0 |
| **P3** | 1 | 1 | | 0 | 0 | 0 |
| **P4** | 0 | 2 | 0 | | 0 | 0 |
| **P5** | 0 | 0 | 0 | 0 | | 0 |
| **P6** | 0 | 0 | 0 | 0 | 0 | |

*Table 2. Example of a similarity matrix based on bibliographic coupling relations (the citation network is shown in Fig. 3 above). The matrix is symmetrical.*

Co-citation analysis is, in a way, the opposite of bibliographic coupling. In co-citation analysis, the similarity between two documents is calculated based on the number of times they are *cited together by the following papers*: «co-citation is the frequency with which two items of earlier literature are cited together by the later literature» (Small, 1973, p. 265). The more two documents are co-cited together, the more 'similar' they will be. Once again, similarity here refers to a commonality of topics (Figure 5).

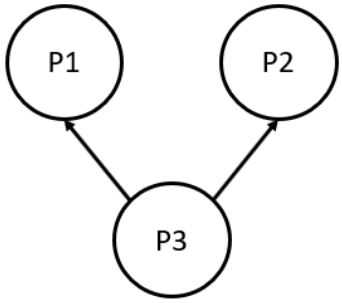



*Figure 5. Co-citation: P1 and P2 are co-cited because they are both cited by a third publication (P3).*

As showed above, the co-citation strengths of a set of documents can be calculated in an N×N-type matrix based on the basic citation network of the publications.

| | P1 | P2 | P3 | P4 | P5 | P6 |
|---|---|---|---|---|---|---|
| **P1** | | 0 | 0 | 0 | 0 | 0 |
| **P2** | 0 | | 0 | 1 | 0 | 0 |
| **P3** | 0 | 0 | | 0 | 0 | 0 |
| **P4** | 0 | 1 | 0 | | 1 | 1 |
| **P5** | 0 | 0 | 0 | 1 | | 2 |
| **P6** | 0 | 0 | 0 | 1 | 2 | |

*Table 3. Example of a similarity matrix based on co-citations strenghts (the citation network is shown in Fig. 3 above). The matrix is symmetrical*

An important feature of co-citation analysis is that the co-citation strengths of documents are not fixed but can change in time, as soon as new papers appear, and citations to previous papers are redistributed. In this way, co-citation reflects the *dynamic perception* that the new authors have of the previous literature:

> In measuring co-citation strength, we measure the degree of relationship or association between papers as perceived by the population of citing authors. Furthermore, because of this dependence on the citing authors, these patterns can change over time, just as vocabulary co-occurrences can change as subject field evolves. (Small, 1973, p. 265)

Bibliographic coupling, on the other hand, is static, because the coupling between documents is based on the references contained in the documents, that cannot change in time. Small firstly proposed to use co-citation analysis to analyze relations between publications. Later on, other units of analysis were introduced, such as authors (author co-citation analysis, (White & Griffith, 1981)) and journals (journal co-citation analysis (McCain, 1991)). However, the basic idea remained the same: to calculate relatedness between units based on the frequency they are cited together.

In the literature on science mapping, considerable attention has been devoted to several technical problems involved in the analysis and, more recently, in the visualization of bibliometric networks (Waltman & van Eck, 2014). Issues such as the normalization of the values in the similarity matrix (that can be done in different ways, sometimes producing very different results, see, e.g. (Leydesdorff, 1987; van Eck & Waltman, 2009)) or the problems involved in reducing multi-dimensional spaces into a two-dimensional visualization (see (Chen, 2013, Chapter 4) for an introduction, see also (van Eck, Waltman, Dekker, & van den Berg, 2010)) are important technical problems of science mapping that are studied by mathematicians and computer scientists. However, science mapping has also an *epistemological* relevance, in so far as it focuses on the structure and the dynamic of science. In other words, besides the technical dimension involved in the *production* of the science maps, there is also an epistemological dimension concerning the interpretation of the *meaning* of the science maps themselves. The awareness of such a dimension is particularly evident in the work of Small, the inventor of co-citation analysis. Small identifies Kuhn explicitly as the main source of inspiration for the project of mapping science. We saw above how Small individuated highly-cited papers as 'concept-symbols' that can be compared to Kuhnian paradigms, in particular to what Kuhn called 'exemplars' (Small, 1980).[52]

[52] In the well-known post-script to the second edition of *The Structure*, Kuhn distinguished four dimensions of the paradigm of a scientific discipline. The fourth dimension are the exemplars, that is important scientific achievements that are taken as *models* for subsequent research by scientists (Kuhn,

Small also discovered that highly cited documents in a discipline, when analyzed by co-citation analysis, form distinct structures in the citation network of science, that correspond to the disciplinary organization of science (Small, 2003, 2010). However, the most important epistemological application of science mapping is in the dynamics of science, that is the study of the evolution of the specialty structure of science. By mapping sets of documents in different moments in time, it is possible to trace the growth of scientific disciplines (Small, 1977) and to calculate the rate of change between subsequent maps of science (Small, 1993). This kind of analysis allows approaching the topic of scientific revolutions by scientometric techniques:

> Detecting revolutionary change in a specialty involves measuring the replacement rate within the paradigm, which is approximated by the turnover in the set of highly cited documents. A high rate of turnover, or low stability, would indicate revolutionary change, while a low turnover, and high stability, would indicate normal science. (Small, 2003, p. 398)

Thus, the longitudinal application of science mapping techniques, i.e., mapping a scientific discipline in time, allows to operationalize at the level of citation analysis theories of scientific change, such as the one proposed by Kuhn, and hence to test them empirically. Furthermore, we can speculate that science can be used for scientific *forecasting*:

> By using a series of chronologically sequential maps, one can see how knowledge advances. While maps of current data alone cannot predict where research will go, they can be useful indicators in the hands of informed analysts. By observing changes from year to year, trends can be detected. Thus, the maps become forecasting tools. (Garfield, 1994, p. 5)

In sum, the research programme of mapping science reveals its full potential when it is considered in the light of the *epistemological* approach to citations. Science maps, offering a visual representation of the citation network, allow investigating both the structure and the dynamics of the *fabric of knowledge*.

### Sum up

In this section, scientometrics was presented as the field studying the quantitative aspects of science. The core notion of scientometrics is the *citation*. Interpreting the meaning of citations is a key problem in scientometrics, not only for the general theory of scientometrics but also in the applied side of the field. Understanding what citation counts mean is, in fact, pivotal in

1996). Recently, in the scientometric literature, Kuhn's theory of scientific change has received a renowned attention (see e.g. (Marx & Bornmann, 2010)).

assessing the use of citation scores and citation analysis more generally in the context of the evaluation of research performance, the main area of application of scientometrics. As we saw, the field has always had this applied side, that has grown in importance as science policies have evolved towards an increasing demand for accountability in the last forty years. It is the use of citation data in evaluation practices that has fueled a recurrent call for a 'theory of citation'. We have distinguished three main frameworks in which different theories of citation have been advanced: a socio-psychological framework, an indicator-centered framework, and an epistemological approach.

Within the sociological and psychological framework, the *explanandum* that the citation theory should account for is the *citing behavior* of scientists. The citation is considered as the product of the act of citing of the scientists, and the theory is meant to explain the reasons why scientists cite in the way they do. The meaning of the aggregates of citations (such as the citation scores of highly cited authors) is taken to be dependent on the meaning of the individual acts of citations. In particular, the two competing theories in the socio-psychological framework present different kinds of reasons for citing. In the normative account, inspired by the Mertonian sociology of science, scientists cite for recognizing intellectual debts and, in their citing, they follow universalistic rules (i.e., they do not cite for particularistic reasons). Thus, citations are interpreted as embedded in the reward structure of science. On the other hand, the advocates of the persuasion hypothesis, grounded in the socio-constructivist sociology of science, argue that scientists cite for persuading their peers. According to them, social reasons are more important than intellectual reasons in explaining scientists' citation behavior. They argue that citation scores cannot be used for evaluative purposes since citations are not given by scientists for recognizing intellectual influence, but only to advance in the stratified structure of the scientific community. Three main empirical methodologies have been designed to test the validity of the two theories: citation context analysis, citation content analysis, and surveys and interviews. They all aim at enriching with qualitative information the mere quantitative measure of citation counts. The first two methods investigate the role that references play in the citing text, focusing either on a set of citing documents (citation context analysis) or on a set of cited documents (citation content analysis). The third method inquires the citing scientists directly, asking by surveys or interviews their motivations for citing. We saw that all these methods suffer from methodological problems that affect mainly their scope and reproducibility.

Within the second framework, the target of the citation theory is not the behavior of scientists, but the indicators that are built using citation data. Thus, the main problem is to understand how citation-based indicators represent science, not what are the motivations behind citing. Compared to the socio-psychological approach, this approach focuses on big aggregates of

citations, adopting a statistical perspective that is modeled on thermodynamics (Van Raan). Wouters, in particular, argues that citation theory should be distinguished from reference theory since the citation is a different *sign* from the reference. If the reference is a sign produced by the scientist at the desk, the citation is essentially a product of the citation index that has a meaning only when it is aggregated in indicators. Because of their focus on the indicators that are central in science policy context, this approach was indicated as the theoretical foundation of evaluative scientometrics.

Lastly, the third framework for citation theory is the epistemological one. Within this perspective, citations are considered as components of the 'fabric of science', i.e., as functions within the epistemic system of science. Thus, citations are not primarily considered as the product of the behavior of scientists, but as links between the atomic components of science, i.e., scientific publications. Citations represent 'concept symbols' (Small) that function as 'compasses' (Fujigaki) in the complex system of scientific knowledge. Furthermore, citations relate newer contributions to the knowledge base of a discipline, highlighting the way in which science accumulates in time. The epistemological perspective on citations is particularly fruitful to interpret the research programme of mapping science through citations. The scientific literature is conceived as a *network* where different types of nodes (publications, journals, researches, etc.) are connected by different types of links (the most common being citations). Science mapping techniques use citations to reveal the structure of the network, by calculating the similarities between different items based on citation relations (bibliographic coupling or co-citation strength). We saw how science maps could be used both statically and longitudinally. In the first case, they reveal the knowledge structure of a discipline, whereas, in the second case, its temporal evolution. Science maps are thus particularly relevant when they are interpreted in the light of the epistemological approach to citations.

## Citation analysis and Rescher's Methodological Challenge

At the end of Chapter 1, several features of Late Analytic Philosophy were highlighted. At the beginning of the present Chapter, we showed how these features pose several methodological challenges to the historian of philosophy. Rescher, in particular, has underlined how the *growth* of philosophy after Second World War pushes the historian of contemporary philosophy away from a *biographical* approach, centered on the individual philosophers, towards a *statistical* approach, centered on groups and trends. However, Rescher remarks remained somehow programmatic and, in his writings, we find no more than a sketch of the statistical approach he proposes. Similarly, Bonino and Tripodi pointed out that new methods are needed for the history of Late Analytic Philosophy, and that these new methods will likely come from disciplines such

as sociology and history of science. Nevertheless, we are still waiting for the application of these methods to Late Analytic Philosophy.

In the previous section, we introduced scientometrics, the quantitative study of science, and citation analysis, the core methodology of scientometrics. *We believe that scientometrics and citation analysis provide methods and insights that are crucial to shed light on the complex phenomenon of Late Analytic Philosophy*. We aim at showing that citation analysis techniques are a fruitful answer to the search for new methods in the historiograpy of Late Analytic Philosophy and that they can take up the Rescher's Methodological Challenge. In the rest of the paragraph, we will show how various forms of citation analysis are suited for shedding light on the six features of Late Analytic Philosophy we highlighted at the end of Chapter 1.

The first feature of Late Analytic Philosophy is the growth of the analytic enterprise, in terms of professionals, philosophical production and philosophical sub-disciplines. We saw above how this is a key aspect of Late Analytic Philosophy, posing significative problems to the historian, both at the practical and methodological level. At the practical level, the number of primary sources that the historian should handle risks to overcome the forces of the individual. At the methodological level, the very dimension of analytic philosophy today reduces the role of the individual in shaping philosophical change, questioning also the role that individual actors should have in the historical reconstruction. Now, scientometric and citation analysis allow to deal with this growth at least at the practical side, because they do not rely on the close reading of texts, but on the *computation* of the big amount of documents and citations stored in the citation index. We saw that scientometric indicators stem out from a *thermodynamic* approach to science, where the aggregate is more important than the individual. Furthermore, science mapping techniques work by processing networks of documents that can potentially contain *millions* of nodes. Thus, scientometric techniques allow reaching a *quantitative* approach that can handle the dimension of Late Analytic Philosophy in a way that is impossible for the traditional, close reading method of the historiography of philosophy.

The second and third features of Late Analytic Philosophy (fragmentation and specialization) have to do with the *structure* and the *dynamic* of the field. These are two topics that can be analyzed by science mapping techniques. The structure of Late Analytic Philosophy can be grasped by mapping its literature, whereas its dynamic can be studied by mapping the literature in subsequent moments in time, in a longitudinal analysis. An important advantage of using science maps for studying these topics is that they allow *operationalizing* notions that could remain vague if we adopt the traditional close reading method. In a science map, fragmentation is likely to be visualized as a network in which different clusters are clearly defined. Specialization will result as a pattern in subsequent networks. Thus, science mapping allows

us to formulate clear hypotheses about these phenomena, testing them empirically. Close reading methods, to the contrary, do not allow a similar operationalization, and we are left with the impressions or feelings of the individual philosophers as the only tangible signs of the existence of both fragmentation and specialization. Such 'phenomenological' evidence is important as a starting point of the research, but it cannot be considered as a point of arrival. Science mapping allows investigating more deeply these features of Late Analytic Philosophy.

Lastly, we will show how citation analysis can shed light on the process of *normalization* of analytic philosophy, i.e., on its approaching a Kuhnian normal science style of intellectual production. The three last features of Late Analytic Philosophy (namely Professionalization, Technicalization, and a Scientific style of intellectual production) are coherent with the notion of normal science developed by Kuhn. They are indeed different aspects of the normal science. As we saw above, citations can be usefully employed to study the process of accumulation of scientific knowledge, as far as they are considered in an epistemological framework. We will show how longitudinal citation context analysis, i.e., the study of how citations in analytic philosophy changed their function in time, can shed light on the process of normalization of the field, scrutinizing the dynamic of knowledge in Late Analytic Philosophy. Furthermore, citation analysis will be used to discover the paradigms of the field, i.e., the documents and authors that are more cited in Late Analytic Philosophy.

However, before passing to the empirical studies where all these techniques will be put in practice, we should address a final methodological point that has remained open from the previous Chapter: namely, the *definition* of Late Analytic Philosophy that it will be used in all these studies.

## The operational definition of Late Analytic Philosophy

In Chapter 1, we analyzed the meanings that the term 'analytic philosophy' has in two areas of debate, namely the Analytic-Continental Divide and the History of Analytic Philosophy. We distinguished a referential and a performative use, and we highlighted that, in this study, 'analytic philosophy' will be used in its referential sense, i.e., to denote an object.

However, it remains to determine what *kind* of object it refers to. We saw that 'analytic philosophy' was used to refer either to an *intellectual* object or to a *social* object. In the former case, the definition of analytic philosophy is given by pointing out a set of *intellectual commitments* that would be typical of analytic philosophy. Thus, individual philosophers are said to be 'analytic' only if they accept such commitments. Such definition starts from the intension of the concept of 'analytic philosophy' to determine the extension of the concept. In the latter case, the definition of analytic philosophy is given in *social* terms, and analytic philosophy

is defined as a set of *philosophers* sharing certain socio-academic characteristics. The focus is on the extension of 'analytic philosophy' (i.e., on the analytic philosophers), not on the intension of the term (i.e., intellectual contents).

Now, when we examined the concept of Late Analytic Philosophy, we presented a sort of 'weak' definition of it (the one proposed by Bonino and Tripodi) that identifies Late Analytic Philosophy by a chronological criterion (i.e., as the analytic philosophy produced in the last thirty years), *leaving open the kind of object the term refers to*. We have now to address this point, presenting the definition of Late Analytic Philosophy that we will employ in this study.

Firstly, we notice that we are not going to advance a *definition*, i.e., a set of necessary and sufficient condition for characterizing something as Late Analytic Philosophy. We will neither present a Wittgensteinian *family resemblance*, as Glock does. Instead, we are going to present an *operationalization* of Late Analytic Philosophy. To operationalize concepts is a typical epistemological strategy of the social sciences, and it is, in fact, the first step in social scientific methodology (Bryman, 2015). The *Oxford Dictionary of the Social Sciences* defines 'operationalization' as follows:[53]

> The process of transforming an abstract concept or theory into an empirical, testable subject of research. Proper operationalization is therefore crucial to obtaining relevant results and is especially at stake in the formulation of research methods. In sociological research based on surveys or interviews, for example, the construction of the line of questioning is essential. To operationalize a theory about happiness, for example, it may be relevant to try to distinguish degrees of happiness or its context or frequency. Bad operationalization can introduce the researcher's preconceptions or biases into the data or generate responses that do not adequately test the theory in question. In contrast, successful operationalizations (resulting in operational definitions) have a high degree of validity and reliability. (Calhoun, 2002)

The idea behind operationalization is that we need to translate vague, contested or too general concepts into something that can be handled by an empirical method, providing an 'operational definition'. It is crucial to see the connection between operationalization and methodology: an operationalization is essentially method-driven and method-specific. Different methods will lead to different operational definitions of the same concept: for example, the concept of 'happiness' will be operationalized differently in quantitative (e.g., a survey) or qualitative (e.g., focus group) social research.

[53] For a survey of the philosophy of science promoted by Bridgmann under the label 'Operationalism', see (H. Chang, 2009)

In our case, we will study Late Analytic Philosophy with a range of citation analysis methods. Consequently, our operationalization of the notion will be determined by the methods of citation analysis. As we saw above, scientometrics and citation analysis work essentially on documents and citations between documents, that is with *texts* and *inter-textual operations*. Therefore, if we want to apply citation analysis to an object, we need to translate it into a set of citing and cited documents, with the important constraint that these documents must be indexed in a citation index.

Therefore, we will propose an operational definition of Late Analytic Philosophy as a *set of documents*. More precisely, the kind of documents we are going to consider are *publications*, i.e., the published outcomes of Late Analytic Philosophy research. It is important to underline that publications are only a subset of all documents that can be considered as 'inscriptions' (to borrow the term from Latour) of Late Analytic Philosophy. Unpublished manuscripts, archival records, draft versions of papers and books are all left out from our target set. Once again, this is a constraint of the method we choose: citation analysis. Unpublished documents are not contained in the available citation indexes; hence they cannot be included in the data. More generally, citation analysis and scientometrics focus only on the *product-side* of the scientific research, i.e., on publications. The process of *production* of scientific knowledge, i.e., what Latour calls the «science in the making» (*la science en action*), and that is the subject of ethnographic studies in STS (e.g. (Knorr-Cetina, 2003)) – this fall necessarily out of the scope of scientometrics. In fact, scientometric methods are a means to *represent* science, and like every form of representation, they focus on certain aspects of the represented object, while they leave aside other aspects.[54] This is important to remember when we operationalize objects in order to apply citation analysis to them. In the case of Late Analytic Philosophy, we will leave out not only unpublished inscriptions, but all the practices of analytic philosophy 'in the making', such as teaching, informal exchanges, unpublished talks.

Moreover, the available citation indexes (provided by Web of Science and Scopus) do not index books.[55] Thus, the set of *citing publications* that can be analyzed using these databases is limited

[54] More precisely, scientometrics is a *second order representation* of the scientific practice. The first representation is the scientific literature itself. It is well known that scientific articles do not simply report the research practice of the laboratory, but they employ complex rhetorical strategies to rationalize the messy process of research (Bazerman, 1988; Knorr-Cetina, 2003). We borrow the concept of scientometrics as second order representation of science from Wouters: «Relative to daily practice in laboratories, literature is therefore a "first order" representation. In the same vein, citation analysis and scientometrics are based on scientific literature and are another step removed from underlying research practice. In other words, they can be seen as "second order" representations of what goes on in laboratories» (Wouters, 1999b, p. 5).

[55] Web of Science has recently launched a Book Citation Index, but its scope is for the moment too limited in time to provide significative results.

to publications in academic journals. It is important however not to misunderstand this point. The absence of monographs in the Citation Index means only that references cited in monographs are not counted in the index, not that monographs do not appear at all in the index. Indeed, monographs do appear insofar as the citing articles contain citations pointing to them. Therefore, monographs are part of the set of *cited* items but not part of the set of *citing* items of Web of Science and Scopus. Moreover, in the specific case of Late Analytic Philosophy, the lack of books in the citation indexes does not seem to be a serious issue. In the last decades, analytic philosophers tended to favor the paper instead of the book as the key medium for disseminating research, in a para-scientific fashion (Ahlgren, Pagin, Persson, & Svedberg, 2015; Marconi, 2014), and Levy, as we saw in Chapter 1, remarks:

> AP [analytic philosophy] and CP [continental philosophy] present their research in differing forms. […] It is easy to think of important philosophers in the analytic tradition whose reputation rests on journal articles alone, or whose books tend to consist of collections of previously published articles – Frank Ramsey, Bernard Williams, and Donald Davidson spring to mind. Gettier would be an extreme example. (Levy, 2003, p. 294)

Thus, the operationalization of Late Analytic Philosophy is constrained by two important features of citation analysis: a) the limitation to the *published* side of the discipline; b) the lack of books (as *citing* items) in the available citation indexes. These constraints set the stage for the *delineation* of the field Late Analytic Philosophy as a set of published articles.

### Field delineation

We need now to determine the set of published articles that we will consider as the operational definition of Late Analytic Philosophy. This operation is called 'field delineation,' and its outcome will be a *query for a database*, i.e., a string that everyone can use to search the database. It is important that the outcome of the operationalization process is a specific query, as it assures that the whole process is potentially *reproducible* by everyone. Along with a clear description of the methodology for analyzing the data, this increases the validity and reliability of our study.

The field delineation can be done in two ways: by specifying some *keywords* that individuate the target research area univocally, or by indicating the *journals* that are specific to the field.[56] In the case of philosophy, specific sub-areas can be successfully individuated by the first method. Ahlgren et al., for instance, has mapped *sorite* and free will debates in philosophy by using

[56] Clearly, the choice is not an *aut-aut* and hybrid methods can be applied. See for example (Laurens, Zitt, & Bassecoulard, 2010; Zitt & Bassecoulard, 2006)

queries that involved specific keywords (Ahlgren et al., 2015). This was possible because both *sorite* and free will are technical terms that are used in specialized and definable areas of philosophy. However, this method cannot be used to define the set of publications of Late Analytic Philosophy for two reasons. Firstly, in Chapter 1 we saw how analytic philosophy is too vague and general for being associated with a specific set of words. Secondly, certain general terms in philosophy are used with very different meanings in different philosophical schools. Take for instance the term 'ontology': its meaning and use are very different in the context of analytic metaphysics and Heidegger scholarship. Thus, using 'ontology' to retrieve analytic metaphysics publications would introduce lots of noise in the search.

We opted then for the second method, i.e., specifying a list of relevant journals. Once again, there are at least three ways for deciding this list: 1) rely on scientometric indicators, such as Journal Impact Factor®; 2) rely on some authoritative source (such as companions of analytic philosophy); or 3) survey the target population (late analytic philosophers). All three options have strengths and weaknesses. Scientometric indicators, such as Impact Factor® and related metrics, are the standard option for determining the importance of journals in the sciences. Being based on the number of citations articles in a journal receive, i.e., on the aggregated behavior of the entire scientific community, they have the advantage of avoiding subjective biases. However, in the case of Late Analytic Philosophy, this option was not feasible within Web of Science, since WoS simply does not provide Impact Factor® for most humanities journals, philosophy included. Scopus, in contrast to Web of Science, provides metrics for Humanities, via the tool SCImago Journal Ranking (http://www.scimagojr.com/ ). For the category "Philosophy", SCImago provides, for the year 2015, the following list of representative journals:

| **Rank** | **Title** | **SJR** | **SJR Quartile** | **H index** | **Country** |
|---|---|---|---|---|---|
| **1** | The Philosophical Review | 3,062 | Q1 | 40 | United States |
| **2** | Nous | 2,405 | Q1 | 38 | United States |
| **3** | The Journal of Philosophy | 1,992 | Q1 | 31 | United States |
| **4** | Ethics | 1,938 | Q1 | 51 | United States |
| **5** | Australasian Journal of Philosophy | 1,747 | Q1 | 27 | United Kingdom |
| **6** | Mind | 1,671 | Q1 | 30 | United Kingdom |
| **7** | Political Psychology | 1,623 | Q1 | 60 | United Kingdom |
| **8** | Business Ethics Quarterly | 1,534 | Q1 | 46 | United States |

| | | | | | |
|---|---|---|---|---|---|
| **9** | Philosophers Imprint | 1,481 | Q1 | 5 | United States |
| **10** | Bulletin of Symbolic Logic | 1,405 | Q1 | 26 | United States |

*Table 4. SCImago Journal Ranking for the category "Philosophy"*

The problem with this list is that the subject category is too general, including Journals that can hardly be considered representative of Late Analytic Philosophy, such as *Ethics* or *Political Psychology*. SCImago list is therefore helpful but insufficient to settle the issue of selecting target journals.

The second option was to extract a list of journals from some authoritative source, such as companions to analytic philosophy. This is the strategy pursued in (Wray, 2010) to determine the key journals in the field of philosophy of science. However, one may think that this method suffers from two possible selection biases, at least in the case of Late Analytic Philosophy. The first one derives from the choice of the companions considered for the research. The second one is the consequence of the subjective bias intrinsic to the choices made by the authors of the companions. Even if the former bias could be overcome by taking all companions as equally valuable, the latter cannot structurally be avoided. We did not consider therefore this option.

Lastly, conducting a survey of analytic philosophers to discover their opinion about key journals seemed to us to be the best solution. Furthermore, such a survey has already been conducted by the blog *Leiter Reports: A Philosophy Blog*.[57] The site conducted two pools among its visitors in 2015, both of which got over 500 votes each, asking precisely to rank the «top 20 general analytic philosophy journals».[58] Even if some methodological doubts can be cast upon the way in which the sample was chosen[59], the final list obtained a good consensus among the site visitors (Table 5).

| **Rank** | **Journal** |
|---|---|
| **1** | Philosophical Review |
| **2** | Noûs |
| **3** | Journal of Philosophy |
| **4** | Mind |
| **5** | Philosophy and Phenomenological Research |

[57] http://leiterreports.typepad.com/

[58] http://leiterreports.typepad.com/blog/2015/09/the-top-20-general-philosophy-journals-2015.html

[59] In fact, the audience of the blog is mainly Anglo-American, so that a geographic bias is likely to affect the sample. Furthermore, no official authentication was required to participate to the survey. Thus, some of the participants could not have been experts of the field.

| | |
|---|---|
| **6** | Australasian Journal of Philosophy |
| **7** | Philosophical Studies |
| **8** | Philosopher's Imprints |
| **9** | Philosophical Quarterly |
| **10** | Analysis |
| **11** | Synthese |
| **12** | Erkenntnis |
| **13** | Proceedings of the Aristotelian Society |
| **14** | Canadian Journal of Philosophy |
| **15** | American Philosophical Quarterly |
| **16** | European Journal of Philosophy |
| **17** | Pacific Philosophical Quarterly |
| **18** | Ratio |
| **19** | Ergo |
| **20** | Philosophical Perspectives |

*Table 5. Ranking of philosophical journals according to Leiter's report pools (Source: http://leiterreports.typepad.com/blog/2015/09/the-top-20-general-philosophy-journals-2015.html)*

We chose then to integrate it with the SCImago list, retaining the first five journals as the most representative ones:

- *The Philosophical Review*
- *Noûs*
- *The Journal of Philosophy*
- *Mind*
- *Philosophy and Phenomenological Research*

We asked analytic philosophers to assess this list, and they, in general, accepted it as well representative of contemporary generalist analytic philosophy. Nonetheless, we noticed that it raised more consensus among analytic philosophers with Anglo-American affiliations than among analytic philosophers of other countries. Further corroboration of this list comes from the study of contemporary American philosophy, carried out by Kuklick (Kuklick, 2007). In commenting his sources, he remarks that he used mainly journal literature. His list overlaps almost entirely with ours:

> In appraising American philosophy in the last part of the century I have depended on four journals: Journal of Philosophy, Philosophical Review, Philosophy and Phenomenological Research, and Review of Metaphysics. Also important are the various publications of the American Philosophical Association (Kuklick, 2007, p. 306)

Once the list of journals was determined, we choose to consider only the articles, leaving aside letters, book reviews[60], and editorials, because articles seem more relevant for research than the other types of publications. At the end of this complex operationalization process, the operational definition of Late Analytic Philosophy we obtained is the following query for retrieving articles from Web of Science:

> (SO=(PHILOSOPHICAL REVIEW OR NOUS OR JOURNAL OF PHILOSOPHY OR MIND OR PHILOSOPHY "AND" PHENOMENOLOGICAL RESEARCH) *AND* **DOCUMENT TYPES:** (Article)

As we will show in Chapter 3, this query was then adapted to each study, in order to set different time-scopes to the corpus of articles.

### The documental level

The result of the operationalization of Late Analytic Philosophy is a set of publications (namely, articles published in five representative journals, in a certain time-span). More precisely, the operational definition results in the set of *metadata* of these publications (author, title, abstract, publication year, etc.) along with their *cited references*. This is the information that is recorded in the citation index. Late Analytic Philosophy is therefore operationalized as a *bibliographic network*, where the nodes (the documents) have specific properties (the metadata) and are connected by links (the citations). We call the kind of object resulting from this operation (i.e., the network) the *documental space* of Late Analytic Philosophy, and the level at which Late Analytic Philosophy is individuated the *documental level* (Petrovich, 2018b).

In Chapter 1, we saw that analytic philosophy, in its referential use, referred either to an *intellectual* object (a set of intellectual contents and commitments) or to a *social* object (a set of philosophers sharing certain socio-professional properties). Now, the operational definition of Late Analytic Philosophy as a documental object individuates the reference of Late Analytic Philosophy at a level that differs both from the purely intellectual and the purely social spheres. The documental level is an intermediate layer between them. It is, in a way, their *interface*. The intellectual level corresponds to the Popperian Third World, made of abstract objects (the intellectual contents), that exist independently of their physical embodiment (Popper, 1979). The

[60] This is particularly relevant in the case of the *Philosophical Review*, that publishes only a limited number of research articles in each issue, being the rest book reviews.

social level, on the other hand, corresponds to the human actors that produce the intellectual contents. The documental level is the interface between the two levels: documental objects are partly similar with intellectual contents, insofar as they can exist independently of their creators. A publication, in fact, is not a private but a public object, and it can circulate beyond the intentions of its authors. However, they share with the social level their being *concrete* and spatiotemporally determined. Documental objects are not abstract but concrete objects (namely, publications) that have definite spatiotemporal coordinates and boundaries. They do not free-float in the abstract intellectual space.

The operational definition of Late Analytic Philosophy is therefore intermediate between a purely sociological definition and a purely intellectual definition. It is a third way between the *internalist* approach to the history of philosophy (that focus only on intellectual content) and the *externalist* approach (that focus only on the context of intellectual production).[61]

Figure 6 provides a schematic representation of the relationships between the intellectual (on the left), the documental (in the middle), and the social level (on the right). Note that the relation between the elements of the layers is not biunivocal. The same intellectual content (such a theory or a concept) can be published in more than one document or, *vice versa*, the same document can present more than one concept.[62] The same holds for the relationship between the social and the documental level: the same document can be authored by more than one author and, obviously, the same author publishes usually more than one document. In the next Chapter, we will investigate the complex interplay between these three levels.

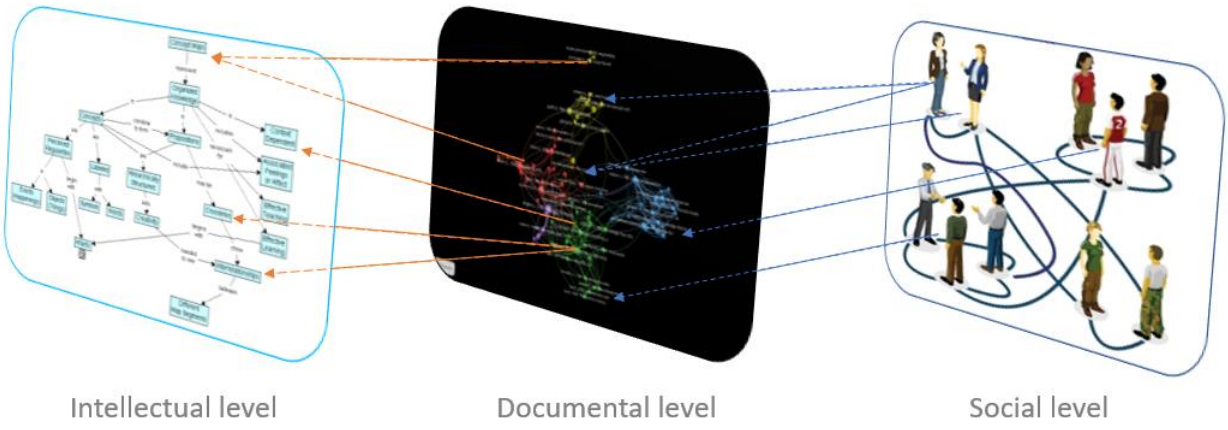



*Figure 6. Diagram representing the relatioship between the intellectual, documental, and social level*

[61] In Chapter 4, we will discuss more extensively the relationship between the documental approach, the historiography of philosophy and the recent field of the sociology of philosophy.
[62] However, according to Small's theory of the citation symbol, at least in the case of the highly-cited references in the sciences, the relationship between one publication and one concept becomes more and more biunivocal (Small, 1978).

## Scientometrics and the humanities. Overview of the main issues

In scientometric and library science literature, philosophy is usually classified as part of the Humanities. The Humanities are in turn distinguished both from the Social Sciences and the Sciences. The three main ISI citation indexes reflect this: the A&HCI (Arts and Humanities Citation Index, launched in 1980 and covering almost 1000 journals), the SSCI (Social Sciences Citation Index, launched in 1966) and the SCI (Science Citation Index, launched in 1961) (Leydesdorff, Hammarfelt, & Salah, 2011). However, it must be noticed that the humanities are a poorly defined field and its boundaries are fuzzy (Hellqvist, 2009). The term is also more widespread in Anglo-American contexts, whereas in other national contexts the humanistic disciplines are categorized differently (in France, for instance, the notion of *sciences de l'homme* does not overlap entirely with Humanities, in Italy philosophy and psychology are classified in the same Area 11 by the national agency of evaluation). Furthermore, humanities are a very heterogeneous area, where very diverse disciplines, such as linguistics and music are classified under the same label. Notwithstanding the heterogeneity and the fuzziness of the field, in scientometric literature, some issues are usually highlighted when scientometrics is applied to humanities areas. In this section, we briefly summarize these issues, and we argue that they are not insurmountable problems for the study of Late Analytic Philosophy.

The first thing to notice is that these issues are typically raised in the context of the discussion of the applicability of scientometric monitoring of research performance in the humanities (Baneyx, 2008; Daniel et al., 2016; Larivière, Archambault, Gingras, & Vignola-Gagné, 2006; Linmans, 2010; Nederhof, 2006). The demand for a higher accountability of the university system has also reached humanistic areas of the academia (Linmans, 2010) and, especially in the last decade, the interest for designing evaluation frameworks suitable for humanities is considerably flourished (see for example the recent volume on *Research Assessment in the Humanities: Towards Criteria and Procedures*, (Daniel et al., 2016)). Therefore, the kind of issues that are raised is strongly connected with evaluative purposes.

Five features of the humanities pose difficulties to the straightforward application of scientometric methods to them (Nederhof, 2006):[63]

1. Compared to the sciences, humanities have a more pronounced national and regional orientation. Humanities studies are often directed to a less international public than the sciences. Some topics in, for instance, law or literature, have a strong national focus and,

[63] Note that Nederhof discusses at the same time the Social Sciences and the Humanities. The association of the two macro-areas is common also in the science policy: for instance, in the European Research Council social sciences and humanities are part of the same are, called 'SSH'.

even if they can be very important for their local context, sometimes they cannot be applied to other nations. The national or regional orientation of (some parts of) the humanities is also reflected by publication outlets, that can have only a national or even regional diffusion, and by the publication language, that it is often the national language rather than English.

2. Books, rather than serials, are the most important humanities output. The publication mode of the humanities is manifestly different from the one of the sciences. Books, monographs, edited volumes, and book chapters are important, if not key outputs of humanities research, and cannot be ignored to evaluate both the productivity and the influence of humanities scholars. The problem is that ISI indexes cover only journal production, losing hence a vital part of the humanistic research.
3. In the humanities, citations are used differently than in the sciences. In fields like history or literature, references point out to very different kinds of document. On the one hand, there are references pointing to the source materials. This type of referencing has a strong tradition in the humanities and, especially in history, the establishment of the footnotes with the primary sources was an important step in turning history into a scientific discipline (Hellqvist, 2009). These citations play a role that is analogous to data in science since they provide the evidence to sustain the claims put forth by the author (this is why they are sometimes called «data citations» (Nederhof, 2006, p. 87). On the other hand, some references are like the references used in the sciences, since they point to secondary publication, i.e., to works by other scholars in the field. These citations are called «influence citations» (Nederhof, 2006, p. 87). Thus, referencing in the humanities is a mix of the footnote and modern referencing in science (Hellqvist, 2009). However, citation indexes do not distinguish between the two types of citations. Therefore, citation analysis can be misleading in the case of humanistic disciplines where sources play an important role, such as history or literature.
4. Single scholar approach versus team research. In most of humanities field, research is carried out individually, and the products of research are authored characteristically by a single scholar. On the other hand, in the sciences publications include a considerable number of co-authors. This difference should be taken into account when the productivity of scientists and humanists is compared because scientists working in teams tend to produce considerably more publications that the single author in humanities.
5. Multiple publics of humanistic research. In contrast with (most of) the sciences, that are oriented to a very specialized audience, several humanistic fields address a diversified audience that often comprehends also the general, non-scholarly public. This means that

some part of the research output in the humanities is not published in specialized journals or book series, but in publication venues addressing non-specialists.

In general, the main concern expressed in the previous remarks is that the *scope* and the *structure* of the databases that are commonly used in scientometrics are *insufficient* to cover humanities, for different reasons. It is insufficient in scope because it does not cover all the research output of the humanities, and it is insufficient in structure because citation indexes do not register the difference between data and influence citations contained in humanities works. As said before, the main implication of these distinctive features of the humanities is that the standard citation measures that are used in the sciences cannot be applied to the humanities, or, at least, they should be adapted and used very cautionary for evaluating purposes.

Now, it is worth remarking once again that the primary aim of this study is to use scientometrics and citation analysis techniques to *describe* Late Analytic Philosophy and *reconstruct* its history, not to evaluate research performance. Citation analysis is used within an epistemological framework, i.e., as a tool for reconstructing the dynamics of Late Analytic Philosophy as a field of knowledge. We believe that this topic is worthy of studying independently of the use (or misuse) that can be made of citation analyses in research evaluation. Therefore, several of the mentioned issues are not relevant or do not affect this work:

1. Late Analytic Philosophy: national or international orientation? It is not easy to say if Late Analytic Philosophy *in abstracto* is an international or national phenomenon. If we take it as a purely intellectual phenomenon, even the question could appear to be meaningless, since ideas do not have a nationality. However, when we operationalize the notion of Late Analytic Philosophy at the documental level, i.e., when we translate it into a set of journals as we have done in the previous section, it is easier to assess the national or international dimension of Late Analytic Philosophy because it can be deduced from the affiliations of the authors. In the first and second study of Chapter 3, we will provide statistics on the nationality of authors publishing in these journals, and this will shed light on the topic. For the moment, it is sufficient to underline the fact that all the five journals are based in UK or US, the two countries that are mostly covered by Web of Science, and that they publish only in English, the main language of Web of Science. Hence, in the case of Late Analytic Philosophy (at least when it is operationalized in the way we propose), the coverage of the database is adequate.
2. The role of books and serials in Late Analytic Philosophy. As we said in the previous section, some authors have noted that the journals are important outlets for analytic philosophers. Books are often a collection of previously published papers. However, the place of serials and books in Late Analytic Philosophy is a matter that has to be

empirically investigated, in order to gain more than anecdotal evidence on this subject. Citation analysis cannot be discarded as a descriptive tool before it has not been tested. Furthermore, books are not entirely absent from the citation index: they do not appear among the citing items, but they do appear as cited references.

3. The use of citations in Late Analytic Philosophy. Once again, this is a subject that should be investigated empirically before refusing citation analysis as a method. *Prima facie*, however, it seems that in analytic philosophy in general, not only late, the weight of 'data citations' is likely to be quite low, since analytic philosophy is (or at least aims at being) a *theoretical* discipline, and not a *hermeneutical* one (such as some parts of Continental Philosophy) or a *historical* one (such as history of philosophy). Thus, it can be expected that the bulk of citations would go to other scholars, instead of historical texts and other sources. However, this conjecture, however plausible, should be empirically checked: we will do that in the third study of Chapter 3.
4. Individual vs. team research in Late Analytic Philosophy. This is the feature of humanities disciplines that probably Late Analytic Philosophy shares at most. However, in the context of citation analysis, this feature does only restrict the kind of analyses that can be pursued. In particular, co-authorship analysis, which is used to reconstruct networks of authors based on shared authorship of papers, is probably not very insightful for studying Late Analytic Philosophy. Other types of analysis, such as co-citation analysis, however, are not affected by the low amount of multi-authored publications in Late Analytic Philosophy.
5. The public of Late Analytic Philosophy. The issue of the many publics of humanistic research seems to concern only slightly Late Analytic Philosophy. As we saw in Chapter 1, Late Analytic Philosophy is today considered by its practitioners as a highly-specialized and professionalized field, that does not aim at addressing the lay public.

In sum, the issues that are usually raised to cast doubts on the applicability of citation analysis and scientometrics to humanistic areas do not hold in the case of Late Analytic Philosophy. Most of them are important in evaluative contexts, but their incidence is downsized when we take a descriptive stance. In fact, the only serious problem that can affect the descriptive use of citation analysis techniques is the coverage of the databases. However, thanks to our operational definition of Late Analytic Philosophy, this problem does not arise, because all the five journals we take as the documental level of Late Analytic Philosophy are indeed covered in Web of Science.

## Sum up of Chapter 2

This Chapter opened with the methodological issues that arise when we attempt to account for several features of Late Analytic Philosophy. In particular, we highlighted the need to develop a new, 'statistical' framework for understanding the structure and the development of Late Analytic Philosophy – a need that we called Rescher's Methodological Challenge. This methodological shift is strictly connected to the exponential growth of the analytic production, which renders the classic method of the historiography of philosophy (close reading of texts) inadequate to grasp the general patterns, such as specialization and fragmentation, that are typical of Late Analytic Philosophy.

In the second section of the Chapter, we introduced the discipline of scientometrics as a valid answer to the methodological challenge. We briefly summarized the history of scientometrics, pointing out its close relationship with science policy issues, especially the evaluation of research performance, a topic that has raised in importance since the Eighties. Notwithstanding the applied side of the field, scientometrics has always had also a theoretical debate concerning its core notion, the notion of 'citation'. Thus, we presented the different theories of citation that have been proposed in the last fifty years, grouping them into three main approaches: a socio-psychological approach, an indicator-centered approach, and an epistemological approach. According to the first approach, the purpose of a theory of citation is to explain the citation behavior of scientists, highlighting the different social and psychological factors that shape this behavior. According to the second approach, the target of the citation theory is not the behavior of the individual, citing scientists, but the aggregate behavior of dozens of scientists, which results in the scientometric indicators. The theory aims to explain what these indicators can tell about science and to justify their use in science policy contexts. Lastly, the third approach focuses on the epistemological functions of citation in the cognitive system of science. Science is not considered primarily as a social system, but as a network of knowledge pieces (the scientific articles) that are mutually linked by the citations. Thus, the study of the citation network allows shedding light on the structure of science and its development in time. This is the aim of science mapping, the area of scientometric research that has developed several techniques for analyzing and visualizing through maps the citation network of science.

In the third section of the Chapter, we began to set the stage for the application of scientometrics and citation analysis to Late Analytic Philosophy. The use of this method involves several constraints on what we can consider as Late Analytic Philosophy. In other words, we needed to translate the notion of Late Analytic Philosophy into something that could be tractable by scientometric methods. This is what we called the *operationalization* of Late Analytic Philosophy: the outcome of this process has been an 'operational definition' of Late Analytic

Philosophy as a set of articles published in five key journals (what we called the *documental space* of Late Analytic Philosophy). By this operation, we pointed out what we called the 'documental level' of Late Analytic Philosophy, a level which is intermediate between the intellectual level which is the traditional subject of the internalist history of philosophy, and the social level which is the subject of the sociology of philosophy.[64]

Finally, in the last section, we focused on some issues that are commonly discussed in the debate concerning the application of scientometrics to the humanities. We showed how many of the issues have to do with the application of scientometric indicators for evaluating humanistic research, which is not the purpose of this research. The main issue that could affect this research would be the insufficient scope of the existing databases in the case of Late Analytic Philosophy. However, the database we will use for our analyses, Clarivate's Web of Science, does cover all the five journals that we take as the operational definition of Late Analytic Philosophy. Therefore, the problem of the scope does not occur in our case.

In the next Chapter, we will present four empirical studies that apply, in different ways, scientometrics and citation analysis to Late Analytic Philosophy.

[64] In Chapter 4, we will return on this topic, developing in more detail the relationship between our approach and the historiography and the sociology of philosophy.

# Chapter 3

This Chapter presents four empirical studies of Late Analytic Philosophy conducted with citation-based methodologies. Hence, it is the empirical core of the dissertation. Globally, the four studies aim at showing that citation analysis is a powerful tool to answer Rescher's Methodological Challenge and to investigate the peculiar features of Late Analytic Philosophy that we pointed out in Chapter 1.

The first study investigates the distribution of scientometric properties (average number of cited references, distribution of citations, most cited institutions and countries) of Late Analytic Philosophy. The second study maps the structure and the dynamics of Late Analytic Philosophy by longitudinal co-citation analysis, a powerful technique of science mapping. The third study approaches the topic of the normalization of Late Analytic Philosophy (i.e., whether and how analytic philosophy has entered a Kuhnian normal-scientific phase) by citation context analysis. Lastly, the fourth study presents some preliminary results on the temporal dynamics of Late Analytic Philosophy, investigating the age-distribution of cited references and the citation life-cycles of documents.

## First study. Scientometric distributions of Late Analytic Philosophy

### Introduction

In this first study, we will present some preliminary statistics about the corpus which results from the operationalization of Late Analytic Philosophy. The corpus is obtained by setting a timespan on the Web of Science query defined in Chapter 2. Recall that the five 'top' journals were: *The Philosophical Review, The Journal of Philosophy, Mind, Noûs,* and *Philosophy and Phenomenological Research.*

The analyses we shall present concern three main topics. Firstly, we will explore the citation behavior of analytic philosophers and how it has changed over time. Which is the average number of cited references per papers? How has it evolved over time? Do analytic philosophers cite more or less today than thirty years ago? What is the average 'life' of the papers, i.e., for how long do they remain cited in the community? How back in time is the so-called 'research front' of Late Analytic Philosophy extended?

Then, we will analyze the distribution of papers according to their citations. One of the earliest results of bibliometrics was the discovery of the so-called 'bibliometric laws': the laws of Lotka (1926), Bradford (1934) and Zipf (1936) (Mingers & Leydesdorff, 2015; Seglen, 1992). These 'laws' (or, better to say, empirical generalizations) describe the distributions, respectively, of authors producing papers in a given field, journals producing papers on a given subject, and texts producing words with a given frequency. What is interesting is that none of these distributions is a *normal* one (i.e., a Gaussian distribution), in which the median, the mode, and the arithmetic mean coincide, with the values symmetrically distributed around them. Gaussian distributions, which are easily recognizable for their bell shape, are typical of random phenomena, such as the fall of beads in a Galton Board.[65] Now, the bibliometric variables appearing in the bibliometric 'laws' do not follow such normal distribution:

> Their common denominator is a striking inequality in the pattern of information processes under observation: a few authors are responsible for most of the scientific literature in a given research field; a few scientific journals publish the majority of the papers relevant to any given subject; and a relatively small number of recurrent word units govern individual linguistic behavior in scientific communication. (De Bellis, 2014, p. 37)

[65] The Galton Board, or bean machine, consists of a vertical board with interleaved rows of pegs. Beads are dropped from the top and bounce either left or right as they hit the pegs. They are collected into bins at the bottom, where the height of bead columns accumulated in the bins approximate a bell curve.

In statistical terms, this means that the distribution of bibliometric properties is *skewed*, i.e., the mean and the median do not coincide, and the curve is not bell-shaped (Albarrán, Crespo, Ortuño, & Ruiz-Castillo, 2011; Seglen, 1992).

> Virtually all empirical studies […] show that within most fields of science about 69-70% of papers seems to be *poorly* cited (i.e., are included in citedness class I), 21% of papers seems to be *fairly* cited (i.e., belong to class II), only about 6-7% seem to be *remarkably* cited (class III), and only about 2-3% seem to be *outstandingly* cited (class IV). (Vîiu, 2018, p. 402)[66]

The typical example of a skewed distribution is the distribution of wealth in a society, which, as Pareto famously demonstrated, fits the trend that a large portion of wealth is held by a small fraction of the population (the so-known Pareto principle). Now, by analyzing the distribution of analytic philosophy papers according to the citations they receive, we want to discover if Late Analytic Philosophy is characterized by a normal or a skewed distribution.

Thirdly, we want to analyze another distribution, namely the distribution of papers according to the institution and the country of their authors. Which are the most productive and most cited institutions of Late Analytic Philosophy? Is their distribution normal or are there structural inequalities? What are countries which contribute mostly to the journals that are taken to be the most prestigious ones of Late Analytic Philosophy? We saw in Chapter 1 that one of the popular definitions of analytic philosophy is in geo-linguistic terms: analytic philosophy would be the dominant mode of philosophizing in Anglophone countries (US, UK, Australia). We also saw that such definition is limited and how Glock rejected it (at the end of the day, the reason was that founding fathers of analytic philosophy such as Frege and the Vienna Circle members were not Anglo-American). Moreover, today analytic philosophy presents itself as a truly international community, and the use of English as common language is not justified by a national or nationalistic emphasis, but by claiming that English is the international language of science and scholarship. Now, it is interesting to check *empirically* whether all these statements are true at the documental level, i.e., whether the authors publishing in the 'top journals' are really diversified in terms of institutions and countries. Indeed, a first hint that this is *not* the case is provided by the fact that all the five journals are published in US and UK, sometimes even by the faculty of a *single* university (such as *The Philosophical Review* and *The Journal of Philosophy,* see Table 6).

[66] The universality of the scientometric distribution across all fields of science has prompted a vast debate in scientometrics, especially because of the use of this assumption in research performance evaluation. For instance, the universality claim is advocated by scientometricians working for the Italian agency of university evaluation (ANVUR) (Bonaccorsi et al., 2017; Radicchi, Fortunato, & Castellano, 2008).

| Journal | Country | Publisher | Editors | Founded |
|---|---|---|---|---|
| **The Philosophical Review** | USA | Duke University Press (US) | Edited by the faculty of the Sage School of Philosophy at Cornell University (US) | 1892 |
| **Noûs** | USA | Willey-Blackwell (US) | Edited by Ernest Sosa (Rutgers University, US) | 1967 |
| **The Journal of Philosophy** | USA | The Journal of Philosophy Inc. (US) | Edited by the Columbia University Philosophy Department (US) | 1904 |
| **Mind** | UK | Oxford University Press (on behalf of the Mind Association, UK) | Edited by Adrian William Moore (University of Oxford) and Lucy O'Brien (University College London) | 1876 |
| **Philosophy and Phenomenological Research** | USA | Willey-Blackwell (on the behalf of the International Phenomenology Society, US) | Edited by Ernest Sosa (Rutgers University, US) | 1940 |

*Table 6. The most prestigious journals of analytic philosophy*

Lastly, we will analyze the relationships between the 'top' five journals by journal co-citation analysis: we want to discover what are the journals that are frequently cited by the papers published in the 'top' five. In particular, by analyzing the co-citation frequencies, we want to understand the extent that these journals are self-referential, i.e., whether they cite mostly themselves or also other journals. In this way, the analysis will also allow us to understand, *post-hoc*, whether the set we choose as operational definition of Late Analytic Philosophy is enough representative of the field.

The statistics we present in this first section will also open wider questions, which will be the topic of the two main studies that we will present in the next two sections of the Chapter.

## Methodology

The first two analyses (average number of cited references over time and average number of citations over time) were performed on the enhanced version of the Web of Science database

owned by the Center for Science and Technology Studies (CWTS) of Leiden[67], during a visiting period between August and September 2017. The queries for the database were coded in SQL with Microsoft® SQL Server T-SQL (see an example of the code below) and the results were subsequently elaborated with Microsoft® Excel to generate the graphs. For the first two analyses, the timespan was set to the interval [1980-2016], whereas for the analysis of the most cited institutions and countries the interval was set to [1985-2014].[68] Only articles were considered, setting aside letters, book reviews, and editorials.

```
-- number of publications and average number of references

drop table #pub
select a.ut, a.pub_year, a.n_refs
into #pub
from woskb..cwts_ut as a
join woskb..cwts_so as b on a.cwts_so_no = b.cwts_so_no
where b.so IN ('philosophical review','nous', 'journal of philosophy',
'mind', 'PHILOSOPHY AND PHENOMENOLOGICAL RESEARCH')
       and a.cwts_dt_no in (2, 4)
       and a.pub_year between 1980 and 2016

select pub_year, n_pubs = count(*), avg_n_refs = avg(cast(n_refs as float))
from #pub
group by pub_year
order by pub_year
```

*Figure 7. SQL code used in the analysis 'average number of cited references over time'*

We used instead the software VOSviewer (www.vosviewer.com), developed at the CWTS by Ludo Waltman and Nees Jan van Eck (van Eck & Waltman, 2010) to produce the ranking of the most cited institutions and countries and for the journal co-citation analysis. We used version 1.6.7 of the software. The map file produced by VOSviewer was then elaborated in Excel to produce the tables and the graphs.[69]

## Results and discussion

### *Distribution of cited references and citations*

Figure 8 shows the average number of cited references per paper over time. The trend is clearly increasing: in 1980 a paper cited, in average, 11.41 references, in 2003 the number doubled to 22.84 and in 2016 it raised to 40 references, with a four-fold increase from the starting point.

[67] This version is cleaned and up-dated regularly at the CWTS and it is used by the members of the Center for producing, among other things, the Leiden Ranking (http://www.leidenranking.com/) and advanced bibliometric assessment of research performance for universities all around the globe.
[68] The difference in the intervals is due to the fact that the first queries were performed on the enhanced version of WoS at the CWTS with Microsoft® SQL Server T-SQL, whereas the other queries were done on the web interface of WoS, accessed from the University of Milan. The subscription of the University of Milan begins only from 1985.
[69] See the Methodology section of the next study (focused on science mapping) for a more detailed account of VOSviewer and the map file.

The pattern is well fitted by an exponential curve, meaning that an acceleration in the trend has occurred. Indeed, it results that after 2005 the average has increased faster than in the previous decades, where it grew almost linearly.

The clear increasing pattern suggests that the citation behavior of analytic philosophers has changed over time: analytic philosophers clearly started using more explicit references to the literature. The interplay of three different factors may explain this pattern. Firstly, it is possible that the editorial policies of the five journals changed in the last decades, encouraging authors to state explicit citations, rather than referring to implicit references. This may be in turn a consequence of the rise of the «citation culture» related to the growing importance of citations in research performance evaluation (Wouters, 1999b). Secondly, it is possible that the emergence of the Internet has considerably simplified the literature search for analytic philosophers, in the same way as it helped scientists (Ucar et al., 2014). Indeed, there exist two databases dedicated to philosophical literature (*The Philosopher's Index* and the more recent *PhilPapers*) which are widely used by analytic philosophers for their literature search. Thirdly, the increasing pattern may be explained by the growth of the documental space of Late Analytic Philosophy, i.e., by the fact that, as we saw in Chapter 1, there is more and more analytic philosophy that can be cited. However, it is interesting to notice that the growth of the documental space is matched by a change in the citation behavior of analytic philosophers. This means that the two phenomena are at least correlated, if not the former causing the latter. The results allow us to formulate a general hypothesis that we will explore in more detail in the next study. We suggest the hypothesis that there is a *feedback mechanism* between the dynamic of the documental space (as it is revealed by patterns such as the one shown in Figure 8) and the actions of the actors involved in building the documental space itself. The documental space interacts dynamically with the actors, shaping their behavior and constraining, to a certain extent, their action: if the average number of cited references is four times higher today than in 1980, our hypothesis is that the *pressure to cite* acting on the individual author today is higher than thirty years ago. In other words, citing a number of references that is significantly lower (or higher)

than the average would involve a sort of *cost* for the individuals, namely the cost of differentiating themselves from the *structural trend* of the documental space.

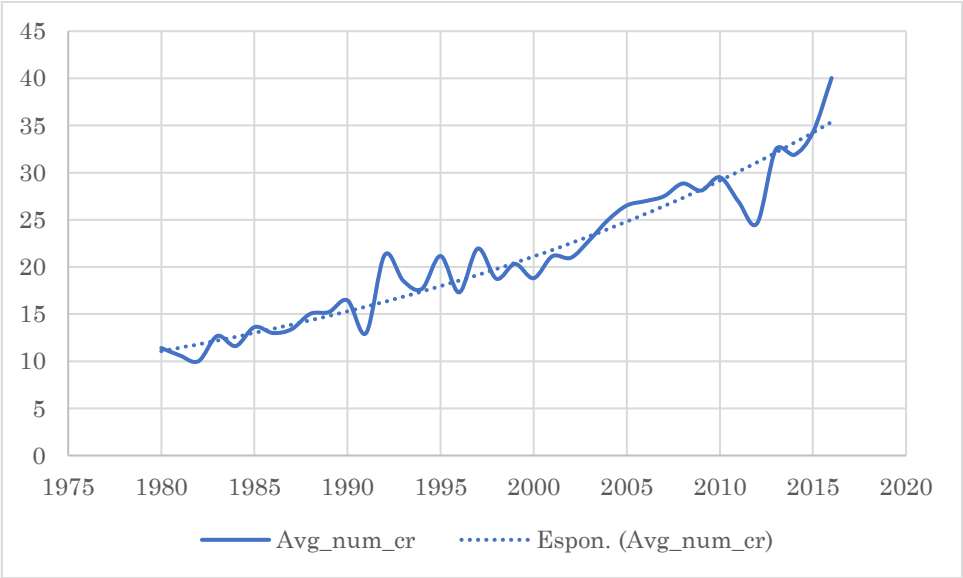



*Figure 8. Average number of cited references per article over time*

However, the mere growth in the number of references still does not say anything about the *epistemic* growth of Late Analytic Philosophy: has analytic philosophy knowledge started to grow or is it still contested and unstable? Is the growth of the documental space matched by *progress* in knowledge, or at least by a raising *consensus* in the community? Has Late Analytic Philosophy started a normalization process, i.e., has it entered in a normal scientific period? In order to answer this kind of questions, we cannot stop at the level of the quantity of references, but it is necessary to explore the quality of the citation links. This will be done in the third study of this Chapter.

Figure 9 shows the average number of citations per article over time. If the previous analysis was backward-looking since it focused on the average number of citations to the previous literature, this one is forward-looking since it shows how the papers published in the 'top' five are cited by subsequent literature.[70] The previous analysis looked at the past of the documental space, this one at the future, so to say.

The overall shape of the curve was expected: the descending trend of the average is a natural consequence of the fact that recent papers need time to collect citations. This is the reason why the average falls almost to zero for papers published in 2016 and 2017. However, this kind of curves is interesting because they show some *peaks* (in our case, a first peak in 1994 and a

[70] Note the number of citations corresponds to the number of items in Web of Science that cite the articles in the 'top' five. As we saw above, Web of Science indexes only articles (the Book Citation Index is still too recent to be useful), therefore these citations come only from journal literature. Since citations coming from books or book chapters are not counted, the values of the averages are underestimated.

second one in 2007). These peaks, that are the local maxima of the function, are noticeable because they show when the citations reach the highest density. The distance between the peak and the present time provide an estimate of the temporal dimension of the *research front* of the documental space, i.e., the time window in which documents are still active (i.e., cited) in the community (Cozzens, 1985). The results of the analysis indicate that the research front of Late Analytic Philosophy is extended between 1994 and today (i.e., a timespan of circa 20 years). This means that documents in Late Analytic Philosophy are still considered (on average) *citable* after 20 years from the publishing. The dimensions of the research front of different disciplines are considerably different and Price used a measure of that (the Price Index) to distinguish between scientific, social-scientific and non-scientific areas (Price, 1986a) .

However, this analysis uses citation data from 2017, i.e., it considers the number of citations that each of the articles published between 1985 and 2016 have collected *form their publication until 2017* in the whole database of WoS. As such, it provides a static image of the research front. The research front, however, is dynamic and moves forward in time. Thus, this analysis can be considered only preliminary to a dynamic study of the research front, which consider how the papers published in each year are cited in the following years (an approach known as diachronous study). We will undertake such dynamic study in the fourth study of this Chapter.[71]

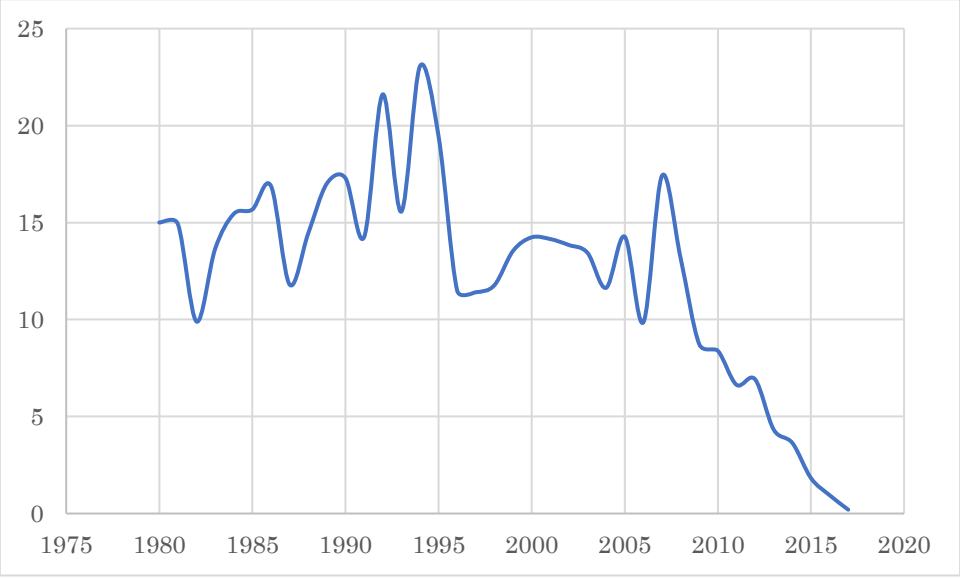



*Figure 9. Average number of citations per article over time*

Figure 10 shows the distribution of papers according to the citations they collect. As we saw in the introductory paragraph, this kind of distributions is quite well-known in scientometrics and some authors even claim that they are universal features of science and scholarship (Bonaccorsi

[71] Note that the values of both Figure 8 and Figure 9 are average values: this means that they can be influenced by outliers, i.e. by articles that receive significantly more citations than the average.

et al., 2017). Figure 10 shows that Late Analytic Philosophy articles *conform* to the *skewed* distribution of other disciplines. 763 articles (12.97% of the total) receive 0 citations, 652 articles (11.08%) 1 citations, 552 articles (9.38%) 2 citations, and so on. On the other end of the spectrum (see Table 7), the most cited paper collects 571 citations (3.3% of the total number of citations), the second most cited 501 (2.9%), and the third one 474 citations (2.8%). In sum, the distribution is clearly skewed, with a small number of highly cited paper collecting most of the citations: the first 10 most cited papers (0.17% of the articles) collect 17.3% of the citations (2 950 citations).

| Citations | Number of papers | Percentage on the total number of articles | Percentage of total citations |
|---|---|---|---|
| **571** | 1 | 0,02% | 3,3% |
| **501** | 1 | 0,02% | 2,9% |
| **474** | 1 | 0,02% | 2,8% |
| **321** | 1 | 0,02% | 1,9% |
| **292** | 2 | 0,03% | 1,7% |
| **268** | 2 | 0,03% | 1,6% |
| **265** | 1 | 0,02% | 1,6% |
| **258** | 1 | 0,02% | 1,5% |

*Table 7. Distribution of papers according to citations (10 most cited papers)*

These data show that Late Analytic Philosophy does not differ from the sciences in terms of the distribution of articles according to citations. This suggests that the same mechanism regulates these distributions, independently of the discipline considered. In the scientometric and sociological literature, this mechanism is variously described as the 'Matthew effect' (the rich get richer principle described by Merton) or, more generally, as cumulative advantage. However, it may be said that these principles are more descriptions of the phenomenon, than explanations of it. More research is needed to shed light on the underlying causes of the skewed distributions. Eventually, this will contribute to explain also the skewed distribution of Late Analytic Philosophy.

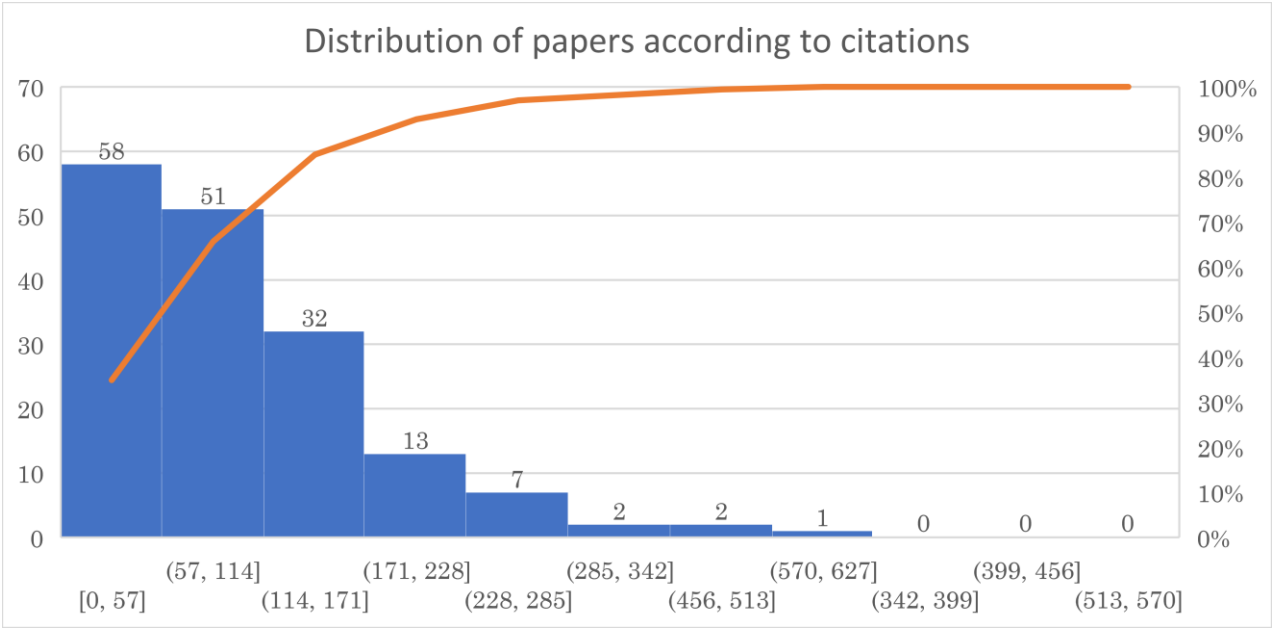



*Figure 10. Distribution of papers according to the percentage of citations they collect*

### *Most cited institutions and countries*

Table 8 and Table 9 show, respectively, the institutions and the countries which are most represented in the 'top' five journals. They present two rankings, showing the 10 most cited institutions and the 10 most cited countries respectively. These data are very interesting for checking the alleged internationality of Late Analytic Philosophy.

Articles published by authors affiliated with the New York University collects most of the citations (1 499 citations). NYU and Rutgers are also the most productive universities, with, respectively, 101 and 102 articles published in the 'top' five. However, remember that two of the five journals (namely, *Noûs* and *Philosophy and Phenomenological Research*) are edited by Ernest Sosa, who is affiliated with Rutgers University. This peculiarity could indeed introduce some positive bias towards Rutgers University affiliates in the selection process of the articles for publication. The same could be said for Oxford University, to which one of the editors of *Mind* is affiliated. On the other hand, it is interesting to notice that Columbia University and Cornell University are outside of the top ten, even if they edit *The Journal of Philosophy* and *The Philosophical Review*. They occupy, respectively, position 22 (38 documents, 444 citations) and position 16 (50 documents, 514 citations) in the ranking. Considering the countries, the weight of United States institutions is, by far, the highest: in the top 10, there are 7 American universities, against 1 British, 1 Australasian, and 1 based in Canada. Considering the top 95 most cited institutions in the dataset (Figure 11), 70 are based in the United States, 16 in the UK, 3 in Canada, 3 in Australia, 1 in New Zealand, and only 1 in Continental Europe (namely, the University of Barcelona, in Spain).

| Ranking | Institutions | Country | Citations | Documents | Citations per document |
|---|---|---|---|---|---|
| **1** | nyu | US | 1499 | 101 | 14,8 |
| **2** | princeton univ | US | 1432 | 69 | 20,8 |
| **3** | rutgers state univ | US | 1413 | 102 | 13,9 |
| **4** | harvard univ | US | 1236 | 48 | 25,8 |
| **5** | mit | US | 1108 | 67 | 16,5 |
| **6** | univ oxford | UK | 1105 | 63 | 17,5 |
| **7** | univ arizona | US | 1053 | 65 | 16,2 |
| **8** | australian natl univ | AUS | 1041 | 60 | 17,4 |
| **9** | univ michigan | US | 997 | 57 | 17,5 |
| **10** | univ toronto | CAN | 733 | 34 | 21,6 |

*Table 8. Most cited and productive institutions, with country, citations, documents, and citation density*

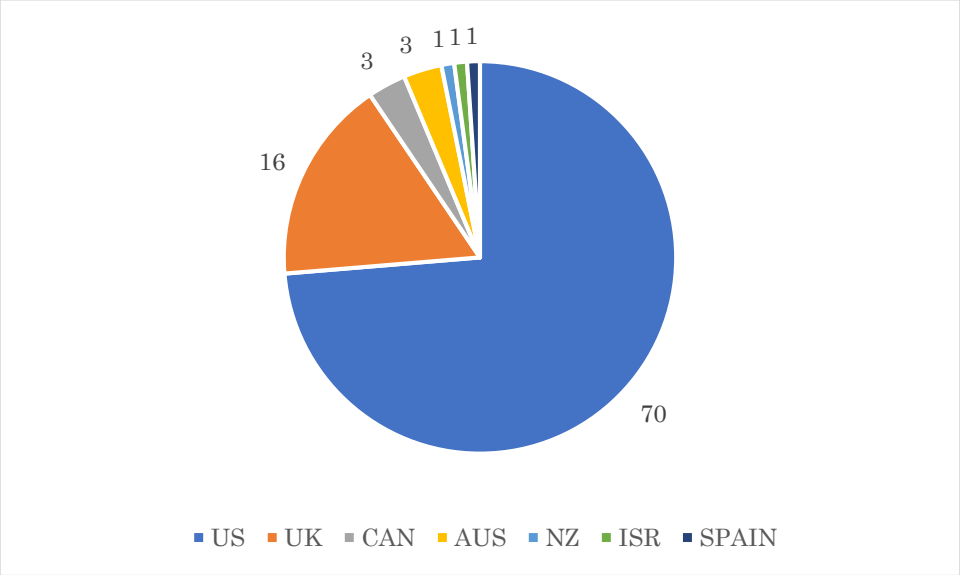



*Figure 11. Nationality of the most cited institutions*

The picture of a US-dominated Late Analytic Philosophy is confirmed by using the country as the unit for the citation analysis instead of the institution. In this case, the citations are not aggregated using the institution as the unit, but directly the country.[72] Table 9 shows the top 10 most cited and productive countries in the dataset. Once again, the United States are overwhelmingly represented. The number of citations and documents of the USA is even one order of magnitude *higher* than the second country in the ranking, England. [73] Note that the first six positions are all occupied by Anglophone countries.

[72] Remember that the country is deduced by the *institution* to which the author is affiliated, and not by the nationality of the author. For instance, a paper by Achille Varzi (Columbia University) will be counted as a US paper, not as an Italian one, even if Varzi is Italian.
[73] Note that WoS differentiates UK into England, Scotland, and Wales.

| Ranking | Country | Citations | Documents | Citations per document |
|---|---|---|---|---|
| **1** | usa | 26918 | 2256 | 11,9 |
| **2** | england | 4918 | 434 | 11,3 |
| **3** | australia | 2002 | 163 | 12,3 |
| **4** | canada | 1843 | 131 | 14,1 |
| **5** | scotland | 1389 | 124 | 11,2 |
| **6** | new zealand | 443 | 30 | 14,8 |
| **7** | germany | 347 | 40 | 8,7 |
| **8** | sweden | 213 | 30 | 7,1 |
| **9** | israel | 196 | 24 | 8,2 |
| **10** | france | 190 | 14 | 13,6 |

*Table 9. Most cited and productive countries*

These data can be partially explained by the different dimensions of the countries and the number of institutions based in each of them. The weight of the US is probably due, to a certain extent, to the sheer academic dimension of the United States in terms of professionals and universities. Thus, it would be necessary to normalize the raw values by the number of universities and analytic philosophers active in each country. Still, these data remain significative because they highlight clearly that Late Analytic Philosophy, as represented in its 'top' journals, is *not* very diversified in terms of nationality. In fact, Late Analytic Philosophy is dominated by English-speaking countries and US-based universities. It is striking that no Continental Europe institutions, except for the University of Barcelona, appears in the most cited institutions. More research is needed to understand if this exclusion is due to some negative biases towards European institutions. Also, we need to understand whether the situation has changed over time or it has remained static: remember that we are considering aggregated data. It is possible that in the last years, something has changed. However, from a purely descriptive point of view, these data tell us that analytic philosophers and analytic-oriented universities *outside* the Anglophone world are still at the *periphery* of Late Analytic Philosophy, which is by far dominated by the United States.

### *Journal co-citation analysis*

In Chapter 2, we individuated the most prestigious journals of Late Analytic Philosophy based on a comparison between the SCImago Journal Ranking (a bibliometric tool) and the results of two polls conducted on the blog *Leiter Reports*. This operation was part of the task of field delineation. By using a scientometric technique known as journal co-citation analysis, it is possible to check if the journals we selected are indeed representative of the field. The journal co-citation analysis allows finding the journals that are most frequently cited together in the references of a set of publications (Leydesdorff, 1987; Leydesdorff et al., 2011). VOSviewer allows performing this analysis, setting the journal as unit for the co-citation analysis.

Figure 12 shows the visualization of the journal co-citation network of the 'top' five journals and Table 10 the ranking of the journals that are most frequently cited. From the map it results clear that the 'top' five occupy the core of the network. They are situated very close to each other, meaning that they are very frequently cited together. In particular, *The Journal of Philosophy*, *The Philosophical Review, Noûs*, and *Mind* are very close. *Philosophy and Phenomenological Review*, on the other hand, is relatively detached from the core. The ranking shows that the 'top' five are also the most cited journal by articles published in the 'top' five (Table 10): *The Journal of Philosophy*, in particular, results to be the most cited journal, with 4 297 citations (more than 1000 citations more than *The Philosophical Review*). It is interesting to notice the presence of *Philosophical Studies,* which results to be the fourth most cited journal. In the *Leiter Reports'* ranking, it occupied the 7th position. The result of the journal co-citation analysis tells us that the 'top' five journals are a quite self-referential set of journals, mainly citing materials appeared in their issues. Thus, it seems that Late Analytic Philosophy has a quite defined *core of journals*. It will be interesting to study, in future research, if these journals are also the most cited ones by the other analytic philosophy journals. The journal co-citation network, on the other hand, does not present a clear structure, apart from the distinction between a core and a periphery. Thus, in order to map the structure of Late Analytic Philosophy, a different unit of analysis from the journal should be chosen for the co-citation analysis. The next study deals with this topic. We will show that the cited reference is the best unit of analysis.

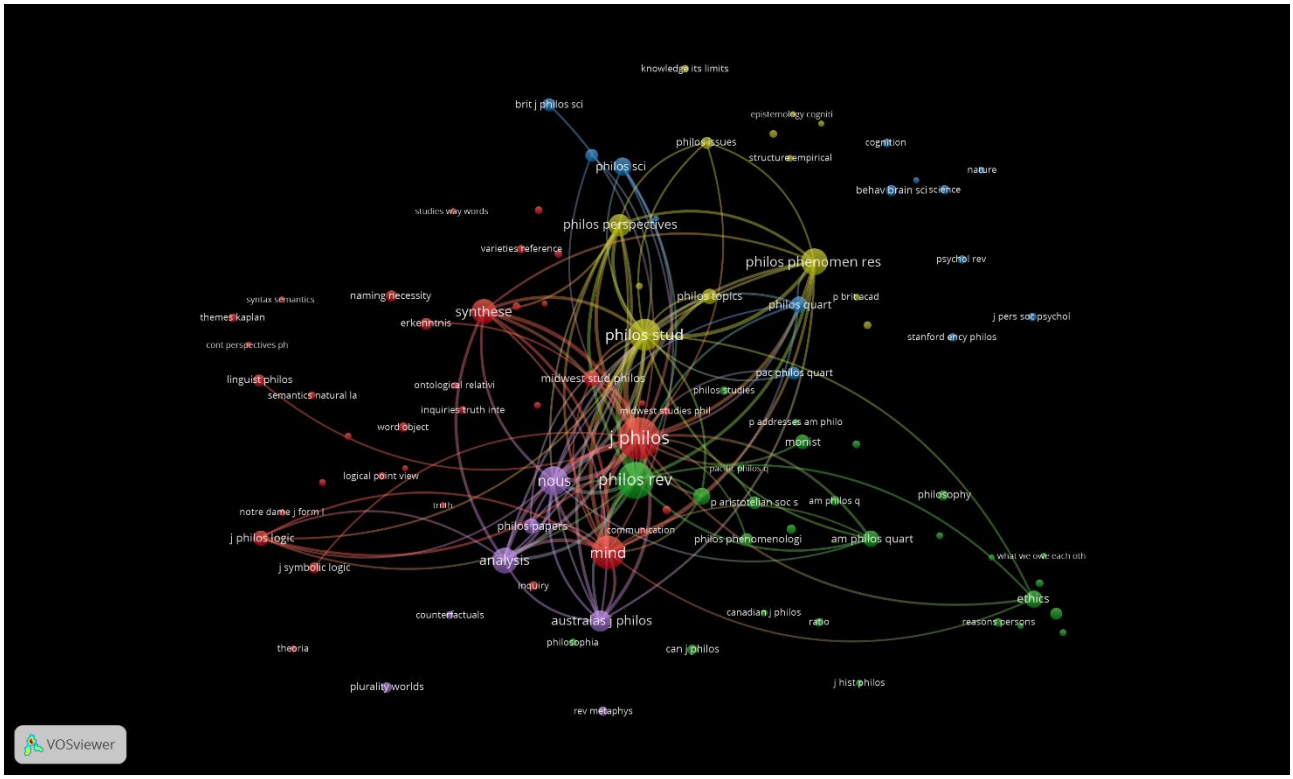



*Figure 12. Journal co-citation network of the Top Five journals (1985-2014)*

| Ranking | Journal | Citations | Indexed in WoS since |
|---|---|---|---|
| **1** | ***j philos*** | 4297 | 1979 |
| **2** | ***philos rev*** | 3212 | 1979 |
| **3** | ***mind*** | 2709 | 1980 |
| **4** | philos stud | 2396 | 1980 |
| **5** | ***nous*** | 2014 | 1979 |
| **6** | ***philos phenomen res*** | 1687 | 1979 |
| **7** | analysis | 1567 | 1980 |
| **8** | synthese | 1511 | 1980 |
| **9** | philos perspectives | 1254 | 2007 |
| **10** | australas j philos | 1116 | 1979 |

*Table 10. Most cited journals in the Top Five (1985-2014). In bold the Top Five*

## Sum up and concluding remarks

In this first study, we started to analyze the properties of the documental level of Late Analytic Philosophy, i.e., the documental space of Late Analytic Philosophy. In particular, we studied the *distribution of scientometric properties* in the 'top' five journals that resulted from the operational definition of Late Analytic Philosophy. The main results of the analyses are the following:

1. The average number of cited references per paper has increased exponentially from 1980 to today. This trend suggests the hypothesis of the existence of a *feedback dynamic* between the documental space and the citation behavior of analytic philosophers. The idea is that the documental space and the actors interact in both ways. On the one hand, the actors *produce* the documental space and its structure by publishing and citing papers. On the other hand, the documental space *shapes back* the actions of the actors, imposing a cost for the deviation from the general trend. In this way, the documental space reduces the degrees of freedom of the actors.
2. The distribution of citations over time suggests that the *research front* of Late Analytic Philosophy is 20 years extended, with the citation peak occurring in 1994. This provides us with first esteem of the temporal extension of the documental space. However, more research is needed to track the shift of the research front in time. We will return to this topic in the fourth study.
3. The distribution of papers according to their citations resulted in being skewed, instead of normal. Few articles receive most of the citations. From this point of view, Late Analytic Philosophy conforms to the already known scientometric distributions. However, more research is needed to understand the underlying mechanism behind the skewness of bibliometric properties.
4. The distribution of papers according to institutions and countries showed that Anglophone institution and countries are disproportionally represented in the 'top' five

journals. In particular, publications in the 'top' five journals are dominated by far by the United States and, only secondary, by the UK. Even if the raw citation and production data should be normalized by the academic population in order to get a clearer picture, it seems plausible to say that Late Analytic Philosophy is still an English-speaking phenomenon, mostly produced in the US and UK.

5. The journal co-citation analysis revealed that the 'top' five journals constitute a self-referential core: these journals cite more frequently themselves than other journals. Late Analytic Philosophy seems therefore to be characterized by a core and a periphery.

As we said at the beginning of this study, these results are preliminary since, even if they begin to show how the study of Late Analytic Philosophy by scientometric methods can deliver interesting results, they open in fact more questions than answers. The studies which follow in the next sections of this Chapter will develop some of these topics. The second study will deal with the structure and the dynamics of Late Analytic Philosophy by science mapping. We will also return in more detail on the hypothesis of the feedback mechanism between the documental space and the individuals. The third study will address the problem of progress and normalization within Late Analytic Philosophy, by studying the changing epistemological functions of citations. Lastly, the fourth study will return on the temporal dimension of the documental space, investigating the aging and the life of the documental space of Late Analytic Philosophy.

## Appendix

In this Appendix, we provide some statistics on the WoS category 'Philosophy'. Web of Science classifies journals in 252 predefined categories, in which the main indexes (*Science Citation Index, Social Science Citation Index,* and *Arts & Humanities Citation Index*) are sub-divided. It is important to notice that the categories are attributed to journals, not directly to the articles. WoS also contains the Category 'Philosophy'. In this Appendix, we provide some basic statistics about it.

At the time of the search (September 2017) the Category contained 212 journals and 245 471 publications, half of which are classified as research articles. These publications point to 1 677 432 references. It is possible to esteem very roughly how many of these references are books by considering 'book' any cited reference which lacks the metadata about the volume and the issue. This is the basic idea underlying the study by Larivière et al., and that was firstly proposed by Glänzel and Schoepflin (Glänzel & Schoepflin, 1999; Larivière et al., 2006) In this way, we estimated that 42% of the cited references are books (or, better to say, non-serial literature).

| | **WoS Category 'Philosophy'** |
|---|---|
| **Publications** | 245 471 |
| **Research articles** | 124 093 |
| **Journals** | 212 |
| **Number of cited references** | 1 677 432 |
| **Number of books** | 704 457 |
| **Percentage of books on the total** | 42,0% |

*Table 11. Number of publications, research articles and journals classified "Philosophy" in WoS*

Lastly, Figure 13 shows the number of journals in the Category 'Philosophy' over time. The graph shows that the coverage of WoS increased significantly between 2005 and 2010, when the number of journals indexed increased approximately by 70%.

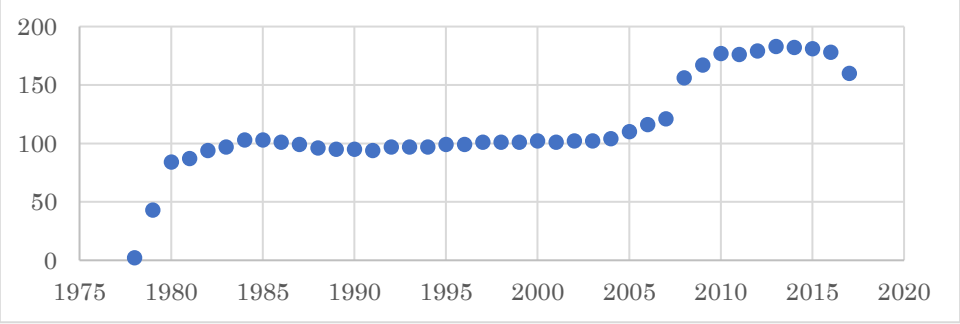



*Figure 13. Number of journals classified "Philosophy" in WoS per year*

## Second study. The structure and the dynamics of Late Analytic Philosophy

### Introduction

In Chapter 2, we saw how the six features of Late Analytic Philosophy pose several challenges to the traditional history of philosophy. We introduced the Rescher's Methodological Challenge as the challenge to develop a *statistical*, instead of biographical, approach towards the history of Late Analytic Philosophy, and we argued that scientometrics and citation analysis could address Rescher's Challenge successfully, allowing to investigate those features of Late Analytic Philosophy that are not accessible to traditional close reading methods.

One of these features is the *shape* of Late Analytic Philosophy: in Chapter 1, we saw that many historians of analytic philosophy and analytic philosophers have a perception of a change in the *morphology* of the field. Fragmentation and specialization are the two dynamics that they perceive as shaping the overall structure of Late Analytic Philosophy. However, as we noted above, there is a limit in these assessments: they have a *qualitative*, if not *anecdotal*, status. No quantitative evidence has been advanced to support them. Moreover, they leave open several questions about these shaping processes: *when* did they begin? What is the *pace* of these processes? If specialization is occurring, how many specialties are there in Late Analytic Philosophy? Do they correspond to traditional philosophical sub-areas (e.g. epistemology, philosophy of science, ethics, political philosophy) or are more fine-grained? Is there an explosion of exotic sub-areas or is the structure of Late Analytic Philosophy, at the end of the day, quite traditional? What is the relationship between the 'fragments' in which Late Analytic Philosophy is fragmented? Do they exchange information or are they increasingly distant? Above all, the key question is: are specialization and fragmentation really taking place or are they just a subjective perception of the actors?

All these questions concern the *structure* and the *dynamics* of Late Analytic Philosophy. In Chapter 2, we saw that *science mapping techniques* could address many of these questions. Science mapping allows indeed reconstructing, quantitatively, both the structure and the dynamic of a documental space, by analyzing the different kinds of citation-relationships between scientific publications (direct citations, co-citations, bibliographic coupling). Recall that the documental space is the set of documents (more specifically, publications) that results from the operationalization of an intellectual field at the documental level, i.e., when we translate the intellectual content into a set of documents. Thus, science mapping allows to map the structure of the documental space and, when the time dimension is included in the analysis (longitudinal mapping), to investigate its dynamics too.

The aim of this study is to reconstruct the changing morphology of Late Analytic Philosophy by science mapping techniques, and specifically by co-citation analysis. Before going into the details of the methodology, we will review briefly the few studies that have applied science mapping to philosophical areas in the past.

Kreuzman studied the relation between epistemology and philosophy of science using author co-citation analysis (Kreuzman, 2001). In author co-citation analysis, the unit of analysis is the cited author, instead of the cited document. The relations between authors are studied by examining the frequency with which they are cited together within a certain dataset. In particular, Kreuzman investigated the co-citation links amongst 62 authors, representative of epistemology (e.g. Chisholm, BonJour, Goldman) and philosophy of science (e.g. Popper, Kuhn, Feyerabend), using data from the *Arts and Humanities Citation Index*. He visualized the results of the analysis on a two-dimensional plane (using a multidimensional scaling algorithm) and then applied cluster analysis to reveal the underlying structure of the data. The map revealed a clear divide between philosophers of science (on the left side of the map) and epistemologists (on the right side, see (Kreuzman, 2001, fig. 3)). Moreover, the cluster could be easily interpreted as mirroring sub-areas of the two disciplines. In the philosophy of science cluster, competing approaches to scientific rationality could be distinguished: in the center, there was a Kuhnian sub-cluster, along with two sub-cluster respectively in the north and in the south. They corresponded to different reactions to Kuhn's approach to the study of science: in the north, the sociology of science (Strong Programme), in the south, the successors to Neo-positivism (e.g. Hempel, Van Fraassen). However, this study is important not only for the results, but also for some methodological remarks that Kreuzman makes. In particular, he highlights the *objectivity* of science mapping compared to traditional attempts to chart the structure of the philosophical field, based on close reading and interpretation of the writings of the philosophers:

> While such approaches are useful, they are subject to the biases of the individual doing the classification. The resulting classification may reveal more about the person doing the analysis than those individuals being examined. (Kreuzman, 2001, p. 527)

Science mapping, on the other hand, is more objective since its procedures are more research-independent:

> The researcher identifies the philosophers to include in the study but does not classify or group the philosophers. The philosophers are related to one another 'unwittingly' by the philosophical community in its citations. The map represents in two dimensions the similarity between philosophers based on the judgments of those authors who co-cite these philosophers. (Kreuzman, 2001, p. 534)

Thus, Kreuzman points out a key feature of science mapping techniques: the science maps capture the result of the aggregated actions of thousands of authors. They are, so to say, images of the collective enterprise of building a shared documental space, i.e., what we call the *literature* of a field. The documental space is shaped by myriads of small actions (namely, the citations) and its overall configuration reflects such multitude.

The same idea is at the core of a recent study by Weingart, on the existence, as a field, of integrated History and Philosophy of Science (HPS). Weingart points out the strict relation that exists between what we called in Chapter 2 the intellectual and the social level:

> In the end, the question of the existence of HPS, as a discipline or an intellectual domain, is a social one. Academic communities do form around the content of their study, yes, but this is but one of many dimensions around which they organize. The best we can do to empirically show that a certain social structure exists is to study their institutional traces. In the case of academia, that means looking at publications, citations, institutional affiliations, mentorship relationships, conference attendance, and so on. (Weingart, 2015, p. 203)

The study explored the relationship between history and philosophy of science by analyzing 15 journals that are categorized 'History & Philosophy of Science' in the *Arts and Humanities Citation Index*.[74] The dataset included 12 510 articles published from 1956 to 2010 by 7 449 authors. Weingart used first a bibliographic coupling technique to map the relations between the journals (Weingart, 2015, fig. 1), and then an author co-citation network to reveal the structure of the cited authors (Weingart, 2015, fig. 2). The results showed that, contrary to the conclusion reached by (Wray, 2010), according to which there is no strong evidence that HPS exists, according to Weingart there is an area, between the main clusters of history of science and philosophy of science, that can be named HPS. This area forms a sort of bridge between the two communities.

Lastly, the study by Alghren et al. analyzed with various scientometric techniques two topics in contemporary philosophy, namely the free will and the *sorite* debates (Ahlgren et al., 2015). They applied co-citation analysis to map the most cited authors, publications, and journals. Moreover, they studied the most occurring *terms* in abstracts and titles of publications, using a term co-occurrence approach. The results showed that the debate on free will is not limited to philosophy but that in recent years journals in medicine, social sciences, and natural sciences have joined the discussion. The topic of *sorite*, on the other hand, is a more specialized philosophical topic,

[74] Therefore, Weingart analyzed the documental, more than the social level. He addressed the documental space, not the social actors.

involving mainly epistemologists and metaphysicians. The results were interpreted by experts of the two sub-domains, which acknowledged the validity of the various networks presented.

In sum, the application of science mapping to philosophy is not entirely new in the scientometric literature. However, what the previous studies lack is a focus on the *temporal dimension*. These studies aggregated data ignoring the transformations that may have occurred in time (Weingart, for instance, aggregated all the articles published between 1956 and 2010, without taking in account the change over time of the relationship between history and philosophy of science). Therefore, these studies focused on the static of the documental space, without inquiring about its dynamics. In practice, they did not apply science mapping *longitudinally* but only in an aggregate form.

On the other hand, in the study we will present now, we will take in consideration both the dimension: we want to shed light both on the structure and the dynamic of Late Analytic Philosophy.[75] In the next section, we will describe the methodology of the study. After that, we will present the main results of the analysis and, in the Discussion, we will comment on them. Lastly, in the Sum up section we will show how the results answer the questions we highlighted in this introduction.[76]

## Methodology

We determined the corpus of this study in accordance with the operational definition of analytic philosophy as discussed in Chapter 2. The query was used on the Web of Science interface (https://login.webofknowledge.com/), setting the interval [1985-2014] as timespan. The type of publication was restricted to research articles, setting aside book reviews and editorials.[77] Thus, 4 966 records were extracted from the databases (45.8% of all the documents published in the five journals in the considered timespan). Each record was fully extracted, meaning that all the metadata and the cited references were downloaded.[78] In Table 12 the essential features of the corpus are reported.

[75] This study was inspired by longitudinal application of citation and term analysis such as the ones we find in (Leydesdorff & Goldstone, 2014b) and (Flis & van Eck, 2017), which address, respectively, the history of cognitive science and the history of psychology.
[76] A first version of this study was published in the monographical issue of *Philosophical Inquiries* devoted to the history of Late Analytic Philosophy, as (Petrovich & Buonomo, 2018).
[77] In the case of *The Philosophical Review*, this resulted in a significant restriction of the number of publications considered. *The Philosophical Review* has a peculiar policy, consisting in publishing only few research articles per issue.
[78] Since Web of Science allows to download only 500 records per extraction, our dataset resulted in fact from the merging of 10 different sub-datasets.

| | |
|---|---|
| **Journals** | Philosophical Review<br>Journal of Philosophy<br>Mind<br>Noûs<br>Philosophy and Phenomenological Research |
| **Timespan** | 1985-2014 |
| **Total number of documents** | 10 834 |
| **Research articles** | 4 966 (45.8%) |
| **Total number of references** | 58 281 |
| **Total number of cited authors** | 17 926 |

*Table 12. Corpus data*

We used a *document co-citation analysis* in order to study the structure of this dataset. As we saw in Chapter 2, the basic idea underlying this kind of analysis is that the relations between documents can be studied by examining the frequency with which they are co-cited. Two documents are co-cited when at least one document in the corpus cites both of them. Their co-citation frequency is equal to the number of times they are cited together. The co-citation scores of each pair of documents are reported in the co-citation matrix. Usually, these data are normalized by replacing the absolute values with normalized values (e.g. the Pearson correlation coefficients). Finally, the matrix can be visualized in the form of a two- or three-dimensional visualization, called 'science map' or, more accurately, 'document co-citation network' (Waltman & van Eck, 2014).

We used the software VOSviewer (www.vosviewer.com), developed at the Centre for Science and Technology Studies (CWTS) by Ludo Waltman and Nees Jan van Eck (van Eck & Waltman, 2010), to perform the co-citation analysis and to visualize the results. We used version 1.6.7 of the software. VOSviewer was expressly developed for constructing and viewing bibliometric maps. Unlike other computer programs (such as Pajek), it pays special attention to the graphical representations of maps. In particular, it provides distance-based, instead of graph-based visualizations. This means that in VOSviewer maps, the distance between the items is inversely proportional to their similarity. The higher the similarity between two items, the nearer they will be represented on the map. In graph-based visualizations, on the other hand, the correlation between two items is not represented by their relative positions on the plane, but by features of the links connecting them (e.g. the thickness of the links). Furthermore, VOSviewer has a clustering algorithm that detects the sub-communities of the network, representing them in different colors. The resolution of the clustering algorithm can be regulated, so that the

structure of the network can be studied at different levels of granularity. These special features of VOSviewer make it particularly well suited for our purposes.[79]

VOSviewer produces, alongside the visualizations, several other files that provide useful information about the items of the map. The most important one for this study is the 'map file', a text file reporting the number of citations and co-citations of each item of the map. This file can be imported into a spreadsheet and further processed (we used Microsoft® Excel for this aim), producing tables and statistics about the items.

Using VOSviewer, we performed two kinds of co-citation analysis: an *overall* analysis and a *longitudinal* analysis. In the former case, all the documents published in the full timespan [1985-2014] were processed and their co-citation network was visualized. In the latter case, documents were first divided into three sub-sets, containing each one the articles published in one decade from [1985-1994] to [2005-2014]. Then, the document co-citation analysis was performed separately on each decade, producing a different map for each of them. This procedure can be compared to taking different 'snapshots' of the field over time. For all the VOSviewer maps, the corresponding map files were elaborated on Microsoft® Excel and tables with the ranking of the most cited documents were produced. In the case of the longitudinal analysis, we also produced some statistics on the 'trajectories' of the items between different clusters over time.

### Results

In this section, we present first the results of the overall mapping (timespan: [1988-2014]) and then the results of the longitudinal analysis (consisting in three different maps corresponding, respectively, to the timespans [1985-1994], [1995-2004], [2005-2014]). These results are shown in the form of document co-citation networks, where each node of the network corresponds to a reference (book or article) cited in the corpus. The diameter of the node is proportional to the number of times the reference is cited in the citing set. It corresponds hence to the number of citations of the documents. The thickness of the arc connecting two nodes is proportional to the co-citation strength of the two documents, i.e., their number of co-citations. The distances between the nodes are determined by their similarities, depending once again on their co-citation values. Finally, the different colors of the items represent the cluster to which they belong according to the VOSviewer clustering algorithm. Note that a document can be assigned to only one cluster since VOSviewer uses a hierarchical form of clustering.

[79] For further details on the technical aspects of VOSviewer, and in particular the VOS technique it uses, see (van Eck & Waltman, 2009; van Eck, Waltman, Dekker, & van den Berg, 2010).

For each map, a table reporting its technical features is provided, including: the number of documents that formed the corpus, their type (they are always research articles), the total number of cited references present in the corpus, the threshold for being visualized on the map (i.e., the minimum number of citations an item should have for being included in the network), the chosen counting method (we always used the full counting method, because it turned out that there was no significant difference with the fractional counting method), the items shown on the maps, the number of clusters detected by the algorithm, the resolution parameter of the clustering algorithm, and, lastly, the employed normalization method.

Concerning this last point, it is important to underline the fact that different normalization methods can be used to normalize the values of the co-citation matrix. Sometimes, they give very different results (van Eck & Waltman, 2009). However, in our case we noted that the structure of the maps remained quite stable in all the four methods offered by VOSviewer (no normalization, association strength, fractionalization, LinLog/modularity). This provides additional robustness to our results, assuring that the revealed structure is a property of the data and not an artifact of the algorithm.

Following the technical table, several tables with the rankings of the most cited documents are presented, in order to ease the reading of the maps.

### *Overall map: 1985-2014*

Figure 14 and Figure 15 show the co-citation network for the overall timespan, [1985-2014]. Each of the nodes of the map corresponds to a highly cited (≥ 40 citations) reference present in the corpus, i.e., to a document that frequently appears in the bibliographies of the 4 966 articles analyzed (see Table 13 for the technical features of the maps).

Both maps present a clear structure, consisting in a major super-cluster in the south-west area and two minor clusters, one in the northern and one in the eastern part of the map.[80] In the northern extremity, a small cluster of three documents stands as an isolated island. The super-cluster, which is recognized by the algorithm as an independent cluster at resolution 0.7 (the red cluster in Figure 14), can be split into sub-clusters if we increase the resolution parameter to 1.0.

[80] This structure remains recognizable independently of the normalization method used.

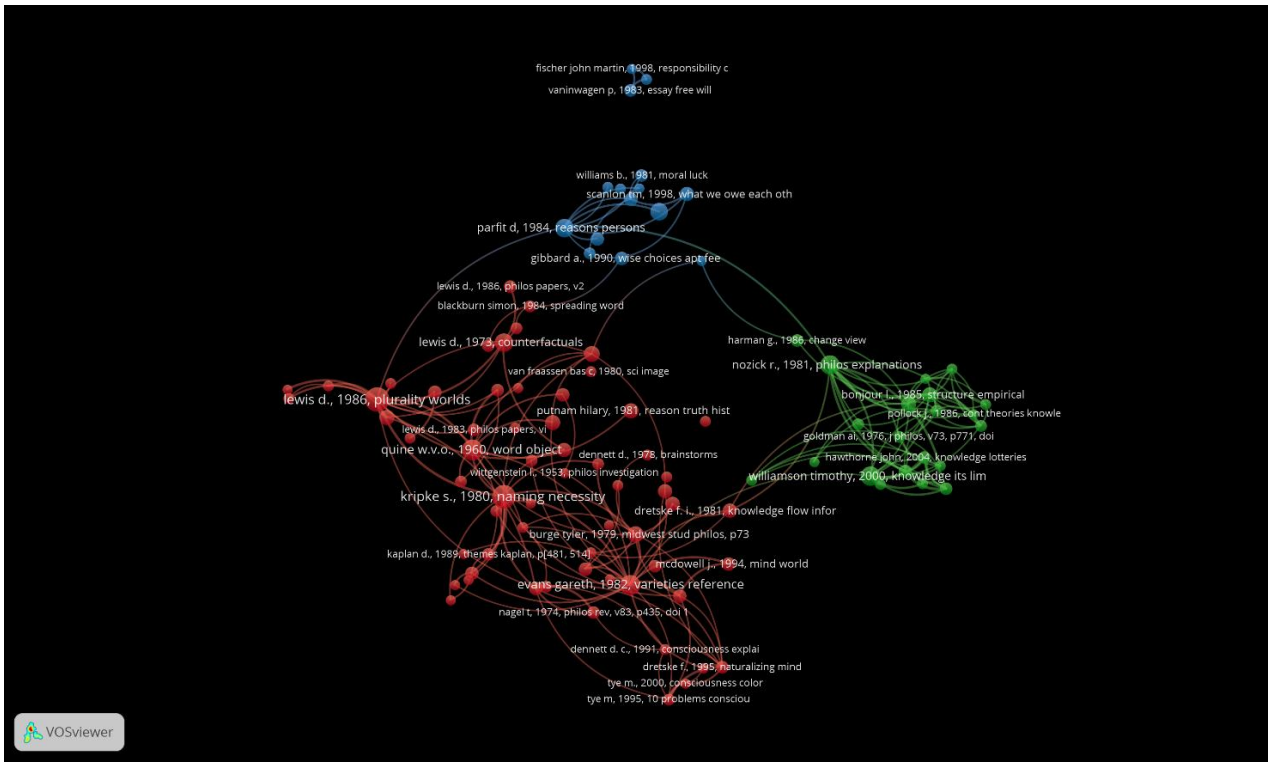



*Figure 14. Co-citation network of Top Five AP Journals (Overall: 1985-2014). Resolution = 0.7*

Figure 15 shows the map at resolution 1. Five main clusters are detected. Three of them are sub-parts of the south-western super-cluster. In terms of number of documents, the biggest cluster is the red one (26 documents), followed by the green cluster (25 documents), the light blue cluster (22 documents), the yellow cluster (16 documents), and, lastly, the purple cluster, which is significantly smaller than the others, containing only 9 documents (third column in Table 14). The clusters are ranked in the same order also if we consider their dimensions in terms of citations (fourth column in Table 14). A remarkable feature is that the red cluster, even if it includes only one document more than the green cluster, still it has 330 citations more. Indeed, in terms of citation density (defined as the citations per documents, fifth column in Table 14), the red cluster has the highest score (72.3). The citation density of all the other cluster is quite stable, ranging from 62.0 to 68.2. It is remarkable that the purple cluster, even if it is the smallest cluster in terms of documents, still has a high citation density (65.7).

| | |
|---|---|
| **Number of documents** | 4 966 documents |
| **Typology** | Articles |
| **Total number of cited references** | 58 281 cited references |
| **Threshold** | 40 citations |
| **Counting method** | Full |
| **Items shown on the map** | 98 |
| **Number of clusters** | 5 |
| **Resolution** | Figure 1: 0.7<br>Figure 2: 1 |
| **Normalization method** | Association strength |

*Table 13. Technical features of the overall maps (Figure 1 and 2).*

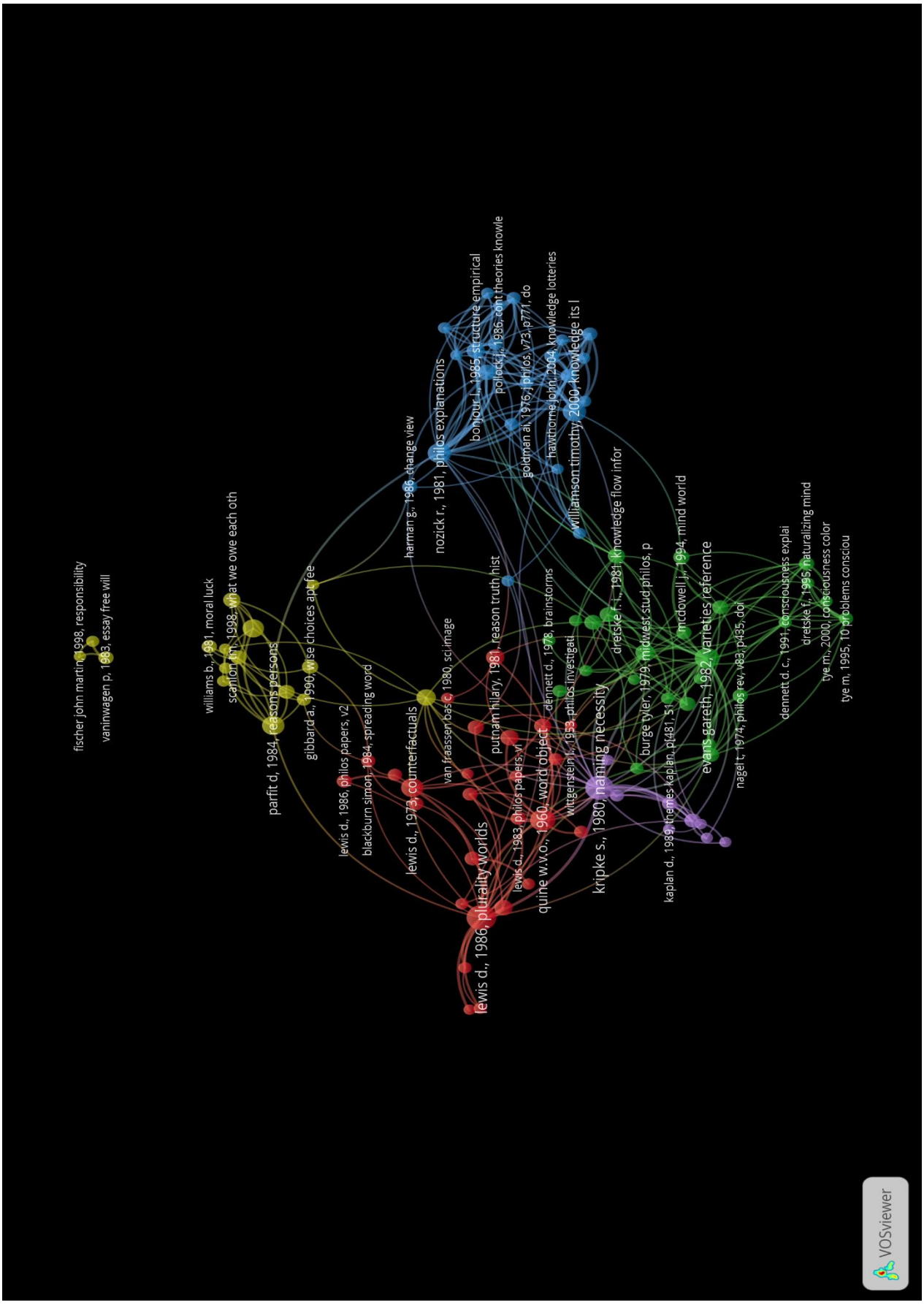



*Figure 15. Co-citation network of Top Five AP Journals (Overall: 1985-2014). Resolution = 1*

An interesting feature of the clusters is the average publication year (PY) of the documents they include (sixth column in Table 14). The red cluster results to be the oldest one, with an average PY of 1981. On the other hand, the youngest cluster is the light blue one, with an average PY of 1988.1. This value is significantly higher than the average PY of all the clusters, that amounts to 1981.5. Interestingly, the light blue one is the only one that presents an average PY that is higher than the inferior limit of the timespan (1985). This means that, in average, the cited literature is older than the corpus from which the co-citation network is extracted.

Considering now the documents contained in each cluster, it is possible to assign some labels to the clusters. In fact, the structure of the map seems to be easy to interpret based on the sub-disciplinary divisions of (Late) Analytic Philosophy. The red cluster can be labeled "Metaphysics", the green cluster "Philosophy of mind", the light blue cluster "Epistemology", the yellow cluster "Ethics and political philosophy", and the purple cluster "Philosophy of language". These labels (which have to be taken *cum grano salis*) represent sub-structures of the *documental level* of Late Analytic Philosophy, and should not be intended as involving any precise intellectual commitment about the content of metaphysics, philosophy of mind, epistemology, etc. Clearly, there is a relationship between the label and the corresponding intellectual areas of philosophical investigation. However, the relationship is mediated by the documental level: the clusters are labeled in this way because they should be interpreted as the *literatures* of the corresponding sub-disciplines, not directly as their intellectual content. We will return on this point in the Discussion.

| Cluster number | Label | Number of documents | Total number of citations | Citation density | Average PY |
|---|---|---|---|---|---|
| **1** | Metaphysics | 26 | 1880 | 72,3 | 1981 |
| **2** | Philosophy of mind | 25 | 1550 | 62,0 | 1983.9 |
| **3** | Epistemology | 22 | 1380 | 62,7 | 1988.1 |
| **4** | Ethics and political philosophy | 16 | 1091 | 68,2 | 1983.3 |
| **5** | Philosophy of language | 9 | 591 | 65,7 | 1982 |

*Table 14. Clusters data: label, number of documents, total number of citations, citation density (citations per document), average PY (publication year) per cluster.*

Table 15 presents the ranking of the top 10 most cited documents in the corpus. These are the references that are cited most frequently in the 4 966 articles under study. 30% of the most cited documents belong to the red cluster ("Metaphysics"), 10% to the green cluster ("Philosophy of mind"), 20% to the light blue cluster ("Epistemology"), 30% to the yellow cluster ("Ethics and political philosophy"), and 10% to the purple cluster ("Philosophy of language"). The most cited document is David Lewis's *On the Plurality of Worlds* (1986), with 219 citations, followed by

Saul Kripke's *Naming and Necessity* (1980), with 203 citations. Table 15 also reports the total number of co-citations (seventh column) and the number of documents with which each document is cited (sixth columns), i.e., the number of its links, independently of the number of co-citations. Considering these values, *Naming and Necessity* occupies the first rank, being it more connected than *On the Plurality of Worlds* (86 vs. 77 edges).

100% of the documents in the table are books. However, they are books of different kinds. Both *On the Plurality of Worlds* and *Naming and Necessity* are in fact re-worked transcripts of lectures given by the two philosophers (respectively, the John Locke Lectures delivered by Lewis at the University of Oxford in 1984 and three lectures delivered by Kripke at Princeton in 1970). Both Quine's *Word and Object* (1960) and Davidson's *Essays on Actions and Events* (1980) are a collection of previously published papers, therefore their contents belonged originally to the serial literature. Lastly, Gareth Evans's *The Varieties of Reference* (1982) was published posthumously by John MacDowell assembling various materials, partially already published in journals. In sum, only 5 on 10 publications were conceived by their authors as standard books.

The average publication year of the top 10 is 1979.7, with 60% published in the 80s, 10% in the 60s, 20% in the 70s, and 10% in the 2000s (Timothy Williamson's *Knowledge and Its Limits,* 2000).

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | lewis d. | 1986 | plurality worlds | 1 | 77 | 502 | 219 |
| **2** | kripke s. | 1980 | naming necessity | 5 | 86 | 523 | 203 |
| **3** | quine w.v.o. | 1960 | word object | 1 | 83 | 446 | 162 |
| **4** | evans gareth | 1982 | varieties reference | 2 | 83 | 501 | 157 |
| **5** | williamson timothy | 2000 | knowledge its limits | 3 | 75 | 408 | 137 |
| **6** | nozick r. | 1981 | philos explanations | 3 | 82 | 443 | 137 |
| **7** | parfit d | 1984 | reasons persons | 4 | 61 | 270 | 136 |
| **8** | lewis d. | 1973 | counterfactuals | 1 | 76 | 268 | 134 |
| **9** | rawls john | 1971 | theory justice | 4 | 58 | 166 | 116 |
| **10** | davidson donald | 1980 | essays actions event | 4 | 81 | 298 | 102 |

*Table 15. Top 10 documents by citations (overall map 1985-2014)*

Considering the ranking of all the references (with ≥ 40 citations), some interesting statistics can be pointed out. On the 98 cited references, 80 are books (81.6%), 18 are articles (18.4%). However, as we noted above, the weight of the serial literature may be underestimated because many books are in fact collections of previously published journal articles. None of the cited references in the ranking is manifestly a Continental publication, they are all recognizable as Analytic Philosophy contributions. The most striking feature is that only one document on 98 is

authored by a woman (namely, Ruth Millikan's *Language, Thought, and Other Biological Categories,* 1984).

Table 16 shows the ranking of most cited authors. Each citation score is the sum of all the citations received by the documents authored by the author. Hence, they represent the citation score of the *oeuvre* of the author. David Lewis is by far the most cited author, with 2 119 citations. His score is more than twice the score of Willard Van Orman Quine (921 citations) and more than four times the score of the 10th author, Saul Kripke (489 citations). Interestingly, two 'founding fathers' of analytic philosophy, namely Bertrand Russell and Gottlob Frege, appear in the Top 10, respectively at the 7th and 9th position. On the other hand, Wittgenstein occupies only the 58th position (199 citations). In general, the distribution of authors according to their citation is *skewed*, meaning that very few authors collect most of the citations. In other words, the distribution of author is similar to a Paretian one (see Figure 16): Lewis alone (1st position) collects 7.4% of all the citations collected by the Top 100 most-cited authors, Quine (2nd position) 3.2%, Kripke (10th position) 1.7%, whereas Adams (100th position, 118 citations) collects only 0.4%. These results are in accordance with the standard distributions of bibliometric properties founded in other fields (see the first study of this Chapter).

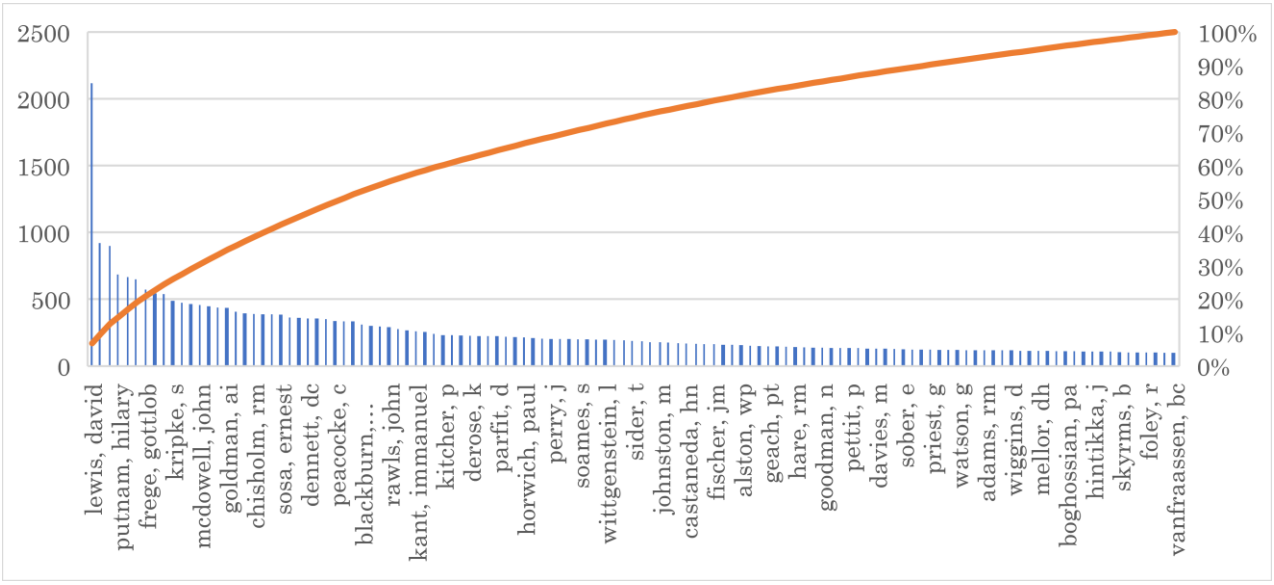



*Figure 16. Distribution of authors according to their citations*

Concerning the nationality of the authors, the first 10 positions include 7 Americans (and the first 6 positions all are occupied by Americans), 2 British, and 1 German (Frege). The gender distribution of the authors is once again dominated by far by males. There are only 2 women in the Top 100, and they occupy quite marginal positions in the ranking: Ruth Garrett Millikan (48h position, 217 citations) and Elizabeth Anscombe (72nd position, 159 citations). In the top 100, there are only 6 philosophers born before 1900: Kant (37th position, 261 citations), Frege

(7th position, 574 citations), Russell (9th positions, 540 citations), Moore, Wittgenstein (58th position, 199 citations) and Carnap (42nd position, 229 citations).

| Ranking | Author | Citations |
|---|---|---|
| **1** | lewis, david | 2119 |
| **2** | quine, wvo | 921 |
| **3** | davidson, donald | 899 |
| **4** | putnam, hilary | 685 |
| **5** | burge, tyler | 668 |
| **6** | fodor, ja | 649 |
| **7** | frege, gottlob | 574 |
| **8** | williamson, timothy | 544 |
| **9** | russell, bertrand | 540 |
| **10** | kripke, s | 489 |
| **11** | dummett, michael | 475 |
| **12** | jackson, f | 464 |
| **13** | mcdowell, john | 459 |
| **14** | dretske, fi | 449 |
| **15** | harman, gilbert | 439 |
| **16** | goldman, ai | 436 |
| **17** | williams, bernard | 407 |
| **18** | wright, c | 395 |
| **19** | chisholm, rm | 391 |
| **20** | stalnaker, robert | 389 |

*Table 16. Top 20 authors by citations (overall map 1985-2014)*

We focus now on each of the five clusters detected a resolution 1. Figure 17 shows a close-up of the red cluster, that we labeled as "Metaphysics". As noted before, this is the biggest cluster on the map, with 26 documents and 1880 citations. The average PY of the cluster is 1981.

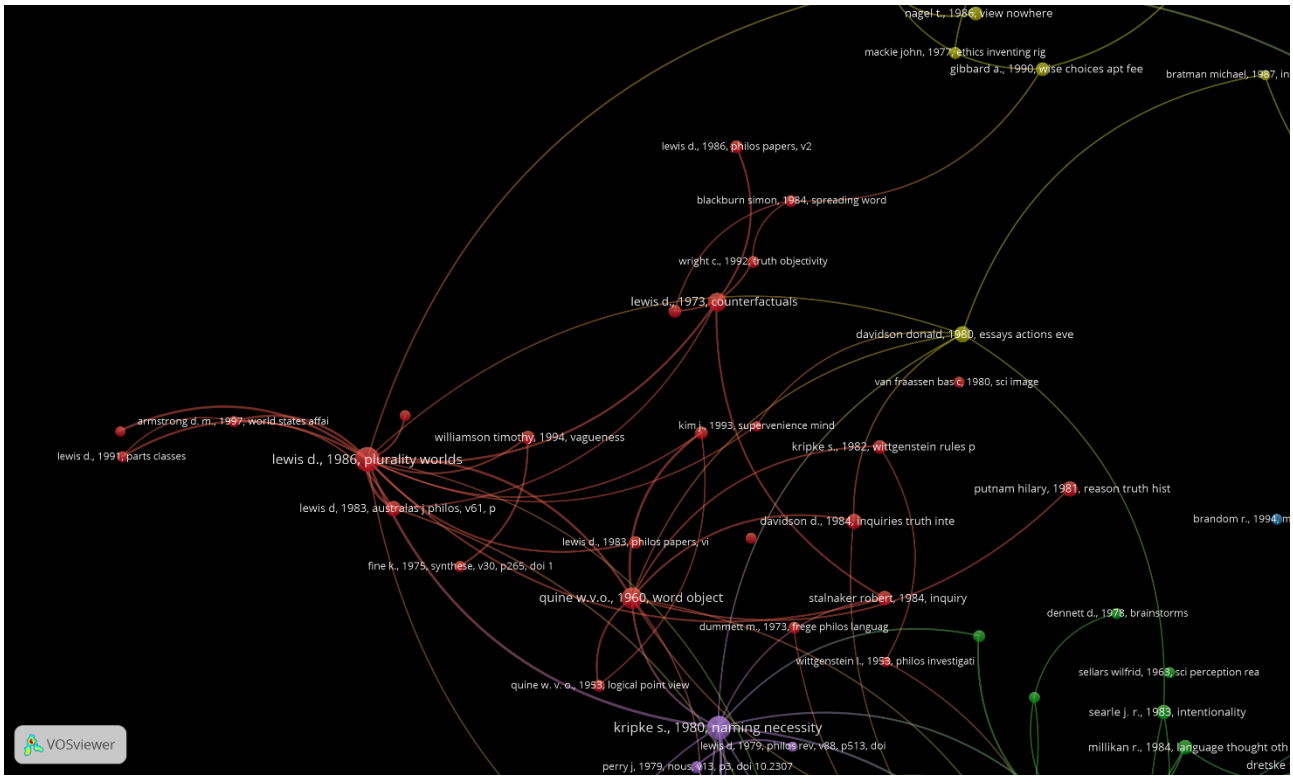



*Figure 17. Close up of the Cluster 1 ("Metaphysics")*

Table 17 shows the 10 most cited documents of the cluster. This cluster is without a doubt dominated by David Lewis' publications: in the Top 10, 3 on 10 documents are authored by him. *On the Plurality of Worlds* alone collects 11.6% of the cluster's citations, whereas the sum of the 6 documents by Lewis within the cluster accounts for the 32.4%. Lewis' works are also frequently co-cited together, as their closeness in the map shows. More precisely, *On the Plurality of Worlds* and "New work for a theory of universals" (published on the *Australasian Journal of Philosophy* in 1983) are co-cited 37 times, *On the Plurality of Worlds* and *Parts of Classes* (1991) are co-cited 21 times, *Parts and Classes* and the 1983 article are co-cited 7 times.

The other highly cited author of the cluster is Quine, with two publications in the Top 10, collecting together 12.1% of the total citations of the cluster. Interestingly, Quine's *Word and Object* is in a position more central than Lewis's main works, that occupy a sort of peninsula in the western area of the map. In particular, Quine's book is closer to the purple cluster "Philosophy of language".

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | lewis d. | 1986 | plurality worlds | 1 | 77 | 502 | 219 |
| **2** | quine w.v.o. | 1960 | word object | 1 | 83 | 446 | 162 |
| **3** | lewis d. | 1973 | counterfactuals | 1 | 76 | 268 | 134 |
| **4** | putnam hilary | 1981 | reason truth hist | 1 | 71 | 238 | 93 |
| **5** | davidson d. | 1984 | inquiries truth inte | 1 | 71 | 222 | 86 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **6** | lewis d | 1983 | australas j philos | 1 | 56 | 221 | 84 |
| **7** | stalnaker robert | 1984 | inquiry | 1 | 81 | 288 | 82 |
| **8** | williamson timothy | 1994 | vagueness | 1 | 57 | 151 | 73 |
| **9** | kripke s. | 1982 | wittgenstein rules p | 1 | 69 | 203 | 73 |
| **10** | quine w. v. o. | 1969 | ontological relativi | 1 | 62 | 187 | 66 |

*Table 17. Cluster 1: Top 10 documents by citations*

Figure 18 shows a close-up of the green south cluster, the one we labeled "Philosophy of mind". It contains 25 documents, which collect 1 550 citations. The average PY of the cluster is 1983.9. Table 18 shows the Top 10 most cited documents of the cluster.

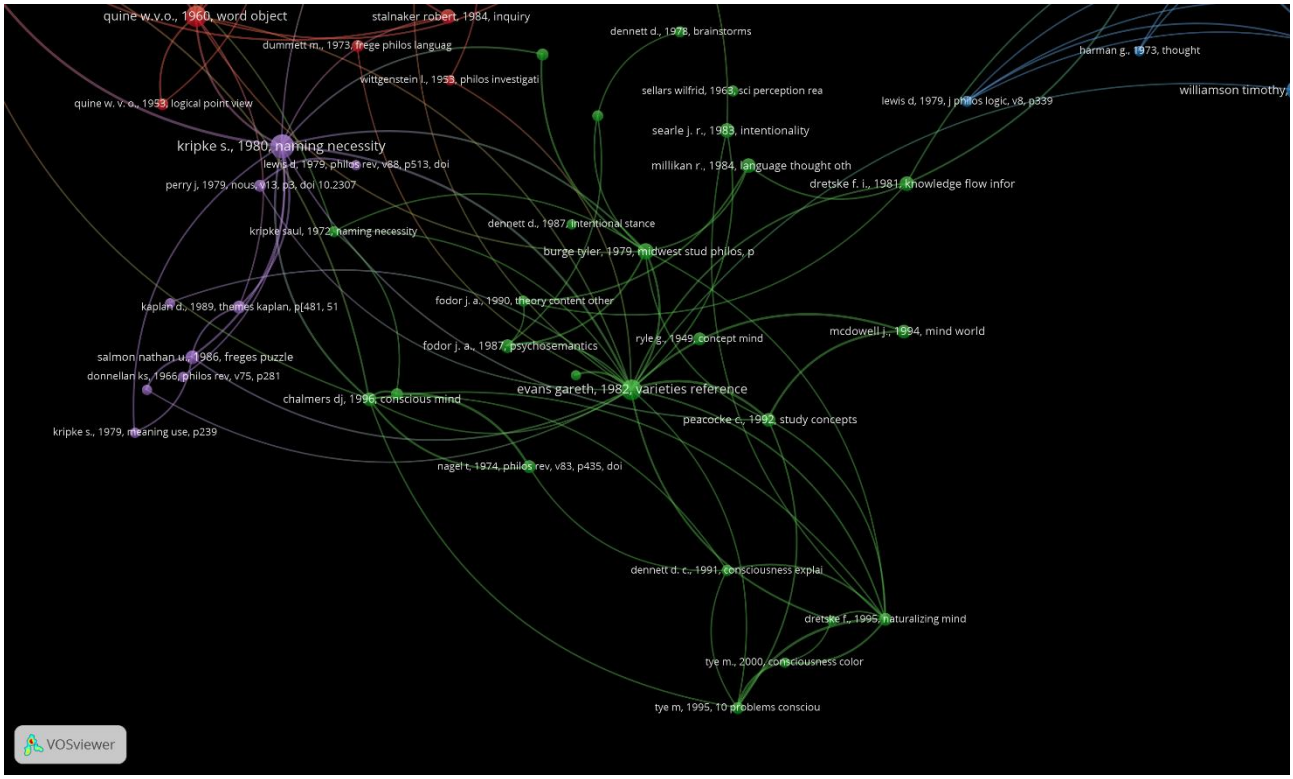



*Figure 18. Close-up of the Cluster 2 ("Philosophy of mind")*

This is the cluster where the only document authored by a woman (Ruth Millikan's *Language, Thought, and Other Biological Categories*) appears. The most cited reference is by far Gareth Evans' *The Varieties of References* (1982). The presence and the rank of this document is interesting. Evans' book deals mainly with philosophy of language topics. However, it has had a huge impact on the debates in philosophy of mind, attesting the close relationship between the reflection on the mind and the reflection on the language in analytic philosophy. Closer to Evans' *Varieties*, we find also a classic of analytic philosophy of mind, Gilbert Ryle's *The Concept of Mind* (1949). Interestingly, in the second position there is a journal article: Burge's "Individualism and the Mental" published in the *Midwest Studies in Philosophy* in 1979.

The cluster presents a sort of southern peninsula that comprises three documents (Daniel Dennett's *Consciousness Explained*, Fred Dretske's *Naturalizing the Mind*, and Michael Tye's *Ten Problems of Consciousness*). They are considered the main representatives of the "representationalism" in philosophy of mind, the theory according to which the phenomenal character of mental states is identical to the content of the state. In other terms, according to representationalism, the world we see in conscious experience is not the real world itself, but merely a miniature virtual-reality replica of that world in an internal representation (Lycan, 2015). At the western periphery of the cluster, close to the "Philosophy of language" cluster, we find the debates around consciousness, with David Chalmers' *The Conscious Mind* (1996), connected to the representationalist peninsula by Thomas Nagel's article "What is like to be a bat?" (1974). In this area we also find the work in psychosemantics by Fodor, dealing with the topic of the 'language of thought'. Once again, the map highlights the importance of the language for approaching the study of the mind in Late Analytic Philosophy. Lastly, Fred Dretske's *Knowledge and the Flow of Information* (1981) represents the link between the "Philosophy of mind" cluster and the "Epistemology cluster".

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | evans gareth | 1982 | varieties reference | 2 | 83 | 501 | 157 |
| **2** | burge tyler | 1979 | midwest stud philos | 2 | 82 | 358 | 98 |
| **3** | searle j. r. | 1983 | intentionality | 2 | 76 | 263 | 77 |
| **4** | millikan r. | 1984 | language thought oth | 2 | 77 | 226 | 77 |
| **5** | dretske f. i. | 1981 | knowledge flow infor | 2 | 79 | 318 | 75 |
| **6** | chalmers dj | 1996 | conscious mind | 2 | 74 | 293 | 74 |
| **7** | fodor j. a. | 1987 | psychosemantics | 2 | 67 | 238 | 71 |
| **8** | mcdowell j. | 1994 | mind world | 2 | 67 | 222 | 69 |
| **9** | peacocke c. | 1992 | study concepts | 2 | 68 | 271 | 67 |
| **10** | ryle g. | 1949 | concept mind | 2 | 67 | 185 | 61 |

*Table 18. Cluster 2: Top 10 documents by citations*

Figure 19 shows a close-up of the light blue eastern cluster, the one we labeled "Epistemology". It contains 22 documents, which collect 1980 citations. The average PY of the cluster is 1988.1. As we noted above, this is the youngest cluster, being almost 7 years younger than the average cluster age. Table 19 shows the Top 10 most cited documents of the cluster.

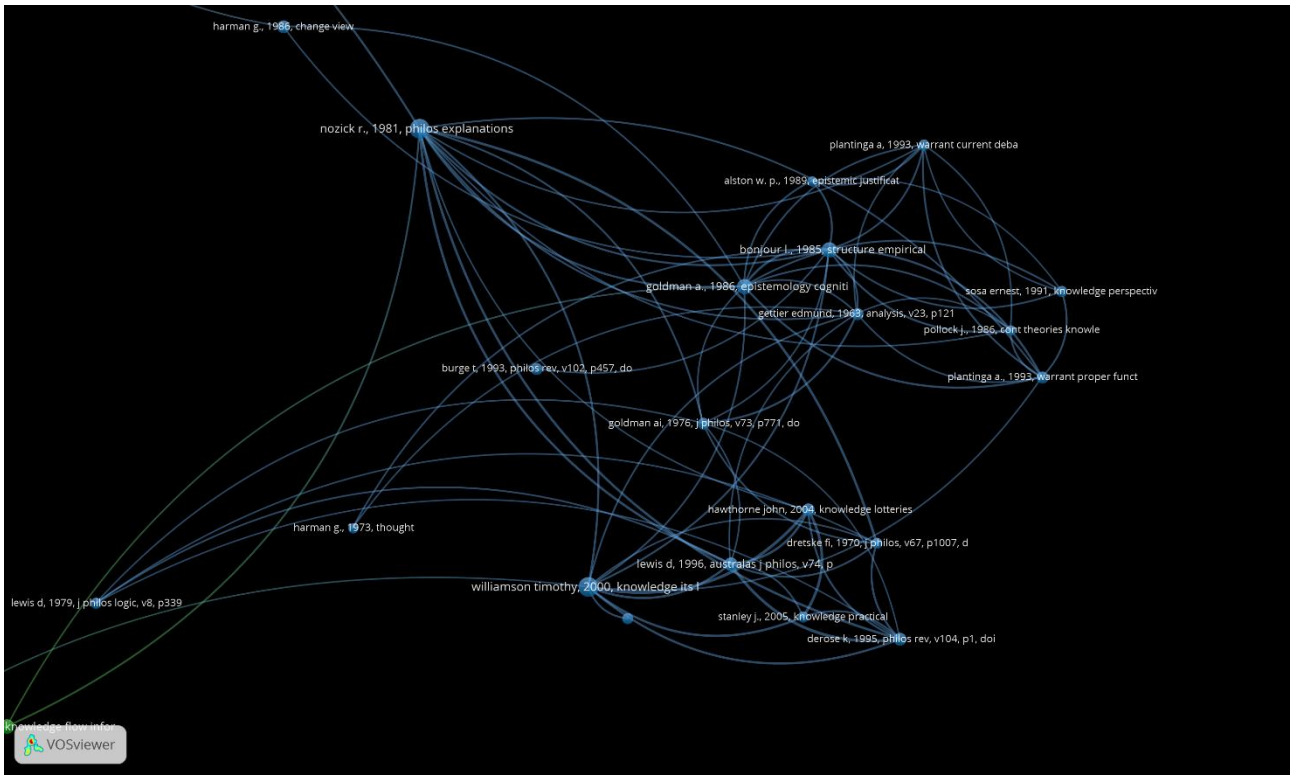



*Figure 19. Close up of the Cluster 3 ("Epistemology")*

The cluster is relatively isolated from the south-western super-cluster, suggesting that "Epistemology" has fewer interactions with the other areas of Late Analytic Philosophy. The two most cited documents of the cluster are Williamson's *Knowledge and Its Limits* and Robert Nozick's *Philosophical Explanations* (1981), collecting both the same number of citations (137 citations). Interestingly, they are positioned at the two poles of the cluster. The presence of Nozick's work in the "Epistemology" cluster is remarkable because it shows that this work, albeit it deals with many different topics, has had mainly an impact on epistemological debates. Around *Knowledge and Its Limits,* we find a group of works that mainly discuss Williamson's programme of 'epistemology first' (i.e., the conception of epistemology in which the notion of knowledge is explanatorily fundamental).

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | williamson timothy | 2000 | knowledge its limits | 3 | 75 | 408 | 137 |
| **2** | nozick r. | 1981 | philos explanations | 3 | 82 | 443 | 137 |
| **3** | bonjour l. | 1985 | structure empirical | 3 | 56 | 320 | 93 |
| **4** | goldman a. | 1986 | epistemology cogniti | 3 | 63 | 316 | 85 |
| **5** | lewis d | 1996 | australas j philos | 3 | 60 | 295 | 74 |
| **6** | hawthorne john | 2004 | knowledge lotteries | 3 | 50 | 224 | 66 |
| **7** | harman g. | 1986 | change view | 3 | 61 | 197 | 63 |
| **8** | derose k | 1995 | philos rev | 3 | 56 | 251 | 61 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **9** | gettier edmund | 1963 | analysis | 3 | 57 | 244 | 55 |
| **10** | plantinga a. | 1993 | warrant proper funct | 3 | 47 | 232 | 54 |

*Table 19. Cluster 3: Top 10 documents by citations*

Figure 20 shows a close-up of the yellow northern cluster, the one we labeled "Ethics and political philosophy". It contains 16 documents, which collect 1 091 citations. The average PY of the cluster is 1983.3. Table 20 shows the Top 10 most cited documents of this cluster.

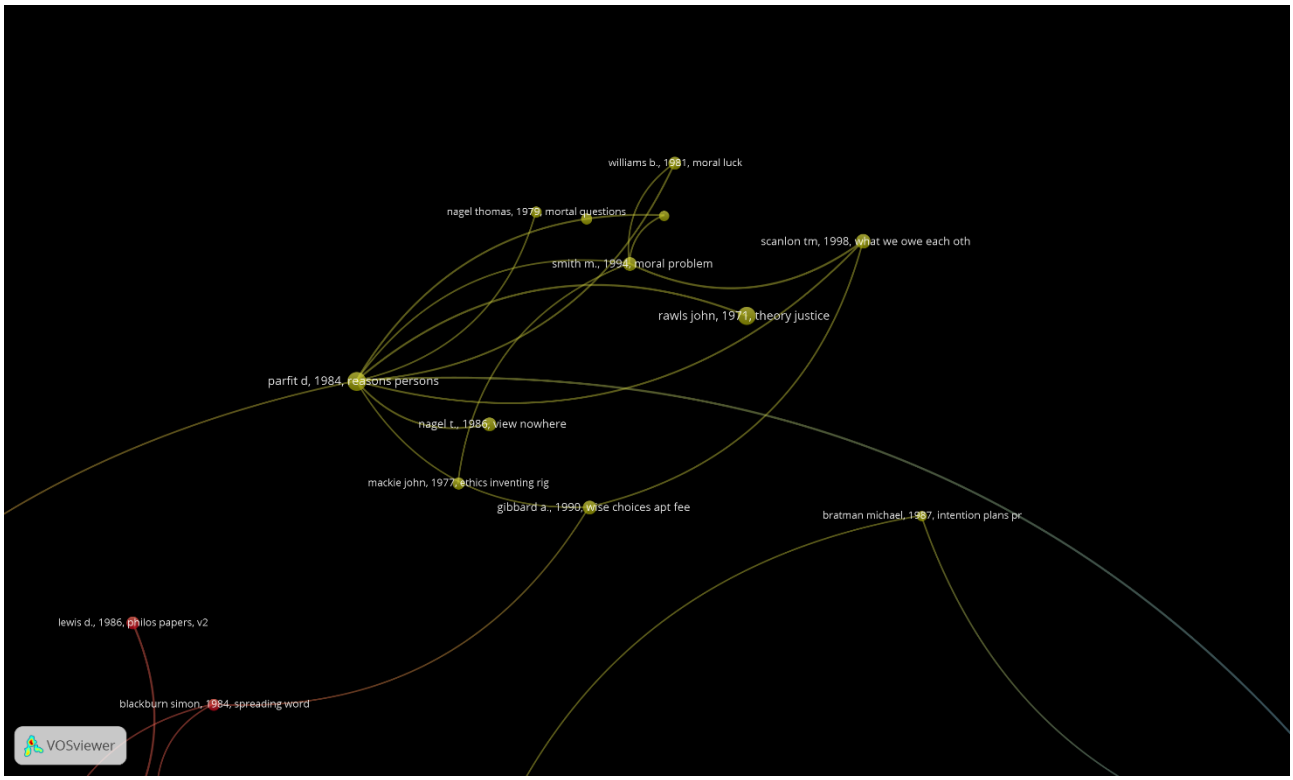



*Figure 20. Close up of the Cluster 4 ("Ethics and political philosophy")*

The cluster is quite isolated in the northern area of the map, as it was for the "Epistemology" cluster. The presence of this cluster contradicts a common idea about analytic philosophy, namely that it would be marked by a lack of ethical and political topics (Glock, 2008). Nonetheless, the isolation of the cluster suggests that these topics are indeed specialized areas of the debate.

The two most cited documents are Derek Parfit's *Reasons and Persons* (1984) and John Rawls's *Theory of Justice* (1971), both classics of the analytic reflection, respectively, on ethics and political philosophy. It is interesting that the third position is occupied by Donald Davidson's *Essays on Actions and Events* (1980). Even if this document is the third most-cited one, it is located at the southern periphery of the cluster, representing a bridge between the "Ethics and political philosophy" cluster and the "Metaphysics" cluster. We think that this reflects the content of the book, that also deals with metaphysical topics such as the ontology of events.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | parfit d | 1984 | reasons persons | 4 | 61 | 270 | 136 |
| **2** | rawls john | 1971 | theory justice | 4 | 58 | 166 | 116 |
| **3** | davidson donald | 1980 | essays actions event | 4 | 81 | 298 | 102 |
| **4** | scanlon tm | 1998 | what we owe each oth | 4 | 46 | 157 | 82 |
| **5** | gibbard a. | 1990 | wise choices apt fee | 4 | 49 | 147 | 71 |
| **6** | smith m. | 1994 | moral problem | 4 | 52 | 169 | 70 |
| **7** | nagel t. | 1986 | view nowhere | 4 | 65 | 163 | 67 |
| **8** | vaninwagen p | 1983 | essay free will | 4 | 23 | 81 | 61 |
| **9** | williams b. | 1981 | moral luck | 4 | 41 | 114 | 60 |
| **10** | mackie john | 1977 | ethics inventing rig | 4 | 54 | 144 | 58 |

*Table 20. Cluster 4: Top 10 documents by citations*

Lastly, Figure 21 shows a close-up of the purple cluster, the one we labeled "Philosophy of language". This is the smallest cluster, containing 9 documents, which collect 591 citations in total. The average PY of the cluster is 1982. Table 20 shows the Top 9 most cited documents of this cluster.

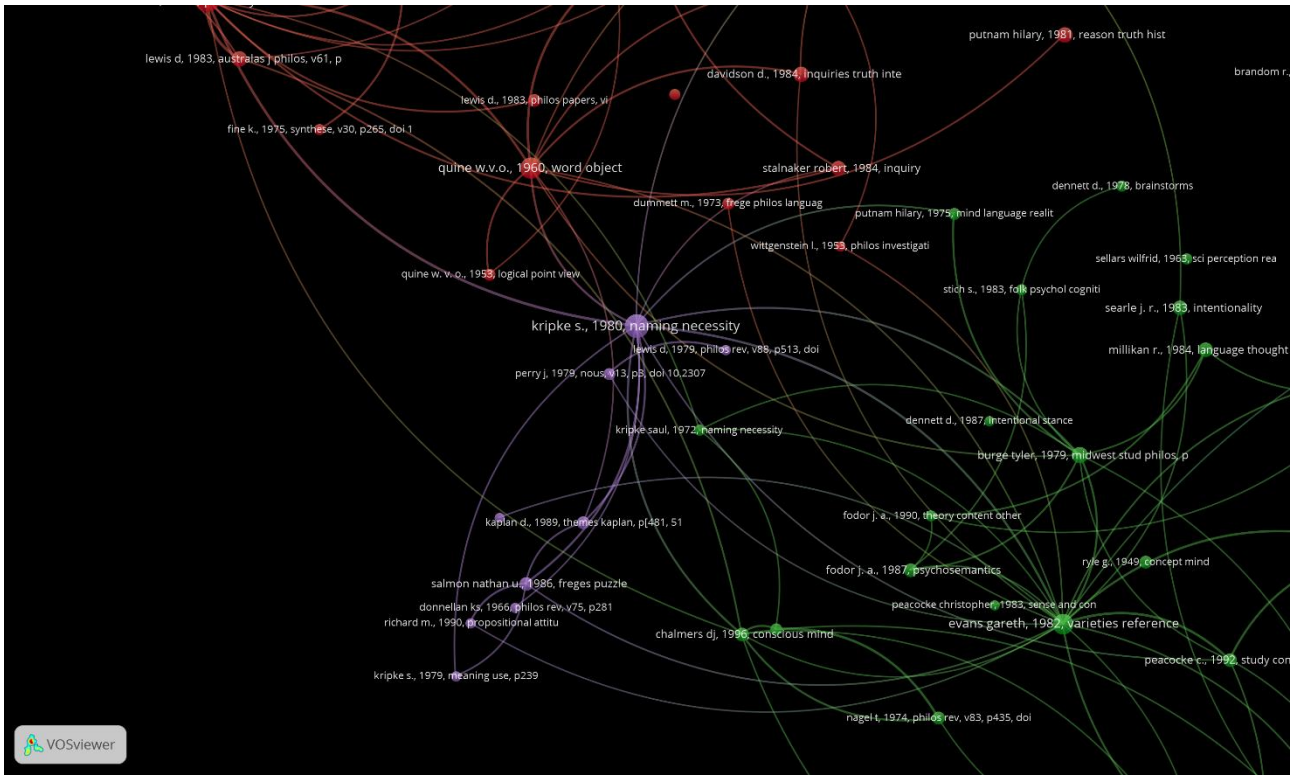



*Figure 21. Close up of the Cluster 5 ("Philosophy of language")*

Saul Kripke's *Naming and Necessity* is the biggest node, collecting alone 34.3% of the total citations of the cluster. Interestingly, 3 on 9 of the documents are published in journals. The position of the cluster on the map is also interesting: philosophy of language is the bridge between the two biggest clusters, "Metaphysics" and "Philosophy of mind". However, it is also

considerably smaller than the others. This is coherent with the standard picture of the history of analytic philosophy, according to which philosophy of language, that once was the foundation of analytic philosophy, in the last decades has left room for metaphysics and philosophy of mind. Indeed, this cluster attracts only 9.1 % of the total citations.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | kripke s. | 1980 | naming necessity | 5 | 86 | 523 | 203 |
| **2** | salmon nathan u. | 1986 | freges puzzle | 5 | 63 | 242 | 69 |
| **3** | kaplan d. | 1989 | themes kaplan | 5 | 59 | 183 | 65 |
| **4** | perry j | 1979 | nous | 5 | 49 | 143 | 52 |
| **5** | donnellan ks | 1966 | philos rev | 5 | 42 | 104 | 41 |
| **6** | lewis d | 1979 | philos rev | 5 | 51 | 127 | 41 |
| **7** | kripke s. | 1979 | meaning use | 5 | 37 | 102 | 40 |
| **8** | neale s. | 1990 | descriptions | 5 | 43 | 104 | 40 |
| **9** | richard m. | 1990 | propositional attitu | 5 | 47 | 132 | 40 |
| **10** | | | | | | | |

*Table 21. Cluster 5: Top 10 documents by citations*

In fact, the supercluster of metaphysics, philosophy of language and philosophy of mind that is visible with resolution 0.7 (Figure 14) reflects the common origin of philosophy of mind and metaphysics from philosophy of language.

### *Longitudinal analyses*

In this section, we present the results of the longitudinal co-citation analysis. By longitudinal co-citation analysis, we mean that the overall corpus was firstly divided in three sub-corpora corresponding to the timespans [1985-1994], [1995-2004], and [2005-2014], and then the co-citation analysis was performed with VOSviewer on each sub-corpus separately. For each of the timespan, we show the co-citation network, followed by a table with the technical features of the map. In order to enable the reading of the maps, we also provide the rankings of the most cited documents of each timespan, along with the most cited documents in each cluster.

It must be noted that the sub-corpora differ for the number of documents contained (Figure 22) and, above all, for the number of cited references (Figure 23). Coherently with the results that we presented in the previous study, the average number of cited references per article has considerably increased during the last decades (see Figure 8). A consequence of the growth of the cited reference is the increase in the number of items that are shown on the map (the threshold of 20 citations was the same in all the three timespans), that increased three-fold from 29 (1985-1994) to 84 (1995-2004).

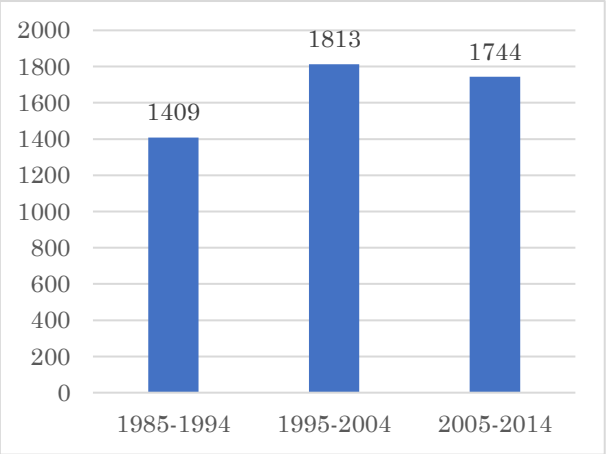



*Figure 22. Number of documents for each timespan.*

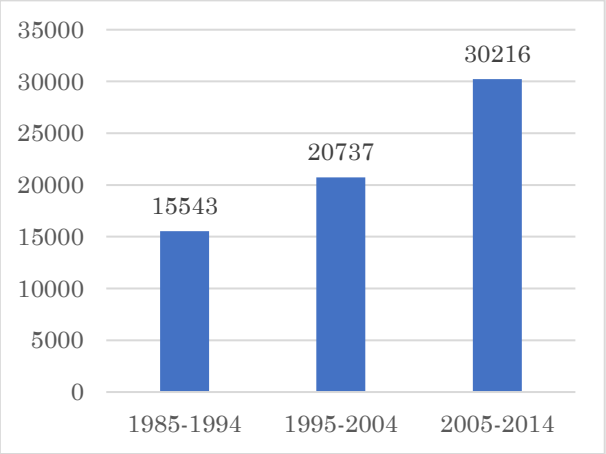



*Figure 23. Total number of cited references for each timespan*

Figure 24 shows the dimension of the different clusters (in terms of number of documents contained) over time. We can observe a general increase over the three decades, with the cluster "Epistemology" that starts to exist in the second decade. The cluster "Metaphysics" has grown almost exponentially [81], whereas the cluster "Philosophy of Mind" has slightly reduced in the last decade.

[81] However, as we will show in presenting the map of the decade [2005-2014], this cluster has incorporated the cluster "Ethics and political philosophy", which regains an independent existence as we increase the resolution of the algorithm.

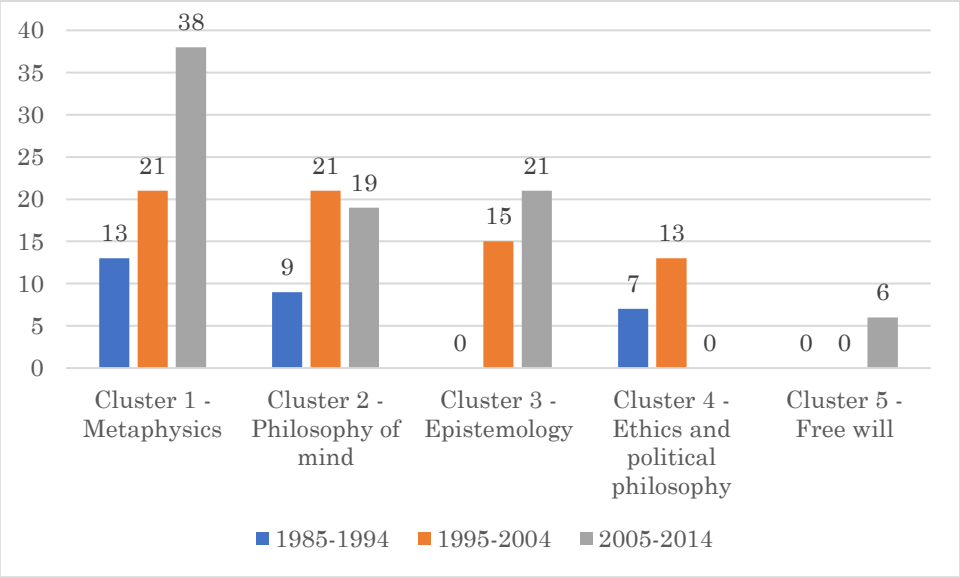



*Figure 24. Number of documents in each cluster over time*

After presenting the three maps, we will present some data about the trajectories over time of the most cited publications between the clusters. We will also show the variation in their co-citation scores.

### 1985-1994

Figure 25 shows the co-citation network for the articles published in the five journals between 1985 and 1994 (Table 22). At resolution 0.8, the algorithm finds three clusters. However, the network is quite sparse, with less definite clusters than the overall map. In the northern area of the network (that corresponds approximately to the green cluster) we find works in philosophy of mind, such as Dennett's *Brainstorms* (1978) and Fodor's *Psychosemantics* (1987). In the southern area (roughly coincident with the red cluster), there are publications relating both to metaphysics (Lewis) and philosophy of language (Stalnaker, Kripke, Salmon). Quine's *Word and Object* is at the center of the network. In the eastern area we find a yellow cluster with works in ethics and political philosophy (around Rawls' *Theory of Justice*). Interestingly, Davidson's *Essays* constitutes the bridge between the yellow area and the western super-cluster (see Figure 20). Compared to the overall map (Figure 15), this network is less defined, and no clear "Epistemology" cluster appears.

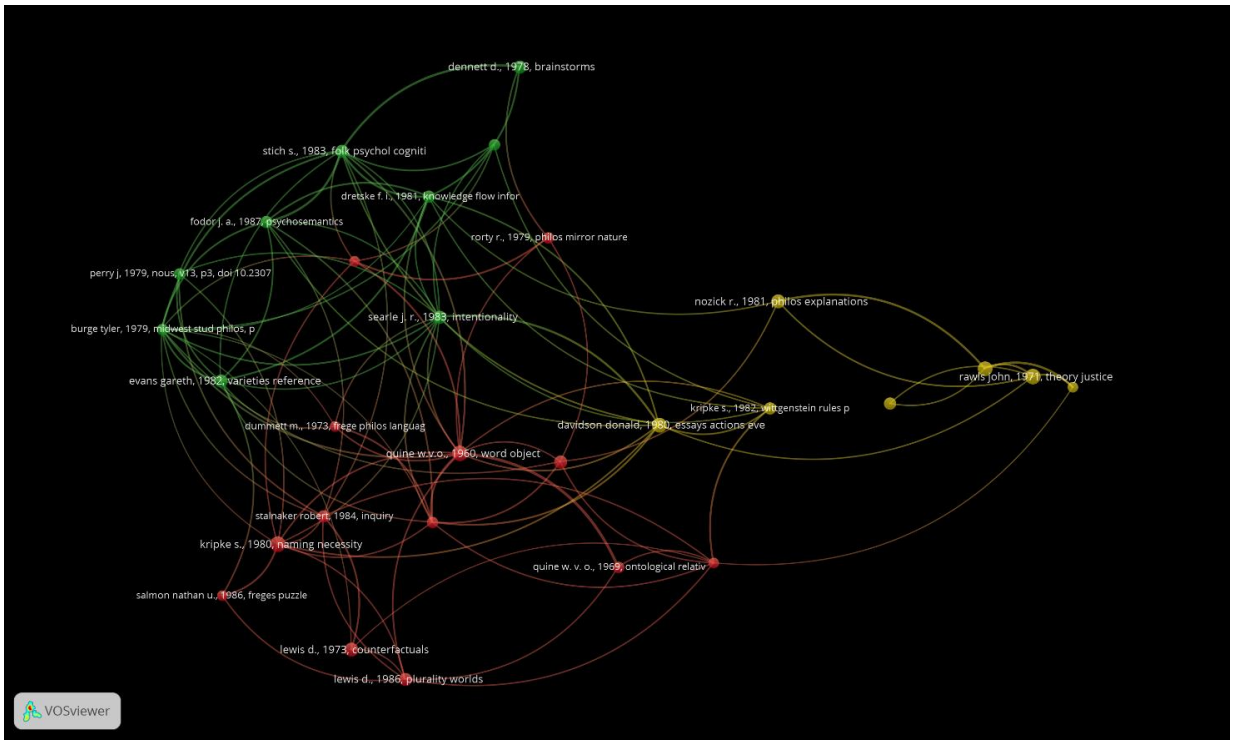



*Figure 25. Co-citation network of Top Five AP Journals (Timespan: 1985-1994)*

| | |
|---|---|
| **Number of documents** | 1 409 documents |
| **Typology** | Articles |
| **Total number of cited references** | 15 543 cited references |
| **Counting method** | Full |
| **Threshold** | 20 citations |
| **Items shown on the map** | 29 |
| **Number of clusters** | 3 |
| **Resolution** | 0.8 |
| **Normalization method** | Association strength |

*Table 22. 1985-1994 map: technical features*

Table 23 shows the Top 10 most cited documents for the timespan [1985-1994]. The average age of the Top 10 is 1977.6, whereas the average age of all the 29 documents over the threshold is 1979.4. Quine's *Word and Object* is the most cited publication (45 citations), but its score is close to the second and the third position in the ranking (*Naming and Necessity* and *Theory of Justice* both score 43 citations). Lewis' *On the Plurality of Worlds* does not appear in the Top 10 but occupies the 13th position with 30 citations.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | quine w.v.o. | 1960 | word object | 1 | 24 | 78 | 45 |
| **2** | kripke s. | 1980 | naming necessity | 1 | 22 | 51 | 43 |
| **3** | rawls john | 1971 | theory justice | 3 | 12 | 28 | 43 |
| **4** | parfit d | 1984 | reasons persons | 3 | 15 | 38 | 39 |
| **5** | davidson donald | 1980 | essays actions event | 3 | 23 | 58 | 38 |
| **6** | nozick r. | 1981 | philos explanations | 3 | 16 | 34 | 35 |
| **7** | lewis d. | 1973 | counterfactuals | 1 | 18 | 29 | 34 |
| **8** | putnam hilary | 1981 | reason truth hist | 1 | 21 | 40 | 33 |
| **9** | stich s. | 1983 | folk psychol cogniti | 2 | 24 | 71 | 33 |
| **10** | searle j. r. | 1983 | intentionality | 2 | 23 | 60 | 32 |

*Table 23. 1985-1994: Top 10 documents by citations*

Table 24, Table 25, and Table 26 show the Top 5 documents in each cluster. These rankings sometimes allow to label the clusters using the same labels used for the overall map. Cluster 2 and 3 can be labeled, respectively, "Philosophy of mind" and "Ethics and political philosophy". The labeling of Cluster 1, on the other hand, is difficult, since it corresponds both to "Metaphysics" and "Philosophy of language".

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | quine w.v.o. | 1960 | word object | 1 | 24 | 78 | 45 |
| **2** | kripke s. | 1980 | naming necessity | 1 | 22 | 51 | 43 |
| **3** | lewis d. | 1973 | counterfactuals | 1 | 18 | 29 | 34 |
| **4** | putnam hilary | 1981 | reason truth hist | 1 | 21 | 40 | 33 |
| **5** | lewis d. | 1986 | plurality worlds | 1 | 15 | 30 | 30 |

*Table 24. 1985-1994. Cluster 1: Top 5 documents by citation*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | stich s. | 1983 | folk psychol cogniti | 2 | 24 | 71 | 33 |
| **2** | searle j. r. | 1983 | intentionality | 2 | 23 | 60 | 32 |
| **3** | dennett d. | 1978 | brainstorms | 2 | 15 | 34 | 31 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **4** | evans gareth | 1982 | varieties reference | 2 | 23 | 55 | 30 |
| **5** | dretske f. i. | 1981 | knowledge flow infor | 2 | 23 | 59 | 28 |

*Table 25. 1985-1994. Cluster 2: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | rawls john | 1971 | theory justice | 3 | 12 | 28 | 43 |
| **2** | parfit d | 1984 | reasons persons | 3 | 15 | 38 | 39 |
| **3** | davidson donald | 1980 | essays actions event | 3 | 23 | 58 | 38 |
| **4** | nozick r. | 1981 | philos explanations | 3 | 16 | 34 | 35 |
| **5** | kripke s. | 1982 | wittgenstein rules p | 3 | 20 | 41 | 29 |

*Table 26. 1985-1994. Cluster 3: Top 5 documents by citations*

### 1995-2004

Figure 26 shows the co-citation network for the articles published in the five journals between 1995 and 2004 (Table 27). At resolution 0.8, the algorithm finds four clusters. Compared to the [1985-1994] map, this one shows a more structured network, with four clusters easily recognizable. In the northern area of the network, we find the yellow cluster with, amongst others, Rawls, Parfit, and Nagel. This cluster corresponds to the "Ethics and political philosophy" of the overall map (Figure 15). In the western area, there is a red cluster with *On the Plurality of Worlds*, which can be labeled "Metaphysics". In the south, the green cluster comprises publication dealing with both philosophy of language and philosophy of mind. The label "Philosophy of mind" can be attributed to this cluster, but with the *caveat* that the weight of language-related topics is still significant in it. Lastly, in the eastern area appears a new, light blue cluster, that was not present in the previous time span. This cluster is also quite independent from the rest of the network, showing a good internal connectedness. Looking at the publications within this cluster (Table 31), such as Gettier's 1963 famous article "Is Justified True Belief Knowledge?" and BonJour's *The Structure of Empirical Knowledge* (1985), it seems plausible to label this clusters as "Epistemology".

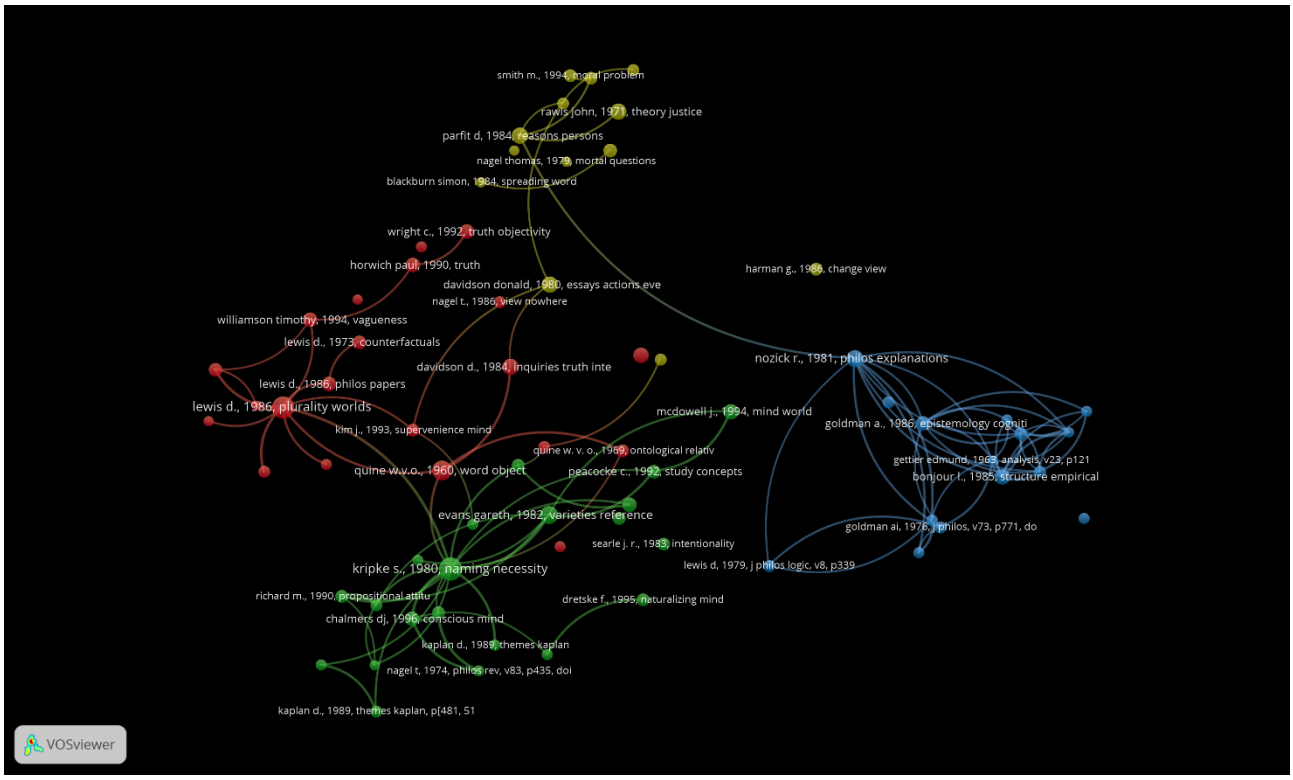



*Figure 26. Co-citation network of the Top Five AP journals (Timespan: 1995- 2004)*

| | |
|---|---|
| **Number of documents** | 1 813 documents |
| **Typology** | Articles |
| **Total number of cited references** | 20 737 cited references |
| **Counting method** | Full |
| **Threshold** | 20 citations |
| **Items shown on the map** | 70 |
| **Number of clusters** | 4 |
| **Resolution** | 0.8 |
| **Normalization method** | Association strength |

*Table 27. 1995-2004 map: technical features*

Table 28 shows the Top 10 most cited documents for the timespan [1995-2004]. The average age of the Top 10 is 1980.9, whereas the average age of all the 70 documents over the threshold is 1984.9. Quine's *Word and Object* has lost two positions, compared to the previous decade, whereas Lewis' *On the Plurality of Worlds*, have moved forward to the second positions. Kripke is in the first rank. Evans' *The Varieties of Reference* appears for the first time in the Top 10.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | kripke s. | 1980 | naming necessity | 2 | 59 | 244 | 92 |
| **2** | lewis d. | 1986 | plurality worlds | 1 | 50 | 192 | 90 |
| **3** | quine w.v.o. | 1960 | word object | 1 | 53 | 157 | 66 |
| **4** | evans gareth | 1982 | varieties reference | 2 | 57 | 172 | 56 |
| **5** | nozick r. | 1981 | philos explanations | 3 | 44 | 168 | 54 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **6** | parfit d | 1984 | reasons persons | 4 | 34 | 97 | 48 |
| **7** | rawls john | 1971 | theory justice | 4 | 30 | 61 | 48 |
| **8** | davidson donald | 1980 | essays actions event | 4 | 47 | 106 | 45 |
| **9** | davidson d. | 1984 | inquiries truth inte | 1 | 43 | 94 | 45 |
| **10** | putnam hilary | 1981 | reason truth hist | 1 | 43 | 91 | 43 |

*Table 28. 1995-2004: Top 10 documents by citations*

Table 29, Table 30, Table 31, and Table 32 show the Top 5 documents in each cluster.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | quine w.v.o. | 1960 | word object | 1 | 53 | 157 | 66 |
| **2** | lewis d. | 1986 | plurality worlds | 1 | 50 | 192 | 90 |
| **3** | davidson d. | 1984 | inquiries truth inte | 1 | 43 | 94 | 45 |
| **4** | putnam hilary | 1981 | reason truth hist | 1 | 43 | 91 | 43 |
| **5** | nagel t. | 1986 | view nowhere | 1 | 39 | 65 | 25 |

*Table 29. 1995-2004. Cluster 1: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | kripke s. | 1980 | naming necessity | 2 | 59 | 244 | 92 |
| **2** | evans gareth | 1982 | varieties reference | 2 | 57 | 172 | 56 |
| **3** | searle j. r. | 1983 | intentionality | 2 | 45 | 97 | 29 |
| **4** | peacocke c. | 1992 | study concepts | 2 | 42 | 100 | 32 |
| **5** | burge tyler | 1979 | midwest stud philos | 2 | 41 | 102 | 40 |

*Table 30. 1995-2004. Cluster 2: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | nozick r. | 1981 | philos explanations | 3 | 44 | 168 | 54 |
| **2** | goldman a. | 1986 | epistemology cogniti | 3 | 41 | 129 | 39 |
| **3** | plantinga a | 1993 | warrant current deba | 3 | 38 | 112 | 24 |
| **4** | bonjour l. | 1985 | structure empirical | 3 | 37 | 135 | 42 |
| **5** | goldman ai | 1976 | j philos | 3 | 36 | 109 | 27 |

*Table 31. 1995-2004. Cluster 3: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | davidson donald | 1980 | essays actions event | 4 | 47 | 106 | 45 |
| **2** | harman g. | 1986 | change view | 4 | 37 | 73 | 28 |
| **3** | parfit d | 1984 | reasons persons | 4 | 34 | 97 | 48 |
| **4** | brandom r. | 1994 | making it explicit | 4 | 31 | 55 | 27 |
| **5** | rawls john | 1971 | theory justice | 4 | 30 | 61 | 48 |

*Table 32. 1995-2004. Cluster 4: Top 5 documents by citations*

### 2005-2014

Figure 27 shows the co-citation network for the articles published in the five journals between 2005 and 2014 (Table 33). At resolution 0.8, the algorithm finds four clusters. Compared to the [1985-1994] and [1995-2004] maps, this one shows a network that is even more structured. The network is clearly divided into three main peninsulas, with a little island in the far east of the map. Each cluster is internally connected and shows relatively few out-going links with the other clusters. There is no clear center of the map. The labeling of the clusters is also easier than in the previous timespans. The light blue cluster in the north, with Williamson's *Knowledge and Its Limits* as the main node, is easily recognizable as "Epistemology". The green cluster in the south-west corresponds to "Philosophy of mind": it can be noticed that the more peripheric documents in this cluster are the ones less concerned with language-related topics and the most specialized on the study of perception and consciousness (Martin, Harman, Campbell). They are also mostly journal articles instead of books. The red cluster in the south-east corresponds to "Metaphysics". It is interesting to notice that, at resolution 0.8, this cluster embeds the cluster of "Ethics and political philosophy", that is visible at resolution 1 (see the close-up in Figure 28). In the northern periphery of the "Metaphysics" cluster, closer to the geometrical center of the map, contributions in philosophy of language can be noticed. In the far south-east periphery, on the other hand, there is an island dominated by Lewis, with documents dealing with highly-specialized metaphysical topics (such as the philosophy of persistence and mereology). Lastly, the little island in the far east includes documents dealing with debates on the free will. This literature seems almost isolated from the rest of the network: the only link that it has is Martin's article "Dispositions and Conditionals", which connects it to the "Metaphysics" cluster.

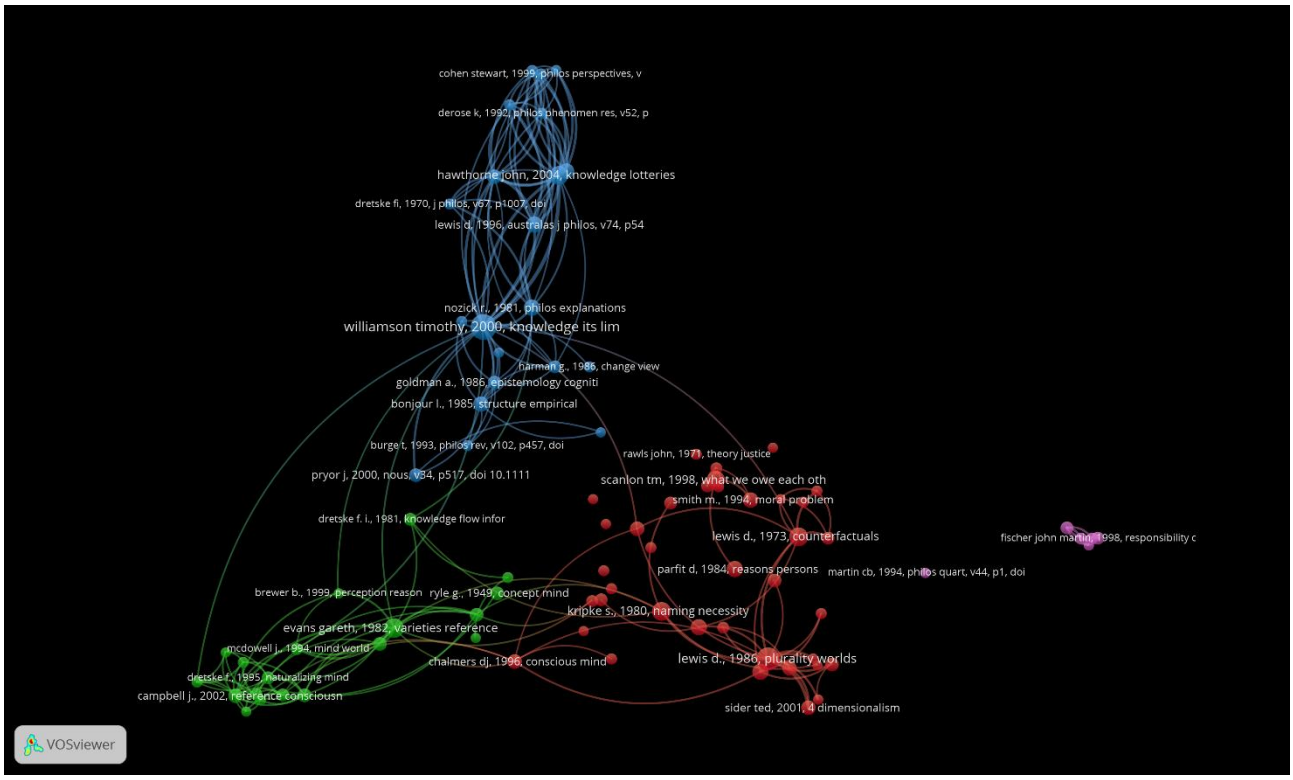



*Figure 27. Co-citation network of the Top Five AP journals (Timespan: 2005-2014)*

| | |
|---|---|
| **Number of documents** | 1 744 documents |
| **Typology** | Articles |
| **Total number of cited references** | 30 216 cited references |
| **Counting method** | Full |
| **Threshold** | 20 citations |
| **Items shown on the map** | 84 |
| **Number of clusters** | 4 |
| **Resolution** | 0.8 |
| **Normalization method** | Association strength |

*Table 33. 2005-2014 map: technical features*

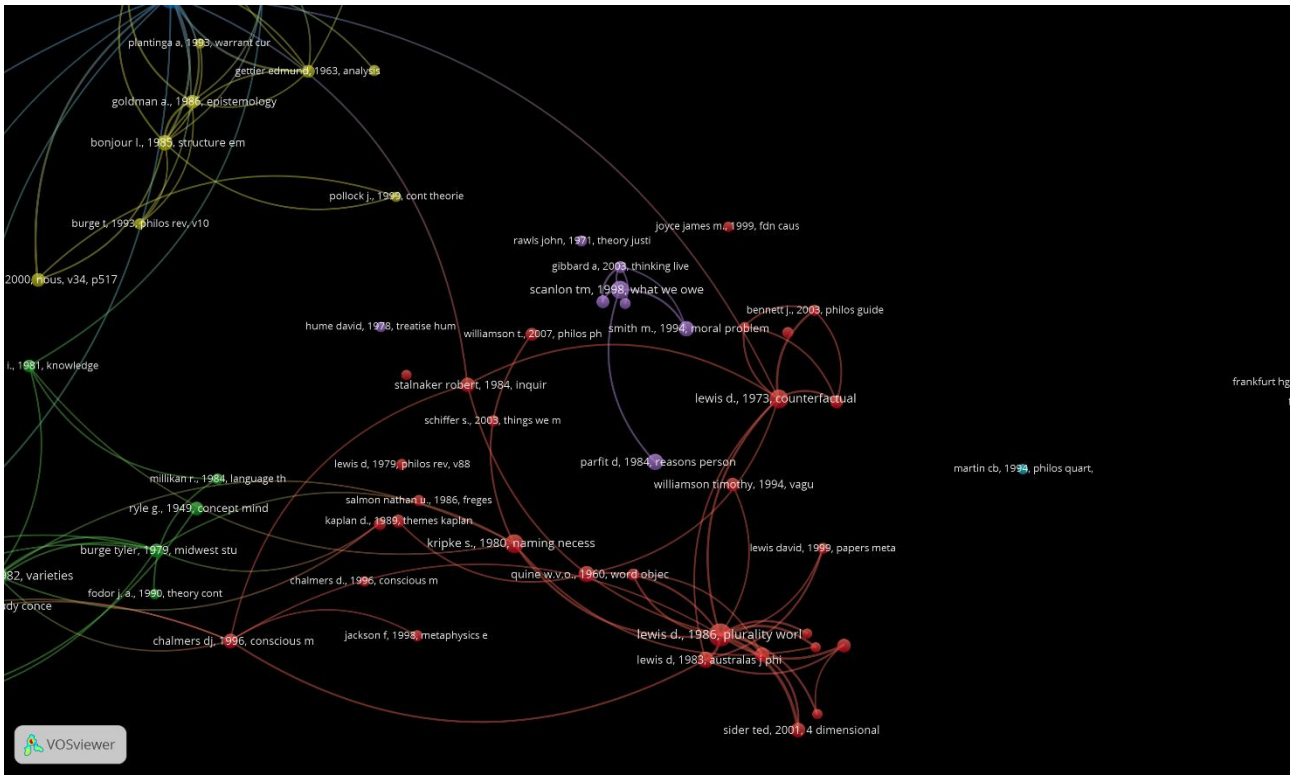



*Figure 28. Close-up of the "Ethics and political philosophy" cluster in 2005-2014 map (Resolution: 1)*

Table 34 shows the Top 10 most cited documents for the timespan [2005-2014]. The average age of the Top 10 is 1986.3, whereas the average age of all the 84 documents over the threshold is 1990.6. Williamson's *Knowledge and Its Limits* occupies the first position, followed by Lewis' *On the Plurality of Worlds* (that was 2nd also in the previous timespan). For the first time, an article appears in the top 10, namely Lewis' article "Elusive Knowledge" (1996). It is interesting that this article belongs to the epistemology cluster, because this is the cluster where the weight of journal literature is higher. 50% of the documents over the threshold in the "Epistemology" cluster are indeed journal article. Compare with the cluster "Metaphysics", where only 13.2% of documents are articles and the cluster "Philosophy of mind", where 31.6% of the documents are articles.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | williamson timothy | 2000 | knowledge its limits | 2 | 64 | 402 | 119 |
| **2** | lewis d. | 1986 | plurality worlds | 1 | 58 | 282 | 99 |
| **3** | evans gareth | 1982 | varieties reference | 3 | 45 | 211 | 71 |
| **4** | kripke s. | 1980 | naming necessity | 1 | 58 | 175 | 68 |
| **5** | lewis d. | 1973 | counterfactuals | 1 | 52 | 180 | 67 |
| **6** | hawthorne john | 2004 | knowledge lotteries | 2 | 49 | 281 | 65 |
| **7** | scanlon tm | 1998 | what we owe each oth | 1 | 39 | 93 | 57 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **8** | quine w.v.o. | 1960 | word object | 1 | 48 | 131 | 51 |
| **9** | parfit d | 1984 | reasons persons | 1 | 40 | 96 | 49 |
| **10** | lewis d | 1996 | australas j philos | 2 | 45 | 225 | 48 |

*Table 34. 2005-2014: Top 10 documents by citations*

Lastly, Table 35, Table 36, Table 37, and Table 38 show the Top 5 documents in each cluster.

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | lewis d. | 1986 | plurality worlds | 1 | 58 | 282 | 99 |
| **2** | kripke s. | 1980 | naming necessity | 1 | 58 | 175 | 68 |
| **3** | lewis d. | 1973 | counterfactuals | 1 | 52 | 180 | 67 |
| **4** | scanlon tm | 1998 | what we owe each oth | 1 | 39 | 93 | 57 |
| **5** | quine w.v.o. | 1960 | word object | 1 | 48 | 131 | 51 |

*Table 35. 2005-2014. Cluster 1: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | williamson timothy | 2000 | knowledge its limits | 2 | 64 | 402 | 119 |
| **2** | hawthorne john | 2004 | knowledge lotteries | 2 | 49 | 281 | 65 |
| **3** | lewis d | 1996 | australas j philos | 2 | 45 | 225 | 48 |
| **4** | nozick r. | 1981 | philos explanations | 2 | 56 | 198 | 48 |
| **5** | stanley j. | 2005 | knowledge practical | 2 | 42 | 209 | 46 |

*Table 36. 2005-2014. Cluster 2: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | evans gareth | 1982 | varieties reference | 3 | 45 | 211 | 71 |
| **2** | campbell j. | 2002 | reference consciousn | 3 | 29 | 143 | 38 |
| **3** | burge tyler | 1979 | midwest stud philos | 3 | 53 | 133 | 35 |
| **4** | peacocke c. | 1992 | study concepts | 3 | 45 | 152 | 34 |
| **5** | tye m | 1995 | 10 problems consciou | 3 | 35 | 156 | 34 |

*Table 37. 2005-2014. Cluster 3: Top 5 documents by citations*

| Rank | AU | PY | TI | Cluster | Edges | Co-citations | Citations |
|---|---|---|---|---|---|---|---|
| **1** | fischer john martin | 1998 | responsibility contr | 4 | 14 | 72 | 30 |
| **2** | frankfurt hg | 1969 | j philos | 4 | 17 | 70 | 29 |
| **3** | pereboom d. | 2001 | living free will | 4 | 17 | 72 | 28 |
| **4** | vaninwagen p | 1983 | essay free will | 4 | 20 | 78 | 28 |
| **5** | fischer j. m. | 1994 | metaphysics free wil | 4 | 14 | 57 | 20 |

*Table 38. 2005-2014. Cluster 3: Top 5 documents by citations*

### Trajectories of Classics

In this section, we focus on the Top 5 most cited documents of the overall ranking (see Table 15) and we follow their trajectory in the three timespans. Since *Knowledge and Its Limits* does not appear in the first two decades (being published in 2000), Nozick's *Philosophical Explanations* (6th position) will take its place in the analysis. Thus, the five documents we will follow are: *On the Plurality of Worlds, Naming and Necessity, Word an Object, The Varieties of References,* and *Philosophical Explanations*. First, we will present data on how their positions in the rankings changed over time. Then, we will show how their reciprocal association, measured firstly as belonging to the same cluster and secondly as co-citation score, changed over time.

Figure 29 shows, for each of these documents, their rank in the three timespans. We can distinguish three kinds of trajectories. The first group includes *On the Plurality of Worlds* and *The Varieties of Reference*: they are both characterized by advancing in the ranking (the former raises from the 16th position of the first decade to the 2nd position in both subsequent decades, the latter advanced from the 12th to the 3rd position). The second group includes documents that have lost positions over time: *Word and Object* has lost 8 positions from the first to the last decade, *Philosophical Explanation* has even left the Top 10 in the last decade. Lastly, there is *Naming and Necessity*, which has followed a more stable trajectory, always remaining in the Top 5 (even if it has lost positions in the last decade). However, it must be underlined that the five documents were published in different years: the difference in the PY probably influences their trajectory. *On the Plurality of Worlds,* for instance, was published in 1986 and it needed some time to collect the citations.

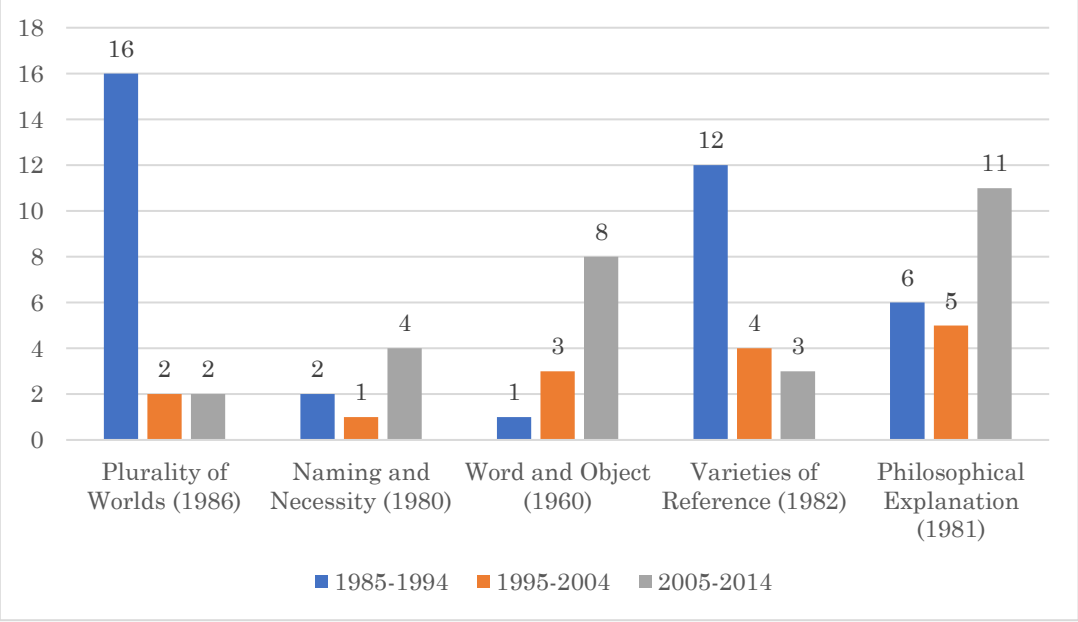



*Figure 29. Evolution in time of the rank of top 5 most cited documents (1985-2014)*

Table 39 shows, for each couple of documents, the frequency in which they were classified by the VOSviewer algorithm in the same cluster (being the resolution parameter constant).[82] *On the Plurality of Worlds* and *Word and Object* were assigned to the same cluster in all the three timespans. Also *Naming and Necessity* was frequently associated with them, in 2 cases on 3. *Philosophical Explanations*, on the other hand, did never appear associated with any of the other four documents.

| | Plurality of Worlds | Naming and Necessity | Word and Object | Varieties of Reference | Philosophical Explanation |
|---|---|---|---|---|---|
| **Plurality of Worlds** | - | 2/3 | 3/3 | 0 | 0 |
| **Naming and Necessity** | 2/3 | - | 2/3 | 1/3 | 0 |
| **Word and Object** | 3/3 | 2/3 | - | 0 | 0 |
| **Varieties of Reference** | 0 | 1/3 | 0 | - | 0 |
| **Philosophical Explanation** | 0 | 0 | 0 | 0 | - |

*Table 39. Permanence of the couples of publications in the same cluster over the three timespans*

Lastly, Figure 30 shows the evolution in time of the co-citation scores of each pair of documents. Data show that *On the Plurality of Worlds* and *Naming and Necessity,* and *On the Plurality of Worlds* and *Word and Object* are cited more frequently in the last two decades than in the previous one.[83] *The Varieties of References* and *Word and Object* increased their co-citation frequency over time but the absolute value remains low, whereas *The Varieties of References* and *Naming and Necessity* show an unstable trend (they were frequently co-cited in [1995-2004] but their co-citation strength decreased in the last decade). The other couples, on the other hand, show low co-citation values.

[82] Clearly, the matrix is symmetrical.
[83] Note however that the low co-citation score of the first decade may be dependent of the relatively low citation score of *On the Plurality of Worlds* in the first decade.

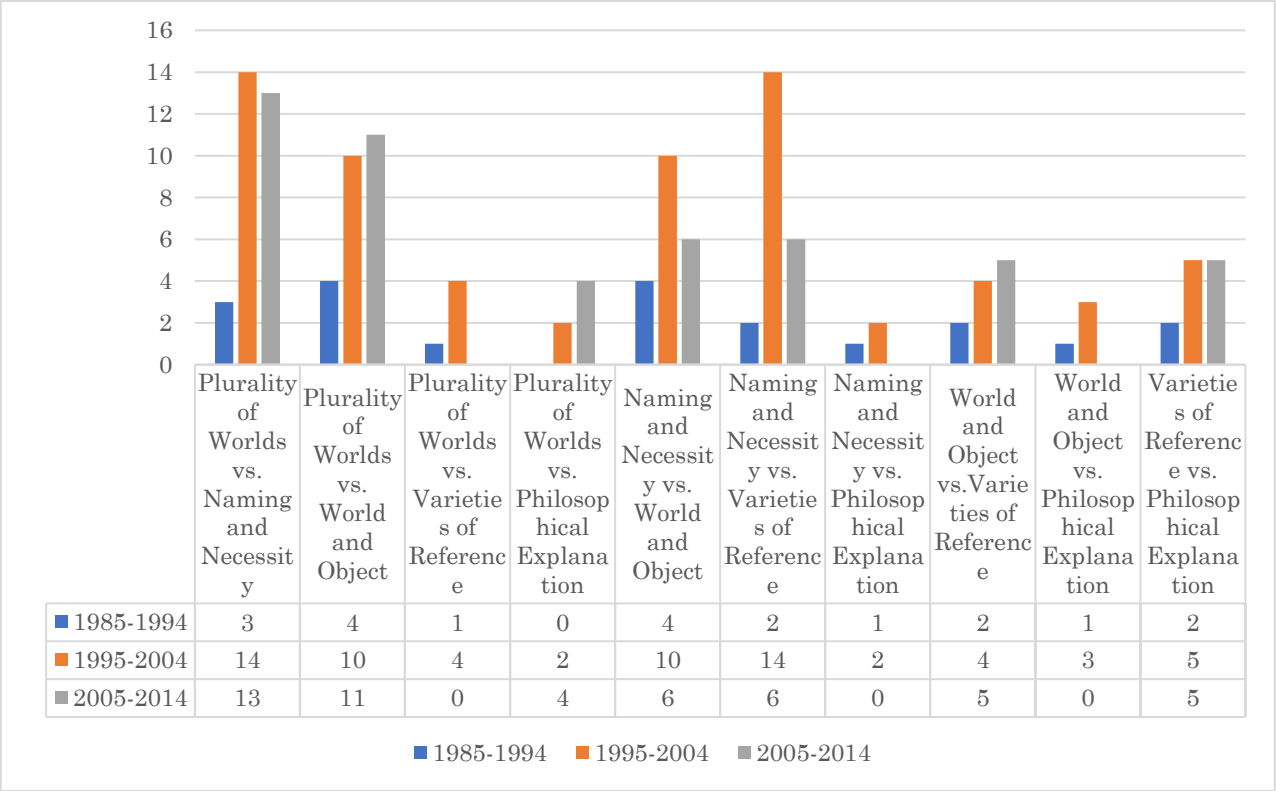



*Figure 30. Evolution of the co-citation strength in time for the top 5 most cited documents (1985-2014).*

## Discussion

The discussion of the results of the co-citation analyses is structured as follows. First, we will provide some general considerations about the *meaning* of the maps and the rankings of documents. In particular, we will relate the results of the analyses to the theoretical framework we reconstructed in Chapter 2. Second, we will discuss the results of the overall map (1985-2014), and, thirdly the results of the longitudinal analysis.

### *On the general meaning of maps and rankings*

In order to interpret the co-citation network maps, it is important to have clear in mind that the documents shown on the maps are the most cited *references* of the dataset. This means that the nodes in the visualizations are *not* the 4 966 articles of the corpus but the documents that are *cited by* the articles of the corpus. Therefore, co-citation analysis grasps what can be called the *literature* of Late Analytic Philosophy, for the timespan 1985-2014. The maps then visualize the *structure* of this literature by placing similar items (i.e., documents that are frequently cited together) close in the 2-dimensional plane.

It is also important to underline that the structure that is revealed by the analysis should be ascribed to the documental level, not straightforwardly to the intellectual level. The structure of the co-citation network is primarily the structure of the cited documents, and only a proxy for

the intellectual structure of the field. This is very important when we consider the labels we provided to the clusters in the previous Results section. The labels should always be intended as referring to the documental, instead of the intellectual, level. They are rough descriptions of the documents of the clusters. They should be considered analogous to the short labels we find in the 'Areas of specialization' section of academic curricula: they have for sure a relationship with a set of intellectual contents, but their primary function is to point to sub-areas of the current philosophical literature.

The distinction between the intellectual and the documental level is crucial in discussing the results of the mapping. The structure revealed by the analysis is the empirical configuration of the cited literature of Late Analytic Philosophy, i.e., the structure of the documental level of the field. The analysis of the documental level should be carefully distinguished from the classification of the intellectual content of Late Analytic Philosophy on the base of a philosophical *taxonomy*. This second project is a philosophical project which cannot be disjoined from a philosophical theory of philosophy, i.e., a meta-philosophy, because philosophical taxonomy is not neutral in respect of philosophical doctrines, as Rescher has clearly pointed out:

> Quarrel about the subject's *shape* is every bit as common as quarrel about its *contentions* – indeed they are part and parcel of the same issue. This substantive, doctrine-reflective aspect of philosophical taxonomy means that *this taxonomical enterprise is also itself a part of philosophy*. The question of the *proper* shape of philosophy is itself bound to be a philosophical question. This is graphically illustrated in the recurrent phenomenon of agenda abridgment that is encountered throughout the history of philosophy. The Stoics' inclination towards materialism led them to eliminate psychology as a branch of philosophy separate from physics at large. Spinoza held that issues of value have no place in philosophy. the ancient skeptics and their latter-day Humean and positivistic successors sought to invalidate the entire subject of philosophy. […] In sum, structural taxonomy and substantive doctrine are inextricably interconnected: form must follow content here (Rescher, 2005, p. 76)

Therefore, if we call *philosophical taxonomy*, following Rescher, the (meta-philosophical) problem of determining the shape of philosophy based on the intellectual level of the discipline, then we can distinguish it from *philosophical mapping*, which is the descriptive project of delineating the structure of philosophy based on documental relationships. The co-citation networks we presented in the previous Section are part of the latter project, not of the former.

This clarification of the meaning of the science maps (as visualization of the documental structure of Late Analytic Philosophy) allows clarifying also the general meaning of the

rankings of documents and authors (Table 15, Table 16, Table 23, Table 28, and Table 34). A promising interpretation of the most cited documents is to assimilate them to Kuhnian paradigms. More precisely, they could be assimilated to Kuhnian exemplars, i.e., «the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science» (Kuhn, 1996, p. 175). Levy explicitly speaks of Frege and Russell as the «paradigms» of analytic philosophy, and argues that certain works in analytic philosophy function as Kuhnian exemplars:

> I suggest the metaethicist and the logician, the philosopher of language and the philosopher of mind, possess a set of shared and a number of divergent exemplars. All may have had the distinction between sense and reference impressed upon them, but Kripke's and Putnam's extensions of this work will matter much more to some of them than to others. These other might find their major exemplar in the new riddle of induction, for example, or in *A Theory of Justice*. (Levy, 2003, p. 294)

As we saw in Chapter 2, Small was the first in scientometrics to suggest that highly cited references in scientific literature can be considered Kuhnian paradigms or exemplars (Small, 1977, 1980, 2003). More recently, Chen writes:

> Kuhn's notion of scientific paradigm indeed provides a framework for us to match visual-spatial patterns to the movement of an underlying paradigm. If there exists a predominant paradigm within a scientific discipline, citation patterns should reflect this phenomenon, allowing the usual delay in publication cycles. A predominant paradigm should acquire the most citations at least over certain period of time. (Chen, 2013, p. 205)

However, we think that the interpretation of highly-cited documents in Late Analytic Philosophy as Kuhnian exemplars is too strong. Indeed, a Kuhnian paradigm is considered, within the normal science community to which it belongs, as a scientific *achievement*. It can be refined as the research programme advances (as, in Kuhn's words, the paradigm is articulated), but it is taken as essentially 'correct' until the crisis and the scientific revolution. From a sociological point of view, in the normal science there is a consensus amongst the scientists on the paradigm, which function as a 'dogma' in the community (Kuhn, 1979, Chapter 9). This consensus is reflected in the pedagogical practices of the scientific community, in which the paradigm plays a central role in the socialization of the new members of the community during the scientific training (Kuhn, 1996, Chapter 4).

Now, even if the top-cited documents share some of the features of the scientific paradigms (for instance, they are probably all part of the syllabi and readings of standard analytic philosophy courses), still it cannot be said that the theories they present are uncontested in the Late

Analytic Philosophy community, or that they are taken as dogmas. David Lewis' *On the Plurality of Worlds* is the most revealing case of this: even if it is the most cited document of the timespan 1985-2014 (Table 15) the thesis that it advances (i.e., modal realism, the view that all possible worlds are real in the same way as is the actual world) has been widely criticized by analytic philosophers. It would be wrong to say that Lewis' work function as a 'dogma' in the analytic community.

Nonetheless, it remains true that the high citation scores of certain documents indicate that they are more *discussed* in the community than documents with low citation profiles. Thus, they function as *points of reference* for the discussion, as the *compasses* of the documental space (Fujigaki, 1998). The highly cited references provide orientation in the field: authors use them to fix the context of their new contributions. At the same time, they function as *documental gate-keepers* of the field: *they are the documents that new authors entering the field must consider and discuss in order to be accepted as qualified contributors*. Therefore, the highly cited documents provide a *structure* to the documental space, which does not result to be, so to say, homogeneously flat but presents a scattered shape, punctuated by the highly cited documents. Such a structure is what the new authors, contributing to the field, find in front of them as the pre-existing state of the documental space. They perceive it as the 'state-of-the-art' of the discipline. The structure of the documental space has both a positive and a negative effect on the authors. The positive effect is that it provides a preliminary organization of the documental space, where certain documents are more important than others. The negative effect is that it constrains, at the same time, the *degrees of freedom* of the new authors because it limits the number of possible paths in the documental space.

The interpretation of highly cited documents in terms of points of references or compasses in the documental space allows us to interpret also the clusters of the maps (Figure 14 and Figure 15). The clusters are the *regions* in which the documental space is sub-divided. In the previous Section, we interpreted them as the sub-disciplinary literatures of Late Analytic Philosophy. Now, the highly cited documents are located in these regions, as components of the clusters. This is a crucial aspect: if we present the highly cited documents only as positions in a ranking (as was done, for instance, in Table 15), we lose important information about them, namely the fact that they belong to certain areas (and not others!) of the documental space. In other words, we lose their *place* in the general structure of the field. This cannot be ignored since the position (i.e., the documental region to which they belong) highlights the area in which the *influence of the document* is higher. Hence, highly cited documents can be compared to heavy masses projecting a gravitational field around them and the clusters, roughly, to the area of the attraction of the field. We will return on this point in the final remarks to this study. For the

moment, it is important to link explicitly our general interpretation of the highly cited documents and the clusters of the map with the theoretical frameworks we presented in Chapter 2.

The three frameworks were: the socio-psychological framework, the indicator-centered account, and the epistemological approach. As it should be clear, our interpretation follows the third framework. We interpreted highly cited documents as compasses in the documental space, following Fujigaki, and the clusters as the internal sub-divisions of the literature, which function as 'documental fields' that constrain the action of the authors.

As we saw in Chapter 2, the epistemological approach in citation theory is not (at least primarily) concerned with the relationship between citation score and research quality. On the other hand, both in the Mertonian theory of citation and in the indicator theories, the key meaning attributed to citation scores is exactly the one of being proxy of research quality. Can we say the same for Late Analytic Philosophy? Are the highly cited documents also the 'best' documents in terms of philosophical quality? Does the ranking in Table 15 reflect the relative philosophical merit of the ranked documents, so that Lewis' *On the Plurality of Worlds* (1st rank, 219 citations) should be considered two times better than Davidson's *Essays on Actions and Events* (10th rank, 102 citations)?

We will return to this point in the Conclusions of the dissertation, but for the moment we want to make the following remark. Note that the notion of philosophical quality is a *normative* notion: it serves to formulate *judgments of value* about a piece of research. Thus, it implies the reference to a set of standards, that specify the content of the notion of quality. For instance, a standard of philosophical quality may be the 'clarity' of the style (i.e., avoiding useless obscurity or technical jargon when unnecessary). Now, the main point is that any normative standard should be determined *independently* by the empirical state of affairs. This is implied by the Hume's Law, which prevents to derive an 'ought' from an 'is' (Spielthenner, 2017). Take the case of the standard of clarity: it should be grounded in philosophical reasons which are independent of the degree of clarity of actual philosophical texts. In the end, even if no empirical philosophical text would have been clear, this would not affect the desirability, and hence the normative value, of clarity. Standards are yardsticks that are used to judge the reality, and they should be therefore *independent* of the reality itself. Therefore, even if we can formulate standards of philosophical quality in terms of citations (e.g. by specifying citation thresholds or percentiles[84]), the *justification* of these standards could not lie in citations themselves because citations are

[84] For instance, a good paper should be cited over a certain citation threshold or it should belong to a certain citation percentile (i.e., being in the top x% of the cited papers).

only an *empirical* measure, a part of reality. They are not external normative yardstick *per se*, but an empirical property of cited documents. One needs a *theory* (such as the Mertonian theory) that links citations to normative standards in order to use them to evaluate research. Without such a theory, the interpretation of citation score in terms of research quality cannot be warranted. Therefore, even if it could be appealing to interpret highly cited documents as high-quality philosophical works, we should remain neutral and abstain from this interpretation, because we interpret our data within an epistemological, instead of normative, framework.

### *The structure of Late Analytic Philosophy*

The overall maps (Figure 14 and Figure 15) show the structure of the documental space for the overall dataset [1985-2014]. We discuss first the global structure of the map, secondly, we focus on the clusters, and thirdly, we comment on the ranking of authors, comparing it with a companion of analytic philosophy.

Globally considered, the map presents a clear structure, with three distinct clusters, one of which is a supercluster that can be decomposed into three sub-clusters (Figure 15). We interpret the fact that the documental space is clearly fragmented into sub-areas (the clusters) as evidence of the *sub-disciplinary structure* of Late Analytic Philosophy. The qualitative assessment made by contemporary analytic philosophers and historians of analytic philosophy about the fragmented nature of Late Analytic Philosophy (see Chapter 1) seems therefore to be confirmed.

At the same time, however, the literature clusters can be easily labeled with the traditional sub-disciplinary categories of philosophy, such as 'metaphysics', 'epistemology', 'ethics', etc. Therefore, at least in the case of the five journals we considered in the study, the structure of Late Analytic Philosophy is quite traditional, with no 'esoteric' areas showing up. This raises an important question: maybe these journals are representative only of the *mainstream* of Late Analytic Philosophy. In order to map the new areas of analytic debates we should add other journals to the dataset. We think that it is plausible. Nonetheless, the results are significant because they show clearly that the journals that are considered the most *prestigious* journals in the field publish material whose documental space is organized according to the *traditional* sub-divisions of philosophy. Then, even if the *content* of metaphysical, epistemological, and ethical theories discussed in the five journals may be very innovative and original, nonetheless, the sub-disciplinary *structure* of Late Analytic Philosophy remains very *traditional*.

The maps are interesting also for the things that they do not show. It seems that some areas of philosophy do not appear on the maps: in particular, there is no cluster that seems to correspond to logic and philosophy of science literature. This can be explained by the fact that these areas

have migrated in specialized journals. At the same time, the results point out that in the most prestigious journals some topics and some literatures, namely logic and philosophy of science, are not discussed (or, at least, are not cited). This is significant also for understanding what the mainstream of Late Analytic Philosophy is.

The last feature of the global structure of the maps that is worth commenting is the lack of a clear center of the documental space. There is a super-cluster comprising most of the documents, but there is no cluster that occupies the center of the plane.[85] The overall structure of the map is similar to a donut, with a ring of clusters arranged around an empty area. This can be interpreted as a lack of a *philosophia prima*, i.e., as the absence of a philosophical sub-area that is the foundation of all the others. The circular structure also suggests the lack of a *hierarchy* among the literature clusters.

Still, there are some documents that function as bridges between the clusters. The main ones are works by Davidson, Nozick, and Dretske. They can be considered as the glue that holds together the documental space. Furthermore, there are links also between the most cited documents: for instance, Kripke's *Naming and Necessity* is connected with Williamson's *Knowledge and Its Limits* by a link of 8 co-citations. The fragmentation of the documental space is therefore limited by the interconnections between the 'compasses'. Thus, we can conclude that, even if Late Analytic Philosophy is sub-divided into sub-areas, nonetheless it has kept some form of internal unity.

Turning now to the interpretation of the clusters of the map, the first interpretation regards the three main literatures in which the documental space of Late Analytic Philosophy is divided: the yellow cluster corresponds to Ethics and political philosophy, the light blue to Epistemology, and the red super-cluster comprehends Metaphysics, Philosophy of Language and Philosophy of mind (Figure 14). The structure of the super-cluster is interesting: we find the Philosophy of language literature in its central area, from which the Metaphysics and the Philosophy of mind depart in the opposite directions of the north-south axis of the super-cluster (see Figure 17, Figure 18, and Figure 21). The central position of Philosophy of language and its high citation density (Table 14) reflect the importance that the language has for the tradition of analytic philosophy. However, its small dimension (Table 14) suggests that this area has lost centrality in favor of the two new disciplines that have derived from it: Metaphysics and Philosophy of mind. This is coherent with the qualitative accounts of the history of Late Analytic Philosophy, and in particular with the resurgence of 'substantive topics' in the analytic debate. Analytic

[85] Remember that the VOSviewer visualization is a distance-based visualization, in which the relative distances of the nodes are significant. Notions such as center and periphery of the map are therefore meaningful, and not an artifact of the visualization.

philosophers do not deal anymore only with the conceptual framework (the language) but they also engage with the 'things themselves', advancing metaphysical theories and theories of the mind (Tripodi, 2015; Williamson, 2014). The maps show how these new areas keep a relationship with the original concern of analytic philosophy with the language.

This relationship seems instead weaker in the case of Epistemology, a literature cluster that presents several remarkable features (Figure 19 and Table 19). The first is its relative isolation from the super-cluster Metaphysics-Philosophy of language-Philosophy of mind, which shows that debates in Epistemology are relatively independent of developments in the other areas of Late Analytic Philosophy. The second is the age of the cluster: Epistemology is the youngest literature cluster. The third is the proportion of journal-based literature: Epistemology has the highest proportion of serial, instead of book, literature. It seems therefore that this area presents para-scientific features that are more pronounced than in other areas of Late Analytic Philosophy. Lastly, within the Epistemology literature, no document in philosophy of science appears. This confirms the results of the study by Kreuzman, which showed with author co-citation analysis that there is a gulf between the literatures of epistemology and philosophy of science (Kreuzman, 2001).

Lastly, the presence of the yellow cluster attests that ethical and political topics are not lacking from Late Analytic Philosophy (Figure 20). However, they form isolated and specialized literature which is connected with other areas of the documental space mainly by the work of Donald Davidson, that functions as a bridge between the super-cluster of Metaphysics-Philosophy of language-Philosophy of Mind and the Ethics and political philosophy literature.

The ranking of the most cited authors tells us other interesting features of Late Analytic Philosophy, especially in terms of what can be called the 'canon' of Late Analytic Philosophy (see Table 16 and Figure 16).

Before commenting on the results, it is interesting to check the measure in which the ranking is consistent with the image of analytic philosophy that is based on expert judgment. Table 40 shows the 41 authors that appear in the *Companion to Analytic Philosophy* edited by Martinich and Sosa in 2001. Even if this companion is not very recent, it is useful because each of the chapters is devoted to one leading figure of analytic philosophy, presenting hence the canon of the field (Martinich & Sosa, 2001). The percentage of matching between the ranking and the companion is quite good: 43.9% of the authors cited in the companion also appear in the Top 100 authors. Consistently with the map, none of the philosophers of science appearing in the companion (namely Popper, Ayer, Hempel, Kuhn) show up in the ranking. Neither the logicians (Tarski, Church, Gödel) are present. However, all the authors whose production fall within the

time span considered in the analysis [1985-2014] are present both in the ranking and in the companion. We think that this corroborates the reliability of citation counting as a method to determine the compasses of the documental space.

| # | Author | Born-Died | Rank in the Top 100 |
|---|---|---|---|
| **1** | Frege | 1848-1925 | 7 |
| **2** | Russell | 19872-1970 | 9 |
| **3** | Moore | 1973-1958 | 36 |
| **4** | Broad | 1887-1971 | - |
| **5** | Wittgenstein | 1889-1951 | 58 |
| **6** | Carnap | 1981-1970 | 42 |
| **7** | Popper | 1982-1994 | - |
| **8** | Ryle | 1900-1976 | - |
| **9** | Tarski | 1902-1983 | (108) |
| **10** | Church | 1903-1995 | - |
| **11** | Goedel | 1906-1978 | - |
| **12** | Ramsey | 1903-1930 | - |
| **13** | Hempel | 1905-1997 | - |
| **14** | Goodman | 1906-1998 | 82 |
| **15** | Hart | 1907-1992 | - |
| **16** | Stevenson | 1908-1979 | - |
| **17** | Quine | 1908-2000 | 2 |
| **18** | Ayer | 1910-1989 | (111) |
| **19** | Austin | 1911-1960 | 87 |
| **20** | Malcolm | 1911-1990 | - |
| **21** | Sellars | 1912-1989 | 56 |
| **22** | Grice | 1913-1988 | 95 |
| **23** | Von Wright | 1916-2003 | - |
| **24** | Chisholm | 1919-1999 | 19 |
| **25** | Davidson | 1917-2003 | 3 |
| **26** | Anscombe | 1919-2001 | 72 |
| **27** | Hare | 1919-2002 | 79 |
| **28** | Strawson | 1919-2006 | 78 |
| **29** | Foot | 1920-2010 | - |
| **30** | Marcus | 1921-2012 | - |
| **31** | Rawls | 1921-2002 | 34 |
| **32** | Kuhn | 1922-1996 | - |
| **33** | Dummett | 1925-2011 | 11 |
| **34** | Putnam | 1926-2016 | 4 |
| **35** | Armstrong | 1926-2014 | 27 |
| **36** | Chomsky | 1928- | (101) |
| **37** | Rorty | 1931-2007 | (107) |
| **38** | Searle | 1932- | 29 |
| **39** | Fodor | 1935-2017 | 6 |

| | | | |
|---|---|---|---|
| **40** | Kripke | 1940- | 10 |
| **41** | Lewis | 1941-2001 | 1 |

*Table 40. Representative analytic philosophers according to Martinich and Sosa (2001) and their rank in the Top 100 most-cited authors*

The ranking in Table 16 is significant also for the authors that it does *not* contain. In particular, it is evident that no manifestly Continental author appears in the Top 100 most cited authors. Richard Rorty, the only figure that can be approached to Continental philosophy (even though he had an analytic background), is ranked out of the Top 100 at position 107 (114 citations). These results show that the Analytic-Continental divide is a reality, at the documental level: Continental authors are not cited by authors publishing in the prestigious journals of analytic philosophy. This means that the project of going beyond the divide, reunifying the split between the two traditions, has to face the *inertia* of the documental level of Late Analytic Philosophy, which does not feature any Continental author amongst its compasses.

Another striking feature of the ranking of the author is the presence of women, which is outstandingly *low*: there are only 2 women amongst the 100 most cited analytic philosophers! In fact, it seems very hard to find a reason for this disproportion, other than a negative bias against women. However, more research is needed in order to determine at which level the bias operates: at the level of the citing behavior? Do analytic philosophers cite more likely men instead of women? It seems more plausible, however, that the bias operates at previous stages of the academic career, preventing women from acquiring positions (such as tenure-track) that would allow them publishing in prestigious journals and hence collecting high citations scores. More research is needed to shed light on this 'dark' side of the canon of Late Analytic Philosophy.

The results also present a clear disproportion in terms of the nationality of the authors. Almost all the authors in the Top 100 are affiliated to universities based in Anglophone countries: mainly in the United States, United Kingdom, and Australia. None of them is based in Continental Europe. Once again, it seems unlikely that the Anglophone countries are not favored by some sort of positive bias, given that fact that there are analytic philosophers also in the Continent (e.g. Diego Marconi in Italy and Pascal Engel in France). The data clearly show that Late Analytic Philosophy literature is anglophone-centric, almost ignoring anything that is not written in English. This result is coherent with the findings of Knievel and Kellsey, that found that in the 2002 volume of the *Journal of Philosophy,* 99.7% of all citations referred to materials in English (Knievel & Kellsey, 2005). These results urge some cautions before claiming that Late Analytic Philosophy is a truly 'international enterprise'. In fact, Late Analytic Philosophy literature is no more self-referential than, say, French philosophy: however, it happens to be based in countries that are dominant thanks to their economic power. These results also shed new light on the data we presented in the previous study about the most cited

institutions and countries (see Figure 11,Table 8, and Table 9 above): not only Late Analytic Philosophy is produced mainly in US and UK, but it *also cites* only US and UK authors.

Lastly, the ranking is also very poor in terms of diversity: no Afro-American author appears. In sum, the picture of Late Analytic Philosophy literature which emerges from the data is the one of a *white, male and Anglophone field, almost impermeable to national and gender diversity*.

### *The dynamics of Late Analytic Philosophy*

The first result of the longitudinal analysis is the increasing trend in the number of cited references in the three timespans (Figure 23). This trend was not matched by an increase in the number of publications (Figure 22), thus we can conclude that the average number of cited references per paper has increased: this means that analytic philosophers cite now, on average, more literature than in the past. This result is coherent with the data we presented in the previous study (see Figure 8 above). Such a trend may be interpreted at first glance as an expansion of the documental space of Late Analytic Philosophy. Note that also the dimensions of the clusters have generally increased in time (with the cluster Epistemology that was born in the second decade, see Figure 24): this means that the general expansion of the documental space was matched by an expansion of the sub-areas (cluster literatures) of the space. However, in order to provide a more insightful interpretation of these trends, we have to take into consideration also the kind of citations (if they are positive, negative, etc.). We will therefore comment on these data in the next study, devoted to the epistemological function of citations over time.

The most interesting result of the longitudinal analysis is the fact that the three maps present a *clear pattern*: the quite sparse and unstructured network of the first decade (Figure 25) becomes, in the last decade (Figure 27), an organized network with three definite sub-areas. This means that the documental space acquires a determined structure progressively (see Figure 31). In particular, the clusters become more and more compact, highlighting that the sub-disciplinary literatures become more and more delineated.[86]

We interpret this pattern as the *empirical evidence of the process of specialization* that was perceived both by analytic philosophers and historians of analytic philosophy as typical of the

[86] Note that our assessment of the pattern in the three networks was based on a qualitative inspection of the changing morphology of the networks. One could object that the network theory offers quantitative measures of the properties of the networks (such as the betweenness and other centrality measures) that would be more robust than qualitative judgement. We did not use these measures for the following reasons: in the three networks we considered changed not only the links between the nodes, but also the nodes themselves. Some nodes appeared only in the first network and disappeared in the following, or vice versa. Therefore, the meaning of the values of centrality that are used in network theory would have been potentially misleading because, at the current state of the art in network theory, we do not have indices that can compare networks whose nodes partially change over time.

Late Analytic Philosophy. The hypothesis we made at the beginning of this study is thus confirmed by the data: Late Analytic Philosophy has undergone a process of increasing specialization that has led to the delineation of specialized, and partly non-communicating, sub-disciplines.

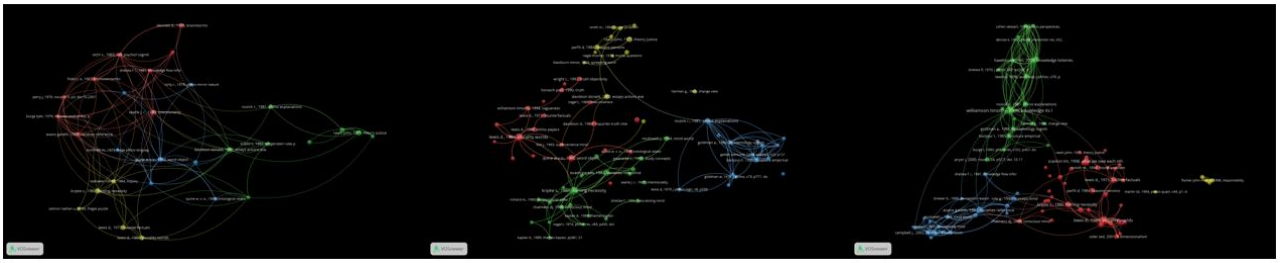


*Figure 31. The clusterization pattern in the three timespans*

It is interesting that this process of specialization also saw the birth of a new sub-specialty ("Epistemology", see Figure 26). In fact, the maps show the sequence of the beginning and consolidation of the literature of this area. Furthermore, they allow us to date the birth of "Epistemology" in the decade [1995-2004]. This result has an important heuristic power since it provides a chronological orientation to the study of the recent history of this sub-area of Late Analytic Philosophy. The longitudinal analysis allows dating the origin of the field and observing, empirically, the genesis of a sub-discipline.

Another result which can generate further research is the disappearance of the cluster "Ethics and political philosophy" into the cluster "Metaphysics" in the last decade (at resolution 0.8). It would be interesting to investigate if this dynamic of the documental space has a counterpart in the intellectual level.

Lastly, the analysis of the trajectories of the nodes in the three networks allows investigating how the same document is used in different time spans. For example, it is interesting that Quine's *Word and Object*, even if it is always located in the same cluster ("Metaphysics"), it changes its position in the three maps: in the first two decades it is close to the central area of the map, whereas in the last one it migrates in the south-eastern area of the map. Lewis' *On the Plurality of Worlds*, on the other hand, even if it is always in the same cluster of Quine, it is always located in the periphery of the networks. Thus, the trajectories of the compasses in the documental space provides further information that enriches the rankings in terms of citations. The meaning of the ranking is enriched by topological consideration, so that for a correct interpretation of them, they should always be used in couple with co-citation networks. The assessment of the trajectory of the documents should include all the different dimensions: position in the rank, cluster, position and trajectory in the map.

## Sum up and concluding remarks

In this study, the scientometric technique of co-citation analysis was used to map the documental space of Late Analytic Philosophy in the timespan [1985-2014]. This technique allowed to investigate both the structure and the dynamics of the documental space. The main result of the aggregate analysis is that the documental space of Late Analytic Philosophy is clearly sub-divided into clusters, which can be easily interpreted as corresponding to traditional sub-disciplines of (analytic) philosophy. Late Analytic Philosophy is indeed fragmented; however, it retains a form of unity to the extent that there are some inter-cluster connections. The main result of the longitudinal analysis is the scientometric evidence that a dynamic of specialization is occurring in Late Analytic Philosophy. In particular, the specialization process is most evident in the last decade.

Thus, co-citation analysis allowed testing at a quantitative level the qualitative claims made by historians of analytic philosophy and analytic philosophers. In this case, it confirmed these claims. At the same time, it allowed defining more precisely the notions of fragmentation and specialization, by operationalizing them at the documental level.

In the discussion of the results, we also advanced a general interpretation of the meaning of maps and rankings. We interpreted the structure revealed by the map as a *set of constraints* that limits the possible actions of the new members entering the field. In particular, we compared the clusters and the highly-cited references, respectively, to gravitational fields and gravitational masses, which influence the behavior of the actors contributing to the documental space. The pattern revealed by the longitudinal analysis can also be interpreted by reference to a physical notion: the notion of *inertia*. An individual actor that wants to invert the trend (for example, address general philosophical themes instead of specialized and delimited philosophical puzzles) must deal with the inertia of the whole documental level, that pushes all the actors towards specialization.

The main hypothesis we advance is that there is a *feedback mechanism between the structure of the documental level and the individuals that want to contribute to it*. We already advanced this idea in the previous study, when we interpreted the increasing trend in the average number of citations per paper as a *shaping factor* of the citing behavior of analytic philosophers. We want now to articulate better this hypothesis, by returning to the diagram we presented in Chapter 2. Figure 32 shows an updated version of the diagram: the feedback of the documental level on the level of the individual actors is visualized by the light blue thick arrows backpropagating from the documental level.

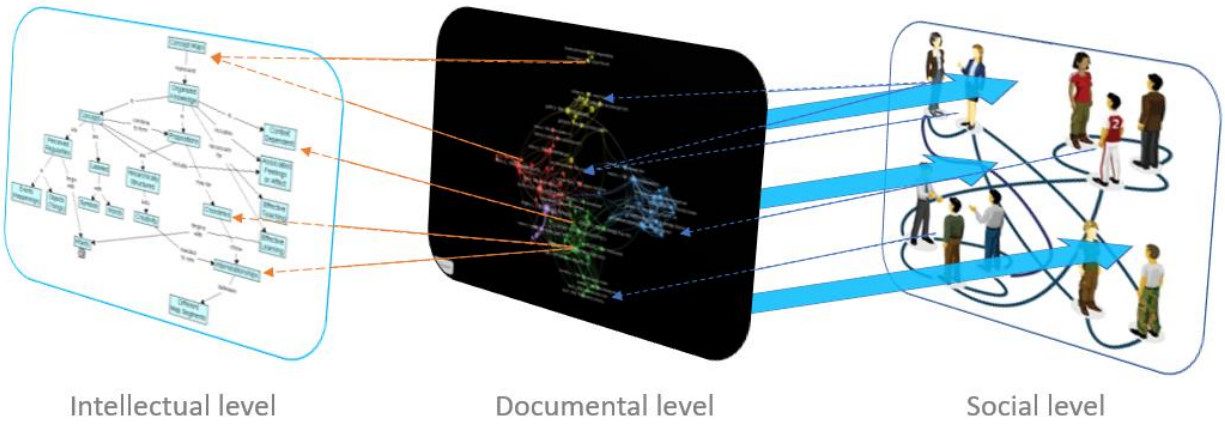



*Figure 32. The feedback mechanism between the documental and the social level*

The arrows represent the effects that the properties of the documental space have on the individuals producing the documental space itself. The fundamental properties of the documental space are its structure and its dynamics (i.e., the evolution in time of the structure). Clearly, these properties do not necessitate the actions of the individuals deterministically. However, they *organize* the space of their possible actions, determining the *costs and benefits* of different patterns of actions. Traditionally, the intellectual actions of the individuals contributing to a scientific or scholarly field are explained as reactions to the *intellectual contents* of the discipline. For instance, the adoption of a certain theory X by the author Y, is explained by the presence, in the intellectual space, of the theoretical options *i, j*, and *k*.[87] Our hypothesis is that the actions of the actor should be explained not only taking into account the configuration of the intellectual level, but also the disposition of the documental space. In particular, the way in which the individual actors perceive the structure of the field, as well as the number of connections they establish with the existing literature, are shaped by the documental space. In the next study, we will investigate more deeply this hypothesis by focusing on the relationships between the normalization of analytic philosophy and the epistemological quality of citations.[88]

[87] See the discussion in the first section of Chapter 4.
[88] I provided a first version of the feedback hypothesis in (Petrovich, 2018b).

# Third study. The normalization of Late Analytic Philosophy

## Introduction

In Chapter 1, we saw that both historians of analytic philosophy and analytic philosophers themselves suggest that Late Analytic Philosophy can be compared, to a certain extent, to what Kuhn calls 'normal science'. The hypothesis is that analytic philosophy would have undergone a process of *normalization* during the second half of the Twentieth century, i.e., it would have approached a normal-scientific style of intellectual production gradually. In Chapter 2, we presented the epistemological approach to citations and we introduced the idea that citation context analysis, when used in the light of the epistemological approach, could be used to detect the process of normalization of Late Analytic Philosophy *empirically*. The aim of this third study is to develop that idea, applying citation context analysis to Late Analytic Philosophy.

However, before presenting the methodology and the results, we have to clarify in more detail the relationships between normal science, accumulation of knowledge, and citations.

### *Normal science and knowledge growth*

As it is well known, Kuhn defined the normal science as the «research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice» (Kuhn, 1996, p. 10). After few lines, Kuhn calls such achievements «paradigms», and ties the notion of paradigm to that of normal science closely. Kuhn argues that, during normal-scientific periods, the activity of scientists consists in an «attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies» and that «normal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies» (24).

In Kuhn's theory, normal science is characterized by another important feature, which is pointed out in the last chapter of the *Structure*: «it is only during periods of normal science that progress seems both obvious and assured» (163). Thus, a key feature of normal science is *progress*: only the scientific knowledge produced during normal-scientific periods is cumulative, only during normal science scientific knowledge accumulates. On the other hand, during pre-paradigmatic and revolutionary science, this does not happen: in these periods, the scientific community is fragmented in competing schools and scientific knowledge is unstable because continuously contested – no clear progress occurs. In sociological terms, we can say that during normal science the *consensus* is high within the scientific community, whereas in pre-paradigmatic and revolutionary science, it is low (Cole, 1992). The progressive nature of normal science, according to Kuhn, is due to the adoption of a paradigm:

> The reception of a common paradigm has freed the community from the need constantly to re-examine its first principles, the members of that community can concentrate exclusively upon the subtlest and most esoteric of the phenomena that concern it. Inevitably, that does increase both the effectiveness and the efficiency with which the group as a whole solves new problems. (163-164)

It is essential to underline the fact that Kuhn distinguishes clearly between the notion of progress during normal science and the notion of progress towards the truth. The former is a property of the way in which knowledge is produced and accumulated in normal science, the latter implies the idea that science is directed towards a goal (the truth). Kuhn refuses to equate the two notions in a famous passage of the final chapter of the *Structure*, where he proposes the evolutionary conception of science*:*

> Does it really help to imagine that there is some one full, objective, true account of nature and that the proper measure of scientific achievement is the extent to which it brings us closer to that ultimate goal? If we can learn to substitute evolution-from-what-we-know for evolution-toward-what-we-wish-to-know, a number of vexing problems may vanish in the process. (171)

Moreover, in the Postscript to the second edition, he argues that «the notion of a match between the ontology of a theory and its "real" counterpart in nature now seems to me illusive in principle» (206) and that in the succession of physical theories from Aristotle to Einstein «no coherent direction of ontological development» could be seen. Hence, Kuhn concludes that what we call scientific progress is in fact the *peculiar mode* in which knowledge is accumulated *during normal-scientific periods*. Such mode takes the form of an accumulation in which new pieces of knowledge are added cumulatively to the previous stock of knowledge, starting from the paradigm. Thus, in normal science, scientific knowledge *grows,* and this growth should be carefully distinguished from a teleological movement toward the 'truth'.[89] On the contrary, during pre-paradigmatic science, each writer «being able to take no common body of belief for granted, […] [feel] forced to build his field anew from its foundations» (13).

[89] As Hacking has showed, the same disentanglement of the phenomenon of the growth of knowledge from the notion of approach to the truth is at the core of Lakatos' philosophy of science: «The one fixed point in Lakatos' endeavor is the simple fact that knowledge does grow. Upon this he tries to build his philosophy without any representationalism, starting from the fact that one can *see* that knowledge grows *whatever* we think about 'truth' or 'reality'» (Hacking, 1979, p. 384). In Popper too, we can find some echoes of this idea, notwithstanding the Popperian theory of verisimilitude which seems to be a full-fledged version of a representationalist conception of knowledge. In fact, when Popper presents his theory of the objective knowledge, in which he argues that knowledge constitutes a Third World, different from both the physical and the psychical reality, he retains somehow the idea of an independent existence of knowledge in itself (Popper, 1979, Chapter 3).

Now, if only in normal science knowledge accumulates, it follows that an indicator of the transition of a field to a normal-scientific phase is not only the adoption of a paradigm, but also the *beginning of a process of knowledge accumulation*. We saw in the previous study that is difficult to talk of paradigms in Late Analytic Philosophy, at least in the same sense of the term used by Kuhn. We saw that is better to conceive highly cited references as the *compasses* in the documental space. The adoption of a paradigm cannot therefore be easily used as a marker of the normalization of Late Analytic Philosophy. However, we think that the presence of knowledge accumulation could fulfill this function. Furthermore, we think that knowledge accumulation can be tracked by citation analysis.

### *The accumulation of knowledge at the documental level: the epistemological functions of citations*

The documental level of a scientific discipline is characterized too by phenomena of growth. In fact, the documental level accumulates in a very material and tangible way: by the piling up of documents. In the serial literature this is particularly evident: journal by journal, issue by issue, article by article, the literature grows. The stock of available documents grows. In Chapter 1 and in the first study of this Chapter, we saw how the documental level of analytic philosophy had undergone a considerable expansion after the Second World War: new journals were launched, enlarging, year after year, the documental space of analytic philosophy. However, the mere growth of the documental space is not enough for a discipline to enter the normal-scientific phase. As we saw above, to be in normal science, there must also be a certain degree of consensus within the community and a common *knowledge base* (constituted by the paradigms, in the case of the sciences) from which the members of the community articulate their new contributions. In particular, the new contributions that the members of the community add to the documental space must be *connected* in a distinctive way with the existing literature. To use the Quine's metaphor, we can say that during normal science, the *fabric of the discipline* must be woven in a specific way, namely, documents must be related in a *positive* way, building one on the other, so to say. They cannot be only criticisms one of the other, in an endless dispute. This latter scenario is what we will expect in pre-paradigmatic and revolutionary phases, but not in the normal science: as Kuhn says, in pre-paradigmatic science «the dialogue of the resulting books [is] often directed as much to the members of other schools as it [is] to nature» (Kuhn, 1996, p. 13).

Now it should be clear how *citations* can be used to study the transition to normal science. We saw in Chapter 2 how the epistemological approach to citations highlights the function of citations in the epistemological system of science. They can be considered as the *stitching of the fabric of science*. Small argued that the peculiar inter-connectivity of the scientific citation network has to do with what he calls the 'consilience' of scientific knowledge (Small, 1998).

Therefore, in order to understand whether a field has entered the normal-scientific phase, we should focus on the citations between the documents, investigating the *epistemological relationships* between the citing and the cited documents. This means that we should characterize epistemologically the links between the documents, understanding if they indicate *constructive* or *destructive* epistemological operations. If most of the links are of the first kind, it is plausible to say that a discipline is in a normal-scientific phase. If most of the links are instead negative, probably the discipline is still in a pre-paradigmatic or revolutionary phase. In sum, our idea is that the *normal-scientific phase of a field can be recognized from the peculiar way in which its citation network is structured*. Thus, the normalization process can be considered as the *increase in the positive citations over the negative ones*.

Now, the epistemological quality of the citations can be investigated by studying the context in which the citation appears, namely by *citation context analysis*.

### *Epistemological citation context analysis*

We introduced the methodology of citation context analysis In Chapter 2, when we presented the sociological and psychological theories of citation. We saw that this methodology was used, especially in the Seventies, to test the conflicting theories about the citation behavior of scientists, i.e., the Mertonian normative theory versus the social-constructivist theory empirically. We also saw that it suffers from some methodological weaknesses, in so far as it is very difficult to reconstruct the motivations of the authors for citing from the textual evidence. Indeed, we agree that citation context analysis may suffer from such shortcomings, *to the extent that it is used for sociological purposes*. Citation context analysis may therefore be insufficient to study the social level of a discipline, namely the behavior of the actors. However, if we take the epistemological approach and we focus on the *documental level* of the discipline, the issues are considerably downsized. *Indeed, our aim is not to guess the intentions behind the citer, but to highlight the epistemological relationship between two documents*. The difference is crucial. Our focus is on the pattern of accumulation of the documental space of Late Analytic Philosophy, not on the citing behavior of late analytic philosophers. Thus, our use of citation context analysis must be inscribed in the epistemological, instead of socio-psychological approach, to the citation.

However, even if the focus of previous studies of citation context analysis in the sciences were sociologically oriented, they revealed some interesting epistemological features of citations in the sciences. In particular, the main result was that the negative citations, i.e., citations used to criticize or undermine the cited work explicitly, are quite *uncommon* in the sciences. Already in 1975, Chubin and Moitra found that citations made by physicists were most frequently affirmative citations, whereas negational citations represented only a small fraction (Chubin & Moitra, 1975). Garfield noted that scientists are reluctant to «go to the trouble of refuting inferior

work» (Garfield, 1979, p. 361) and observed that the studies which are judged negatively by the community tend to be just *ignored*, instead of being cited critically. Further studies confirmed this result. The most recent ones were conducted by Catalini et al. and Bertin et al. with natural language processing techniques. Catalini et al. investigated more than 750 000 citations in the *Journal of Immunology* and discovered that only 2.4% of the total were negative citations[90], whereas Bertin et al. showed that negations around the citations in 75 000 research articles published in seven PLOS journals are «infrequent». (Bertin, Atanassova, Sugimoto, & Lariviere, 2016; Catalini, Lacetera, & Oettl, 2015). These results confirm the idea that in normal science the fabric of knowledge is woven by papers which mutually *support* each other, i.e., the citations constitute epistemologically *constructive* operations.

A precious source on the research on the types of citations is the review of the literature on citation context analysis, authored by Bornmann and Daniel (Bornmann & Daniel, 2008). They analyzed 30 studies on citation behavior and attempted to summarize the most important types of citations within a unified citation typology, that we report in Table 41 (Bornmann & Daniel, 2008, pp. 66–67).

| Type | Bornmann and Daniel definition | Percentage in the citing behavior studies |
|---|---|---|
| **Affirmational** | Citing work confirms cited work; citing work is supported by cited work; citing work depends on cited work; citing work agrees with ideas or findings of cited work; citing work is strongly influenced by cited work. | 10% to 90% |
| **Assumptive** | Citing work refers to assumed knowledge that is general/specific background; citing work refers to assumed knowledge in a historical account; citing work acknowledges cited work pioneers | 5% to 50% |
| **Conceptual** | Use of definitions, concepts, or theories of cited work | 1% to 50% |
| **Contrastive** | Citing work contrasts between the current work and cited work; citing work contrasts other works with each other; citing work is an alternative to cited work | 5% to 40% |
| **Methodological** | Use of materials, equipment, practical techniques, or tools of cited work; use of analysis methods, procedures, and design of cited work | 5% to 45% |
| **Negational** | Citing work disputes some aspects of cited work; citing work corrects/questions cited work; citing work negatively evaluates cited work | 1% to 15% |
| **Perfunctory** | Citing work makes a perfunctory reference to cited work; cited work is cited without additional comment; citing work makes a redundant reference | 10% to 50% |

[90] They defined negative citations as citation which «question or limit the scope and impact of a contribution, a scholar, or an entire line of research» (Catalini, Lacetera, & Oettl, 2015, p. 13823)

| | | |
|---|---|---|
| | to cited work; cited work is not apparently strictly relevant to the author's immediate concerns | |
| **Persuasive** | Cited work is cited in a "ceremonial fashion"; the cited work is authored by a recognized authority in the field | 5% to 40% |

*Table 41. Types of citations and their percentages, as founded in citing behavior studies. Source: Bornmann & Daniel (2008).*

As we can see from the data reported in Table 41, the percentage of negative citations is low, whereas positive (affirmational) citations are the most common type. In the table, we can find three other categories of citations which can be interpreted as epistemologically constructive operations: the assumptive, the conceptual, and the methodological. These are interesting categories, because their function is not to support a specific claim of the citing article, but to provide the *knowledge background* for the new contribution. In this way, they mark the existence of a background, a shared *state-of-the-art* of the discipline. Note that only in normal sciences there can be a definite state-of-the-art since the production of knowledge is organized, and the epistemic labor is sub-divided into precise areas of research. Compared to the erratic trend of the research in pre-paradigmatic and revolutionary science, in normal science, research is structured in sub-areas with relatively defined borders. The use of the assumptive, conceptual and methodological citations serves to place the new contribution into such shared epistemic landscape. In this regard, these citations can be compared to what Hargens calls «Orienting Reference List» (ORL) (Hargens, 2000).

### *The classificatory scheme*

The classificatory scheme we developed to study the epistemological functions of citations in Late Analytic Philosophy integrates all these insights. Clearly, it had to be adapted to the analytic philosophy research practices. For instance, it would have had not much sense to include a 'methodological' category, since laboratory activity does not take place in analytic philosophy.[91]

Table 42 presents the classificatory scheme we used. It comprehends six categories of citations, plus a seventh "Unknown" category designed to collect citations that did not fall in any of the categories.

| # | Type | Function |
|---|---|---|
| 1 | State of the art citation | The reference is used to provide an overview of the state of the art of the field. It is «neutral»: the citing author does not use it either to support her argument or to criticize the cited document. It includes citations to standard mental experiments or examples. |

[91] Except for the so-called 'experimental philosophy'.

| | | |
|---|---|---|
| 2 | Supporting citation | The reference supports the argument of the citing author, either because it brings additional arguments to the stated claims or because it strengthens the author's arguments since the authors agree on specific topics. |
| 3 | Supplementary/perfunctory citation | The reference to the cited document is accidental. The cited work it is not essential to follow or support the citing author's argument. |
| 4 | Acknowledgment citation | The citing author pays a form of tribute or acknowledgment towards the cited document. |
| 5 | Critical citation | The cited document is criticized, the citing author disagrees with the cited document. |
| 6 | Documental citation | The cited document is used to support the historical reconstruction of the argument of the cited author provided by the citing author. |
| 7 | Unknown | The citation does not fit into any of the previous categories. |

*Table 42. The classificatory scheme used to classify citations*

The category of "State of the art citations" corresponds to Bornmann and Daniel's assumptive and conceptual types. It captures citations that are employed to provide an overview of the field to which the citing paper intends to contribute. From an epistemological point of view, they point out the presence of a shared body of literature. The authors use such body as a *knowledge base* to articulate their own contribution around. In a mature field, the lack of such citations can result in the rejection of the paper, because the author did not sufficiently review the state of the art. The authors' attitude towards this kind of citations is neutral: they neither endorse nor criticize them. The authors rather use the "State of the art citation" to locate their contribution in a specific stream of philosophical debates. The presence of these citations in analytic philosophy is particularly interesting since they demonstrate that the analytic philosophy research itself is divided into specific sub-contexts. The following are examples of State of the art citations:

> "Almost all the extensive recent literature seeking alternatives to the orthodox approach – I would mention especially the writings of Bas Van Fraassen and Robert L. Martin – agrees on a single basic idea…" [Kripke 1975 : 698]
>
> "For the classic discussion of these problems, see [12]" [Perry 1979 : 21]
>
> "A survey of the recent philosophical literature on the nature of functional analysis and explanation, beginning with the classic essays of Hempel in 1959 and Nagel in 1961, reveals that… [note]" [Cummins 1975 : 741]
>
> "Some philosophers have claimed that people have incompatibilist intuitions (e.g. Kane 1999, 218; Strawson 1986, 30; Vargas 2006); others have challenged this claim and

> suggested that people's intuitions actually fit with compatibilism (Nahmias et al. 2015)" [Nichols and Knobe 2007 : 663]

The "Supporting citations" category gathers the citations that support the argument proposed in the citing paper, either by supplying arguments for certain claims or by reinforcing the author's argument by showing that the cited reference agrees with it. From an epistemological point of view, they underline a *constructive* operation: knowledge is accumulated via a positive relation of agreement between the citing and the cited document. Examples of Supporting citations are the following:

> "I follow Arthur Smullyan's treatment of scope ambiguity in modal sentences, given in 'Modality and Description', *Journal of Symbolic Logic*, XIII, 1 (March 1948): 31-37, as qualified by Wilson's objection, in *The Concept of Language*…" [Lewis 1968 : 120]

> "The influence of H. P. Grice's 'Meaning', *The Philosophical Review*, LXVI (1957): 377-388 will be evident here" [Davidson 1992 : 311]

The third category, "Supplementary/perfunctory citations", refers to citations that seem not to be essential to follow the author's main argument.[92] This is an example:

> "For my former view, see the treatment of preemption in 'Postscript E to 'Causation", in my *Philosophical Papers*, Volume II (New York: Oxford, 1986), pp. 193-212." [Lewis 2000 : 1983, in footnote]

The fourth category, "Acknowledgement citations", is meant to capture citations that are explicitly used to pay homage to or acknowledge the cited author. [93] For instance:

> "In thinking about the problem of essential indexical, I have been greatly helped by the writings of Hector-Neri Castaneda on indexicality and related topics. Castaneda focused attention on these problems, and made many of the points made here, in [1], [2] and [3]" [Perry 1979 : 21]

It may be argued that these two categories are more sociological than epistemological, and thus not fitting the epistemological purpose of this study. However, it is important to emphasize that, even if these citations have no clear epistemological functions, they do provide *negative* or *indirect* epistemological information. If Supplementary/perfunctory citations were the most common type, it would mean that analytic philosophy accumulation process is only loosely

[92] The further question about the reasons an author may have to cite supplementary material (e.g. hidden social-networking purposes) is not pursued in this study.

[93] In this study, only explicit citations were considered, i.e. citations pointing to specific documents. Proto-citations such as "I owe this point to Prof. X", commonly used in acknowledgements section of recent papers, are not counted. For an interesting study of acknowledgements in philosophy, see (Cronin, Shaw, & La Barre, 2003).

connected with epistemological factors. Alternatively, if Acknowledgement citations resulted in being the most common type (perhaps a more plausible scenario), it could be argued that the documental level of analytic philosophy is woven more by social rather than epistemic relations. Both scenarios would offer important epistemological, *although negative*, insights into the accumulation process of analytic philosophy: they would support the idea that analytic philosophy accumulates in a "non-epistemic" manner. Plausibly, this would also mean that no transition to normal science has happened.

In the "Critical citations" category, the cited reference is criticized by the author, who marks her disagreement with the cited reference. As we saw above, this type of citation is quite uncommon in the sciences. However, in analytic philosophy it is reasonable to expect a significant number of these citations because of the high value of dialectics in philosophy in general(Cullars, 1998). From an epistemological point of view, a critical citation is a *destructive* operation: its function is to undermine a previous piece of knowledge. From a sociological point of view, it flags lack of consensus on a topic. Here we provide some examples:

> "The difficulty one gets into by a mechanical application of the theory of games to moral philosophy can be brought out by considering among several possible examples, R. B. Braithwaite's study, *Theory of Games as a Tool for the Moral Philosopher* (Cambridge 1955) […] Braithwaite's use of the theory of games, insofar as it is intended to analyze the concept of fairness, is, I think, mistaken" [Rawls 1958 : 176-177]

> "W. V. Quine, for one, explicitly denies that anything needs to be done other than provide a progression to serve as the numbers. In *Word and Object* (London, 1960, pp. 262-263, he states […] I would disagree" [Benacerraf 1965 : 51]

Lastly, the category "Documental citation" covers citations to documents used as historical sources. The cited text is mentioned as a support for the historical reconstruction provided in the citing paper. This kind of citation is very common in humanities, where there is a clear distinction between citations pointing to the textual material (e.g. historical documents in history) and citations pointing to other scholars (Frost, 1979; Hellqvist, 2009). In a theoretical discipline like analytic philosophy, however, the number of historical citations is expected to be quite low. Here an example of Documental citation:

> "While the assimilation is implicit in Bentham's and Sidgwick's moral theory, explicit statements of is as applied to justice are relatively rare. One clear instance in *The Principles of Morals and Legislation* occurs in ch. X, footnote 2 to section XL: […]" [Rawls 1958 : 184]

### *The research question*

To sum up, the research aim of this study is to assess whether analytic philosophy has approached a Kuhnian normal science in its late period (i.d., whether it has 'normalized'). We want to understand whether Late Analytic Philosophy can be compared to a normal science as a historian of analytic philosophy and analytic philosophers claim. This research aim will be pursued by focusing on the *epistemological function* of the links between documents in analytic philosophy, i.e., by classifying the citations using a classificatory scheme.

If analytic philosophy has reached a normal-scientific phase, we will expect, respectively, a high rate of Supporting citations (the citations that are directly connected with the progress of knowledge), a high rate of State of the art citations (indicating the presence of a shared knowledge base), and a low rate of Critical citations (meaning that knowledge is not contested). Furthermore, we will expect a low rate of non-epistemic citations, namely the Supplementary/perfunctory and Acknowledgment citations.

Since we are interested in the *normalization* of analytic philosophy, which is a temporal process, in this study we will not consider only Late Analytic Philosophy, but we will extend the scope to include also Middle Analytic Philosophy. Thus, the timespan of the study will begin after the Second World War. We will investigate the frequency over time of the different types of citations, in order to detect their temporal trends. In particular, we are interested in understanding whether the passage from Middle to Late Analytic Philosophy coincides with the transition to the normal-scientific phase.

In the next section, we will present the corpus on which citation context analysis was performed and then the steps of the classification process.[94]

## Methodology

### *The time window and the sample*

As said above, a wide time-window was chosen for this study: from 1950 to 2009. Covering the last 60 years after the Second World War, this time-window allowed to detect the changes in the epistemological patterns of the documental space of analytic philosophy.

The 60-year time-window was further divided into six 10-year timespans. For each of the six timespans, the list of the most cited papers, published in the selected journals in that decade, was obtained from Web of Science.[95] Then, for each of the six timespans, the 10 most cited papers were chosen, and their full-texts downloaded. The result was a sample of 60 papers, divided into

[94] A first version of this study was published in *Scientometrics* (Petrovich, 2018a). It was commented by Wray in (Wray, 2018). I replied to Wray's comment in (Petrovich, 2018c).
[95] Search date: 29.08.2017

six groups of 10 papers each.[96] The metadata of the corpus is reported in Table 43. Taken together, the total number of cited references in the sample amounted to 1 293 references.

It is important to stress that this is the first study that considers the *temporal dimension* in the analysis of the citation context. In fact, previous studies (Bertin et al., 2016; Catalini et al., 2015; Chubin & Moitra, 1975; Frost, 1979; Lin, 2018; Moravcsik & Murugesan, 1975; Spiegel-Rosing, 1977; Sula & Miller, 2014; Teufel, Siddharthan, & Tidhar, 2006) focused on disciplines whose citation practices were assumed to be rather stable in time, therefore no temporal dimension was considered. In the case of analytic philosophy, however, it would be wrong not to take into consideration the temporal dimension. On the one hand, historians of philosophy agree on an evolution of analytic philosophy in the last century: it started from a small group of philosophical schools located in Vienna, Cambridge, Oxford, and a few American universities, and later on became a worldwide enterprise with thousands of practitioners (Beaney, 2013; Kuklick, 2007; Marconi, 2014). It is unlikely that the citation functions remained unchanged during this evolution. On the other hand, the normalization is structurally a *process,* i.e., something developing in time, not a *state*, i.e., something occurring in a definite moment. Therefore, it can be successfully detected only if the temporal dimension is included in the analysis.

Instead of a random sample, the top ten most cited papers for each decade were selected for the following reasons. First, the high citation score of these papers means that they were widely read (i.e., they had a great impact on the community).[97] Second, many 'classics' of analytic philosophy do appear in the sample, confirming that the selected papers are a good representation of 'high-quality' analytic philosophy in each decade, as analytic philosophers asked to assess the list confirmed. Being the publications both widely cited and high quality, it may be argued that they set to a certain extent, standards of citation behavior. Third, the choice of a random set of papers would have implied a sample of at least 100 papers for each decade, in order to obtain statistically significant results. The analysis of such a large number of papers,

[96] Two papers originally ranked top ten were excluded and substituted with subsequent papers in the ranking: [Anderson 1958] and [Sen 1985]. Even if they were published in philosophy journals, their subject falls outside AP (even in the broad sense), being respectively a result in formal logic for the first and economic welfare theory for the second.

[97] As Simona Azzan has pointed out, this sample may suffer from some *anachronism*. In fact, the top ten most cited papers of the decade 1950-1959 are the ones that are most cited *today* (or, more precisely, at the time of the search on WoS). It is possible that these were *not* the most cited papers in the decade, say, 1960-1969. Thus, the sample we used can be said to be somehow anachronistic, to the extent that it represents the papers which were highly cited in a *70-year long interval*. This issue can be fixed, in future work, using a fixed citation window, so that, for instance, for papers published in 1950-1959, we will consider only the citations they gather in the interval [1960-1969]. Even if we recognize the point raised by Azzan, in this study we preferred not to fix such citation windows. The reason is that, without a previous study of the average citation life of analytic philosophy papers, the dimension of the citation window would have been necessarily arbitrary. In the next study, we will present some data that could be useful to solve this problem.

however, was practically impossible because of the close reading approach that was chosen for this study (see below).

### *The decade profiles*

Each paper was read entirely, and every cited reference was assigned to one or more categories, often in light of the entire content of the paper.

When a reference was assigned to more than one category, its score was fractionalized in order to avoid percentages higher than 100% in the final sum.[98] The score of each reference was not weighted: documents that were mentioned multiple times in the citing paper did not receive a score proportional to the number of mentions. Equally, the score of documents which were cited both positively and critically was not fractionalized proportionally to the number of times in which they were cited either positively or critically.[99] The use of a system of weights, even if theoretically desirable, is actually unmanageable in practice. In fact, if adopted, it would have raised exegetical issues on each of the analyzed references, and it would have been ultimately highly subjective and not reproducible.

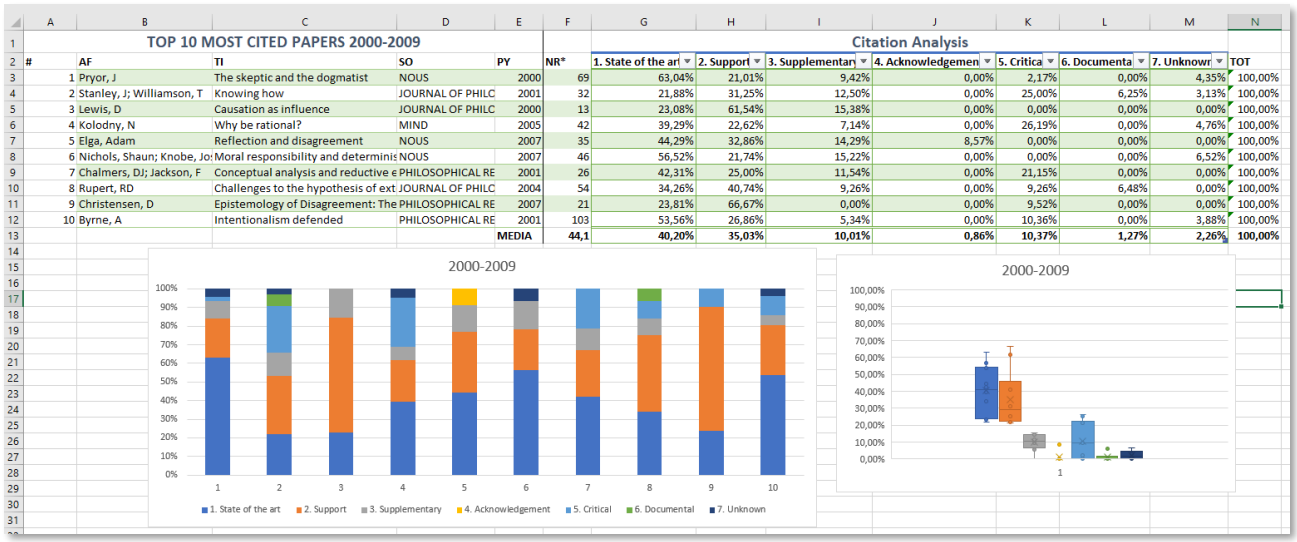
The results of the analysis of each paper were summarized in a paper profile, reporting for each category both the absolute score and the percentage on the total (Figure 33). Then, the profiles of the papers of the same timespan were aggregated to obtain a single profile for each of the six decades (Figure 34).

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | *Paper* | | | | | | | | | |
| 2 | # | Author | Title | Source | References | NR | Year | 1. State of the art | 2. Support | 3. Supplementary |
| 3 | 1 | Pryor, J | The skeptic and the do | NOUS | Alston William P., 1999, BLA | 68 | 2000 | 63,04% | 21,01% | 9,42% |
| 4 | | | | | | | | | | |
| 5 | *References* | | | | | | | | | |
| 6 | # | Author and Year | 1. State of the art | 2. Support | 3. Supplementary | 4. Acknowledgeme | 5. Critical | 6. Documental | 7. Unknown | Tot |
| 7 | 1 | Alston 1989 | 0,5 | 0,5 | | | | | | *1* |
| 8 | 2 | Alston 1997 | | 1,00 | | | | | | *1* |
| 9 | 3 | Alston 1999 | | 1,00 | | | | | | *1* |
| 10 | 4 | Armstrong 1961 | 1,00 | | | | | | | *1* |
| 11 | 5 | Armstrong 1968 | 1,00 | | | | | | | *1* |
| 12 | 6 | Audi 1993 | 0,50 | 0,50 | | | | | | *1* |
| 13 | 7 | Baldwin 1990 | | | 1 | | | | | *1* |
| 14 | 8 | Baldwin 1993 | | | 1 | | | | | *1* |
| 15 | 9 | Block 1990 | 1 | | | | | | | *1* |
| 16 | 10 | Block forth | 1 | | | | | | | *1* |
| 17 | 11 | BonJour 1978 | | | | | 1 | | | *1* |
| 18 | 12 | BonJour 1985 | 0,5 | | | | 0,5 | | | *1* |
| 19 | 13 | Brueckner 1992 | | | 1 | | | | | *1* |
| 20 | 14 | Brueckner 1994 | 1,00 | | | | | | | *1* |
| 21 | 15 | Burge 1986 | 1 | | | | | | | *1* |
| 22 | 16 | Burge 1993 | | 1 | | | | | | *1* |
| 23 | 17 | Byrne and Hilbert 199 | 1 | | | | | | | *1* |
| 24 | 18 | Cohen 1987 | 1 | | | | | | | *1* |
| 25 | 19 | Cohen 1998 | 1 | | | | | | | *1* |

*Figure 33. Example of paper profile*

[98] It turned out that no citation could be attributed to more than three categories.

[99] For example, if a reference was mentioned 3 times in the same article, but it played always the same function, it scored 1 point, and not 3 points. On the other hand, if it was mentioned 3 times, each time with a different function, its point was equally divided among the functions it played.



| | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | TOP 10 MOST CITED PAPERS 2000-2009 | | | | | | Citation Analysis | | | | | | | |
| 2 | # | AF | TI | SO | PY | NR* | 1. State of the ar | 2. Support | 3. Supplementar | 4. Acknowledgemen | 5. Critica | 6. Documenta | 7. Unknowr | TOT |
| 3 | 1 | Pryor, J | The skeptic and the dogmatist | NOUS | 2000 | 69 | 63,04% | 21,01% | 9,42% | 0,00% | 2,17% | 0,00% | 4,35% | 100,00% |
| 4 | 2 | Stanley, J; Williamson, T | Knowing how | JOURNAL OF PHILC | 2001 | 32 | 21,88% | 31,25% | 12,50% | 0,00% | 25,00% | 6,25% | 3,13% | 100,00% |
| 5 | 3 | Lewis, D | Causation as influence | JOURNAL OF PHILC | 2000 | 13 | 23,08% | 61,54% | 15,38% | 0,00% | 0,00% | 0,00% | 0,00% | 100,00% |
| 6 | 4 | Kolodny, N | Why be rational? | MIND | 2005 | 42 | 39,29% | 22,62% | 7,14% | 0,00% | 26,19% | 0,00% | 4,76% | 100,00% |
| 7 | 5 | Elga, Adam | Reflection and disagreement | NOUS | 2007 | 35 | 44,29% | 32,86% | 14,29% | 8,57% | 0,00% | 0,00% | 0,00% | 100,00% |
| 8 | 6 | Nichols, Shaun; Knobe, Jo | Moral responsibility and determinis | NOUS | 2007 | 46 | 56,52% | 21,74% | 15,22% | 0,00% | 0,00% | 0,00% | 6,52% | 100,00% |
| 9 | 7 | Chalmers, DJ; Jackson, F | Conceptual analysis and reductive e | PHILOSOPHICAL RE | 2001 | 26 | 42,31% | 25,00% | 11,54% | 0,00% | 21,15% | 0,00% | 0,00% | 100,00% |
| 10 | 8 | Rupert, RD | Challenges to the hypothesis of ext | JOURNAL OF PHILC | 2004 | 54 | 34,26% | 40,74% | 9,26% | 0,00% | 9,26% | 6,48% | 0,00% | 100,00% |
| 11 | 9 | Christensen, D | Epistemology of Disagreement: The | PHILOSOPHICAL RE | 2007 | 21 | 23,81% | 66,67% | 0,00% | 0,00% | 9,52% | 0,00% | 0,00% | 100,00% |
| 12 | 10 | Byrne, A | Intentionalism defended | PHILOSOPHICAL RE | 2001 | 103 | 53,56% | 26,86% | 5,34% | 0,00% | 10,36% | 0,00% | 3,88% | 100,00% |
| 13 | | | | | MEDIA | 44,1 | 40,20% | 35,03% | 10,01% | 0,86% | 10,37% | 1,27% | 2,26% | 100,00% |



*Figure 34. Example of decade profile.*

| # | Author | PY | Title | Source | Volume | Issue | First Page | End Page |
|---|---|---|---|---|---|---|---|---|
| **1950-1959** | | | | | | | | |
| **1** | GRICE, HP | 1957 | MEANING | Philos. Rev. | 66 | 3 | 377 | 388 |
| **2** | VENDLER, Z | 1957 | VERBS AND TIMES | Philos. Rev. | 66 | 2 | 143 | 160 |
| **3** | SMART, JJC | 1959 | SENSATIONS AND BRAIN PROCESSES | Philos. Rev. | 68 | 2 | 141 | 156 |
| **4** | RAWLS, J | 1958 | JUSTICE AS FAIRNESS | Philos. Rev. | 67 | 2 | 164 | 194 |
| **5** | QUINE, WV | 1956 | QUANTIFIERS AND PROPOSITIONAL ATTITUDES | J. Philos. | 53 | 5 | 177 | 187 |
| **6** | SEARLE, JR | 1958 | PROPER NAMES | Mind | 67 | 266 | 166 | 173 |
| **7** | FREGE, G | 1956 | THE THOUGHT - A LOGICAL INQUIRY | Mind | 65 | 259 | 289 | 311 |
| **8** | SIBLEY, F | 1959 | AESTHETIC CONCEPTS | Philos. Rev. | 68 | 4 | 421 | 450 |
| **9** | GRICE, HP; STRAWSON, PF | 1956 | IN DEFENSE OF A DOGMA | Philos. Rev. | 65 | 2 | 141 | 158 |
| **10** | DUMMETT, M | 1959 | WITTGENSTEIN PHILOSOPHY OF MATHEMATICS | Philos. Rev. | 68 | 3 | 324 | 348 |
| **1960-1969** | | | | | | | | |
| **1** | DONNELLAN, KS | 1966 | REFERENCE AND DEFINITE DESCRIPTIONS | Philos. Rev. | 75 | 3 | 281 | 304 |
| **2** | DAVIDSON, D | 1963 | ACTIONS, REASONS, AND CAUSES – SYMPOSIUM | J. Philos. | 60 | 23 | 685 | 700 |
| **3** | FRANKFURT, HG | 1969 | ALTERNATE POSSIBILITIES AND MORAL RESPONSIBILITY | J. Philos. | 66 | 23 | 829 | 839 |
| **4** | HARMAN, GH | 1965 | THE INFERENCE TO THE BEST EXPLANATION | Philos. Rev. | 74 | 1 | 88 | 95 |
| **5** | GRICE, HP | 1969 | UTTERERS MEANING AND INTENTIONS | Philos. Rev. | 78 | 2 | 147 | 177 |
| **6** | LEWIS, DK | 1968 | COUNTERPART THEORY AND QUANTIFIED MODAL LOGIC | J. Philos. | 65 | 5 | 113 | 126 |
| **7** | DANTO, A | 1964 | THE ARTWORLD | J. Philos. | 61 | 19 | 571 | 584 |
| **8** | BENACERRAF, P | 1965 | WHAT NUMBERS COULD NOT BE | Philos. Rev. | 74 | 1 | 47 | 73 |
| **9** | STRAWSON, PF | 1964 | INTENTION AND CONVENTION IN SPEECH ACTS | Philos. Rev. | 73 | 4 | 439 | 460 |
| **10** | GEACH, PT | 1965 | ASSERTION | Philos. Rev. | 74 | 4 | 449 | 465 |
| **1970-1979** | | | | | | | | |
| **1** | NAGEL, T | 1974 | WHAT IS IT LIKE TO BE A BAT | Philos. Rev. | 83 | 4 | 435 | 450 |
| **2** | KRIPKE, S | 1975 | OUTLINE OF A THEORY OF TRUTH | J. Philos. | 72 | 19 | 690 | 716 |
| **3** | PERRY, J | 1979 | PROBLEM OF THE ESSENTIAL INDEXICAL | Nous | 13 | 1 | 3 | 21 |
| **4** | CUMMINS, R | 1975 | FUNCTIONAL-ANALYSIS | J. Philos. | 72 | 20 | 741 | 765 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **5** | LEWIS, D | 1979 | ATTITUDES DE-DICTO AND DE-SE | Philos. Rev. | 88 | 4 | 513 | 543 |
| **6** | GOLDMAN, AI | 1976 | DISCRIMINATION AND PERCEPTUAL KNOWLEDGE | J. Philos. | 73 | 20 | 771 | 791 |
| **7** | LEWIS, D | 1979 | COUNTERFACTUAL DEPENDENCE AND TIMES ARROW | Nous | 13 | 4 | 455 | 476 |
| **8** | DRETSKE, FI | 1970 | EPISTEMIC OPERATORS | J. Philos. | 67 | 24 | 1007 | 1023 |
| **9** | LEWIS, D | 1976 | PROBABILITIES OF CONDITIONALS AND CONDITIONAL PROBABILITIES | Philos. Rev. | 85 | 3 | 297 | 315 |
| **10** | WRIGHT, L | 1973 | FUNCTIONS | Philos. Rev. | 82 | 2 | 139 | 168 |
| **1980-1989** | | | | | | | | |
| **1** | CHURCHLAND, PM | 1981 | ELIMINATIVE MATERIALISM AND THE PROPOSITIONAL ATTITUDES | J. Philos. | 78 | 2 | 67 | 90 |
| **2** | RAWLS, J | 1980 | RATIONAL AND FULL AUTONOMY | J. Philos. | 77 | 9 | 515 | 535 |
| **3** | JACKSON, F | 1986 | WHAT MARY DIDNT KNOW + KNOWLEDGE ARGUMENT AGAINST PHYSICALISM | J. Philos. | 83 | 5 | 291 | 295 |
| **4** | RAILTON, P | 1986 | MORAL REALISM + A FORM OF ETHICAL NATURALISM | Philos. Rev. | 95 | 2 | 163 | 207 |
| **5** | WOLF, S | 1982 | MORAL SAINTS + IMPLICATIONS FOR MORAL-PHILOSOPHY | J. Philos. | 79 | 8 | 419 | 439 |
| **6** | BURGE, T | 1986 | INDIVIDUALISM AND PSYCHOLOGY | Philos. Rev. | 95 | 1 | 3 | 45 |
| **7** | KIM, J | 1984 | CONCEPTS OF SUPERVENIENCE | Philos. Phenomenol. Res. | 45 | 2 | 153 | 176 |
| **8** | BURGE, T | 1988 | INDIVIDUALISM AND SELF-KNOWLEDGE | J. Philos. | 85 | 11 | 649 | 663 |
| **9** | MCGINN, C | 1989 | CAN WE SOLVE THE MIND BODY PROBLEM | Mind | 98 | 391 | 349 | 366 |
| **10** | BOGEN, J; WOODWARD, J | 1988 | SAVING THE PHENOMENA | Philos. Rev. | 97 | 3 | 303 | 352 |
| **1990-1999** | | | | | | | | |
| **1** | DEROSE, K | 1995 | SOLVING THE SKEPTICAL PROBLEM | Philos. Rev. | 104 | 1 | 1 | 52 |
| **2** | BRATMAN, ME | 1992 | SHARED COOPERATIVE ACTIVITY | Philos. Rev. | 101 | 2 | 327 | 340 |
| **3** | BURGE, T | 1993 | CONTENT PRESERVATION | Philos. Rev. | 102 | 4 | 457 | 488 |
| **4** | YABLO, S | 1992 | MENTAL CAUSATION | Philos. Rev. | 101 | 2 | 245 | 280 |
| **5** | DENNETT, DC | 1991 | REAL PATTERNS | J. Philos. | 88 | 1 | 27 | 51 |
| **6** | EDGINGTON, D | 1995 | ON CONDITIONALS | Mind | 104 | 414 | 235 | 329 |
| **7** | DAVIDSON, D | 1990 | THE STRUCTURE AND CONTENT OF TRUTH | J. Philos. | 87 | 6 | 279 | 328 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **8** | LEWIS, D | 1994 | CHANCE AND CREDENCE - HUMEAN SUPERVENIENCE DEBUGGED | Mind | 103 | 412 | 473 | 490 |
| **9** | DEROSE, K | 1992 | CONTEXTUALISM AND KNOWLEDGE ATTRIBUTIONS | Philos. Phenomenol. Res. | 52 | 4 | 913 | 929 |
| **10** | GRIFFITHS, PE; GRAY, RD | 1994 | DEVELOPMENTAL SYSTEMS AND EVOLUTIONARY EXPLANATION | J. Philos. | 91 | 6 | 277 | 304 |
| **2000-2009** | | | | | | | | |
| **1** | Pryor, J | 2000 | The skeptic and the dogmatist | Nous | 34 | 4 | 517 | 549 |
| **2** | Stanley, J; Williamson, T | 2001 | Knowing how | J. Philos. | 98 | 8 | 411 | 444 |
| **3** | Lewis, D | 2000 | Causation as influence | J. Philos. | 97 | 4 | 182 | 197 |
| **4** | Kolodny, N | 2005 | Why be rational? | Mind | 114 | 455 | 509 | 563 |
| **5** | Elga, A | 2007 | Reflection and disagreement | Nous | 41 | 3 | 478 | 502 |
| **6** | Nichols, S; Knobe, J | 2007 | Moral responsibility and determinism: The cognitive science of folk intuitions | Nous | 41 | 4 | 663 | 685 |
| **7** | Chalmers, DJ; Jackson, F | 2001 | Conceptual analysis and reductive explanation | Philos. Rev. | 110 | 3 | 315 | 360 |
| **8** | Rupert, RD | 2004 | Challenges to the hypothesis of extended cognition | J. Philos. | 101 | 8 | 389 | 428 |
| **9** | Christensen, D | 2007 | Epistemology of Disagreement: The Good News | Philos. Rev. | 116 | 2 | 187 | 217 |
| **10** | Byrne, A | 2001 | Intentionalism defended | Philos. Rev. | 110 | 2 | 199 | 240 |

*Table 43. Sample metadata*

## Results

### *Aggregated level (1950-2009)*

The results of the citation context analysis for the whole period (1950-2009) are summarized in Table 44. Data show that the Supporting citation is the most common type of citation (37.9%), followed by Critical citations (23.1%) and State of the art citations (21.4%). These three categories alone cover 82.4% of the citations. Supplementary, Acknowledgement and Documental citations play only a minor role on the total (overall, they account only for 11.4% of the citations).

| Rank | Type | Percentage on the total |
|---|---|---|
| 1 | Supporting citations | 37.9% |
| 2 | Critical citations | 23.1% |
| 3 | State of the art citations | 21.4% |
| 4 | Supplementary/perfunctory citations | 4.7% |
| 5 | Acknowledgment citations | 3.4% |
| 6 | Documental citations | 3.4% |
| 7 | Unknown | 1.1% |
| | *TOTAL (3 papers with no citations)*[100] | *95.0%* |

*Table 44. Types of citations (1950-2009)*

However, the data show great variance in time, as the next section highlights and explains in detail.

### *Development in time*

The first clear pattern is the increase in the average number of references per paper (Figure 35), which shows a five-fold increase from the 1950s (8.8 citations per paper) to 2000s (44.1 citations per paper). The increase between the 1980s and 1990s is particularly evident. Moreover, only in the first two decades, we find papers without citations (1 in the 1950s and 2 in the 1960s). This trend is coherent with the data we showed in the first and in the second study of this Chapter (see, respectively, Figure 8 and Figure 23).

[100] 3 papers (1 in the decade 1950-1959 and 2 in the decade 1960-1969, 5% on the total) had no citations, so that the total is slightly lower than 100%.

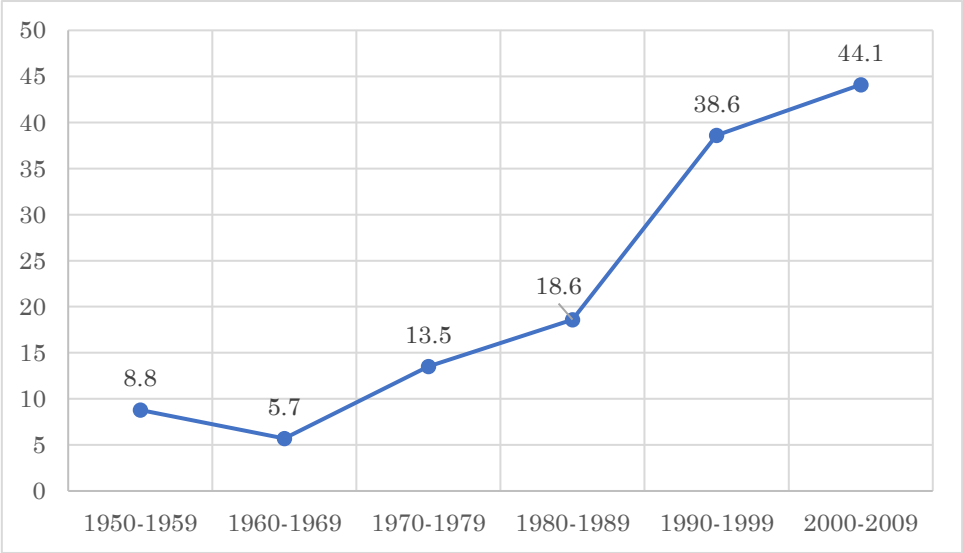



*Figure 35. Average number of references per paper over time*

Figure 36 shows the average number of Supporting, Critical and State of the Art citations per paper in each decade. These three categories account for most of the citations in all the six timespans, and they all increase in time. This was expected, given the increase in the average number of references shown in Figure 35. However, their increase rate is significantly different: State of the Art citations raise almost exponentially (increasing 13-folds, from 1.5 to 20.1 from the 1950s to 2000s), whereas Supporting citations increase quite linearly (from 4.0 to 13.4), and Critical citations slightly increase at first (from 1.5 to 4.4), but then even seem to decrease in the last decade.

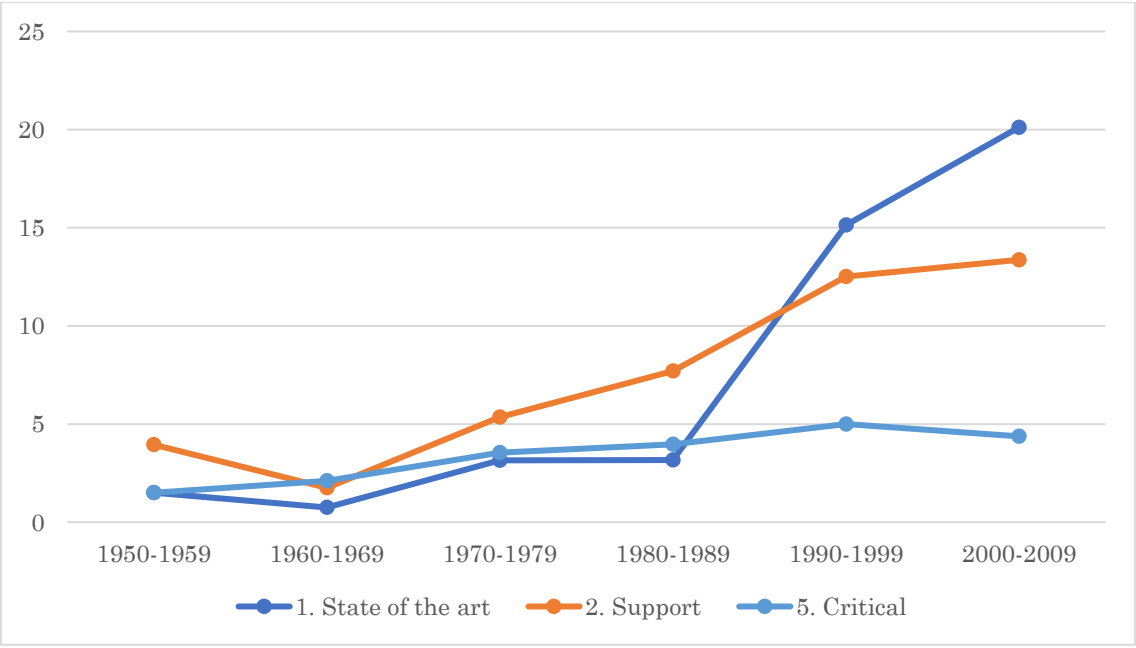



*Figure 36. Average number of State of the art, Supporting and Critical citations per paper over time*

In order to better understand how the relative weight of each category changes over time, we have considered the *percentage* of each citations category on the total.

Figure 37, Figure 38, and Figure 39 show the distribution of Supporting, Critical and State of the Art citations in time by box plot diagrams. Again, these three categories account for most of the citations in all the six timespans.

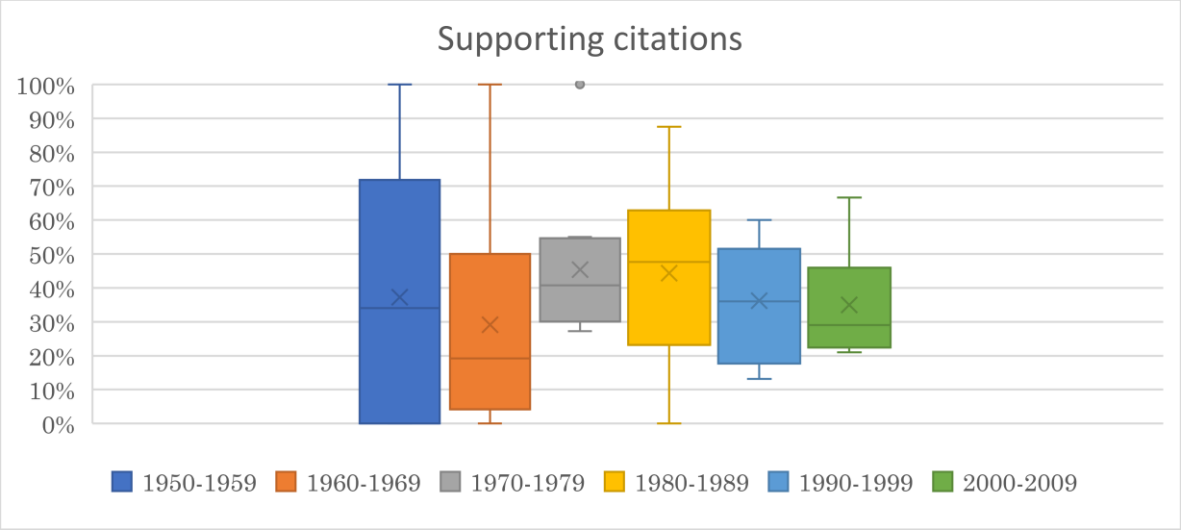



*Figure 37. Percentage of Supporting citations over time (distribution over time). "×" = mean, "—" = median, "o" = outlier.*

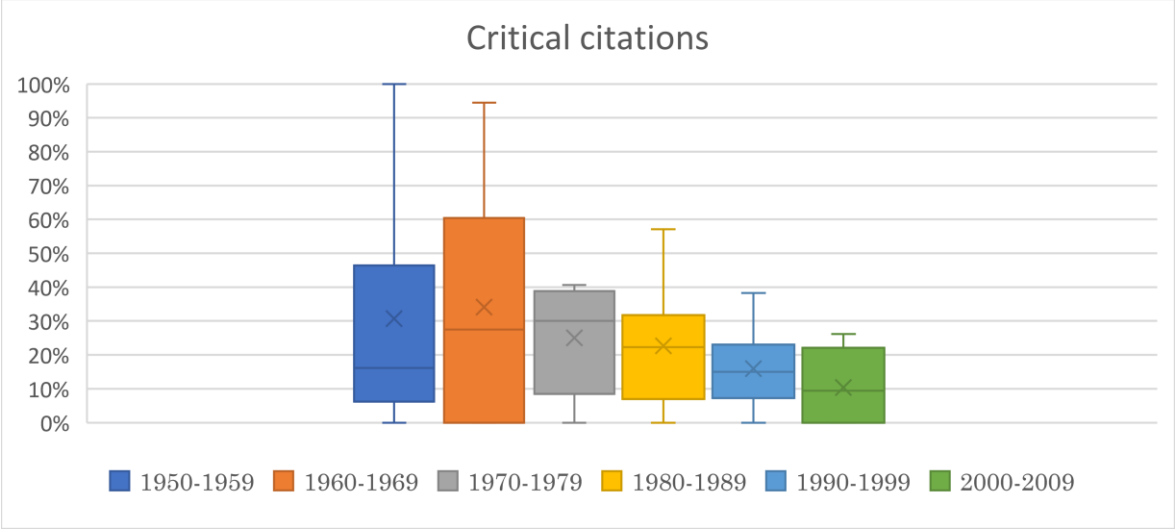



*Figure 38. Percentage of Critical citations over time (distribution over time)*

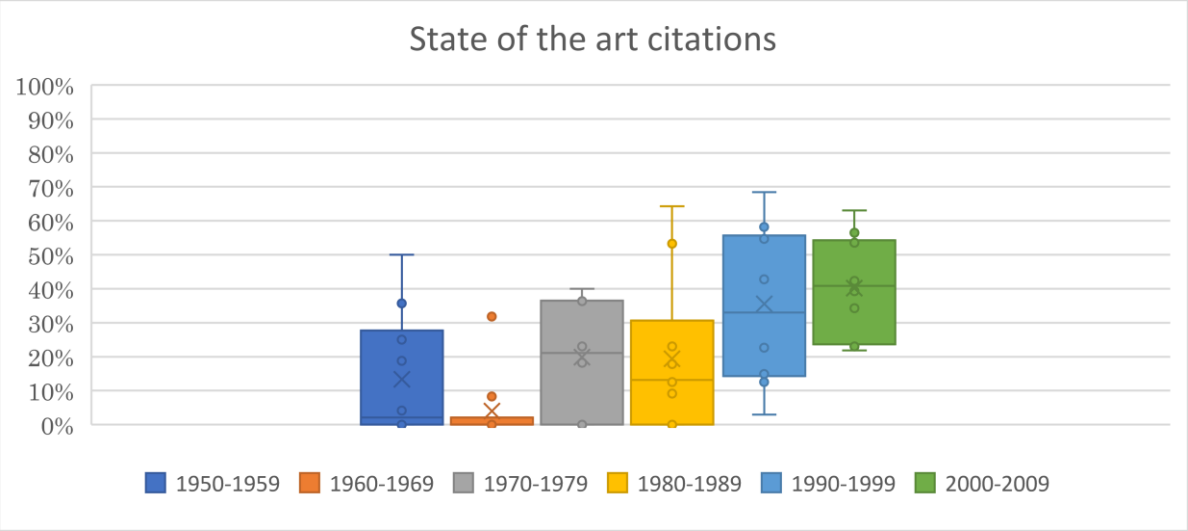



*Figure 39. Percentage of State of the art citations (distribution over time)*

Figure 40, Figure 41, and Figure 42 show the trend of mean and median for each of the three categories. Both the mean and median are shown because of the non-normal distribution of the citations.

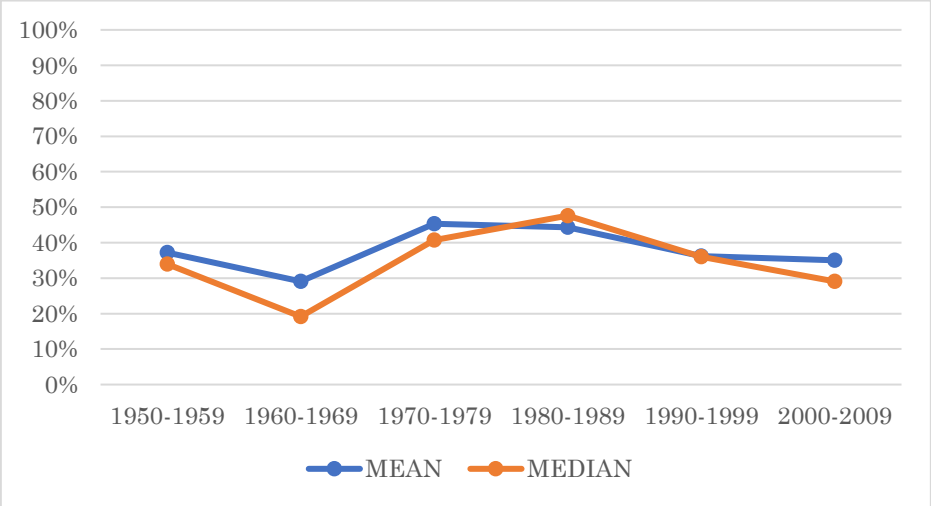



*Figure 40. Percentage of Supporting citations (Mean and Median over time)*

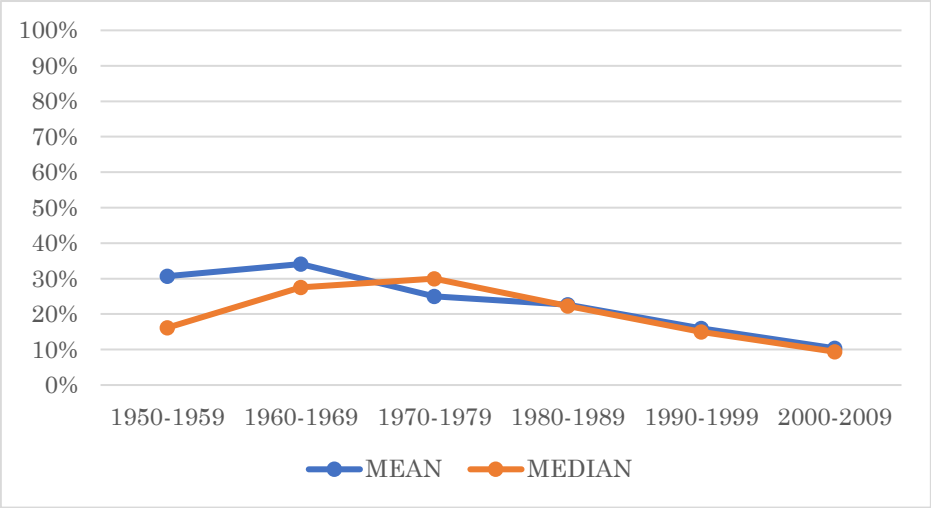



*Figure 41. Percentage of Critical citations (Mean and Median over time)*

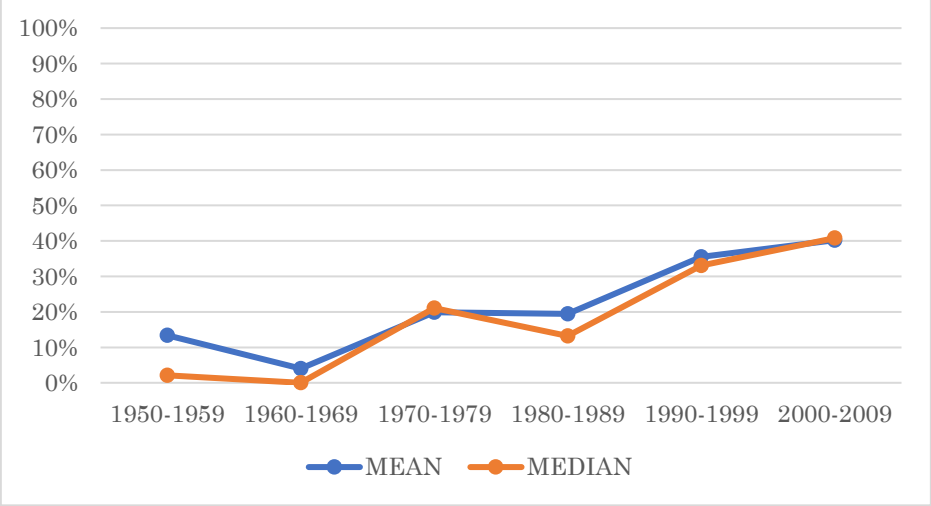



*Figure 42. Percentage of State of the art citations (Mean and Median over time)*

The percentage of State of the art citations clearly increases, especially in the last three decades. Their average triplicates from the 1950s to 2000s. The increase in the median values is even more evident (from 2.1% to 40.8%). From 1990 their minimum leaves the 0, becoming 2.9% in the 1990s and 21.9% in 2000s. Furthermore, in the last decade, this category has become the most common type of citation, overtaking the Supporting citations.

Critical citations show an almost linear decreasing trend since the 1970s, with their mean decreasing from 30.7% in 1950s to 10.4% in 2010s. On the other hand, the trend of Supporting citations is more unstable and shows a slight decrease in the last decades.

Lastly, Figure 43 depicts the evolution of the average percentage of Supplementary, Acknowledgement, and Documental citations. The only type showing a clear trend is the percentage of Supplementary citations, which reaches its maximum peak in the last decade.

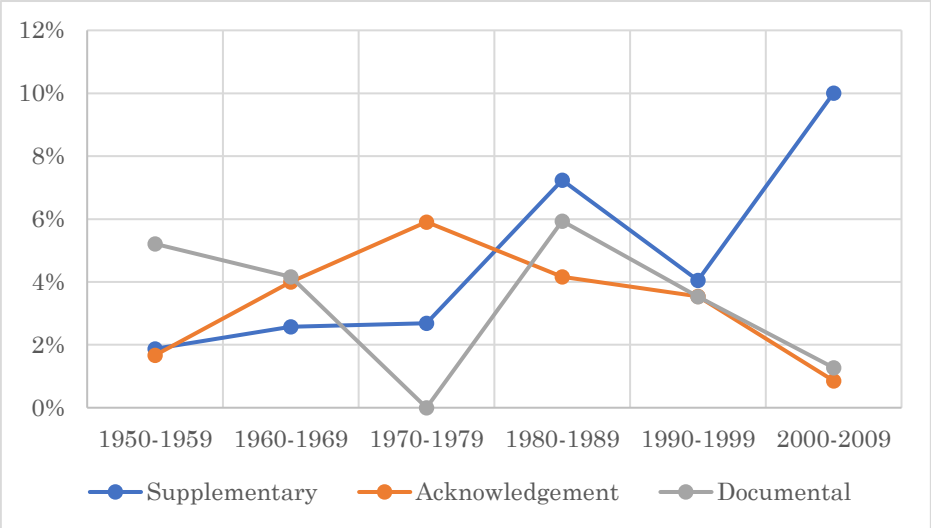



*Figure 43. Percentage of Supplementary, Acknowledgment and Documental citations (Mean over time)*

In the Appendix, the detailed profiles of each decade, with the distribution of categories in each paper of the sample, are provided.

## Discussion

The first clear pattern in the data is the quasi-exponential growth in the average number of cited references (Figure 35). This pattern is coherent with the data we presented in the previous studies, and we already commented it in terms of citation behavior of analytic philosophers in the first study. The larger scope of this study allows us to observe the transition from Middle to Late Analytic Philosophy. If we set the border between the two periods in the decade 1970-1980, the data suggest that the transition to Late Analytic Philosophy is indeed characterized by an increase in the average number of cited references, which is particularly evident in the period 1990-2009. Late Analytic Philosophy seems therefore to be characterized by a higher number of cited references per paper, compared to Middle Analytic Philosophy. This means that the documental space of Late Analytic Philosophy is larger than the one of Middle Analytic Philosophy. This enlargement is due not only to the growth of journals and publications, but also to the growth of the *links* that the average document establishes with the literature. The fabric of Late Analytic Philosophy is not only wider than the one of Middle Analytic Philosophy: it is also more interconnected. This means that Late Analytic Philosophy documents are, in average, more intertwined with the documental space. But how do documents rely on each other? The growth in the number of cited references tells us that there are more links, but still does not clarify what *kind* of links they are. In particular, we are interested in investigating the epistemological relationships which bind together the documental space of Late Analytic Philosophy. This will shed light on the normalization of analytic philosophy and on the question whether Late Analytic Philosophy is a normal science.

In this regard, the State of the art category is particularly relevant. As we said in the Introduction, these citations play two closely related functions: a) an *epistemological* function: they mark the presence of a *knowledge base*, a shared set of documents from which the citing paper starts; b) a *topical* function: by specifying the *documental background* of the new contribution, the State of the art citations specify its position in the intellectual landscape of the discipline. As Hargens says, they provide an «orientation» to the paper (Hargens, 2000). Therefore, even if State of the art citations are not, strictly speaking, epistemologically constructive operations (only Supporting citations play this role), nonetheless they point out a subtler form of knowledge accumulation. *They attest the knowledge of the structure of the field.* When the authors use State of the art citations, classically at the beginning of the paper, they want to insert their contribution into a precise stream of research. By doing this they point out, at the same time, that *that stream of research exists and that it is a legitimate area of research*. Therefore, the increase in the percentage of this type of citations (Figure 36 and Figure 39) is an important hint of the progressive *structuration* of analytic philosophy. In particular, the decades 1990-1999 and 2000-2009 saw widespread use of State of the art citations (from 1990 onward we do not find any paper lacking this type of citations). These results are coherent with the science maps we presented in the second study of this Chapter, that showed that after the turn of the century Late Analytic Philosophy is clearly divided into a set of sub-disciplines. Thus, both the co-citation analysis and the citation context analysis converge on showing a progressive *organization* of the documental space. This can be considered a first hint of the fact that Late Analytic Philosophy has become a normal science, denote by a structure and a specific knowledge base.

This interpretation is confirmed by the decreasing trend of the Critical citations (both in absolute and relative terms, see Figure 36 and Figure 38), i.e., the citations that are used as destructive epistemological operations and that mark lack of consensus in the community. From Middle to Late Analytic Philosophy, disagreement has lost weight following a linearly decreasing trend. This is in line with Kuhn's theory of normal science and the scarce percentage of negative citations is a feature of the sciences, as we saw above.

However, the unstable trend in the percentage of Supporting citations, and their almost linear decrease in the last three decades (Figure 36 and Figure 37), suggests some caution before straightforwardly assimilating Late Analytic Philosophy to a classic Kuhnian normal science. It is important to remember that these citations are the only ones whose epistemological function is openly *constructive,* and the only ones stating an explicit *consensus* between the citing and the cited documents. State of the art citations, on the contrary, are cited without an open endorsement of the cited document. From an epistemological point of view, they are cited

neutrally by the citing author. Their function is to build a background for the contribution, not to support some specific claim[101], so that they cannot be directly interpreted as fully positive citations. It is theoretically possible for an author to firstly cite several documents in order to review the topic's state of the art, and then to dismiss all their claims.

Given the lack of a well-defined increasing pattern in the occurrence of Supporting citations, the statement that Late Analytic Philosophy is a Kuhnian normal science must be honed. The data present in fact a paradoxical situation: *Late Analytic Philosophy has stabilized in terms of knowledge base and structure of the field, without, at the same time, converging towards consensus as the theory of normal science will predict*. We propose the following explanation to this apparently contradictory situation: analytic philosophy underwent a process of *fragmentation* into several sub-disciplines, especially in its Late phase (and more markedly from the 1990s onwards). Under this hypothesis, the State of the art citations have the primary function of *identifying the sub-disciplinary area* to which the paper is meant to contribute. Once the sub-area is identified, analytic philosophers debate inside it in the classical philosophical fashion, i.e., citing both positively and negatively other documents. Within each sub-area, the consensus is lacking, as the decrease in the proportion of Supporting citations from the 1980s may indicate. However, the set of papers to contrast in order to advance a debate is clearly defined. Each sub-area has its own state-of-the-art. If this hypothesis is correct, the fragmentation process of AP would have begun in the 1980s, the decade in which the percentages of Supporting and State of the Art citations started following opposite trends (the first decreasing, the second increasing). This is not very far from traditional historical accounts of analytic philosophy, which set in the middle 1970s the beginning of the fragmentation of the field (Tripodi, 2015, Chapter 4).

Developing the classic Kuhnian theory of normal science, we can say that in Late Analytic Philosophy a *soft instead of strong paradigm has taken over*. A strong paradigm is a scientific (in our case, philosophical) achievement that has the features of attracting the consensus in the community and opening new lines of research – it corresponds to the standard Kuhnian definition of paradigm (see the Introduction of this study). On the other hand, the soft paradigm regards the *knowledge of the structure of the field*. Its function is to assure that this structure is not contested. Our hypothesis is that the fragmentation of analytic philosophy during Late Analytic Philosophy has produced in its practitioners, at the same time, the *awareness* of a clear sub-disciplinary structure (i.e., the idea that analytic philosophy' intellectual content is subdivided into metaphysics, philosophy of mind, philosophy of language, etc., and each of those

[101] Unless very loosely, by showing that the author is legitimated to contribute to the debate because she is up-to-date.

areas are populated by different sub-topics and sub-debates). Thus, in Late Analytic Philosophy, the consensus of the community would regard the *shape of the field*, instead of any specific philosophical claim, theory, or position. In other terms, the consensus will be about the way in which new knowledge contents are produced, the structure in which they are organized (i.e., the partitions of the intellectual and documental spaces), not on the truth or reliability of any specific content. *In Late Analytic Philosophy, knowledge is contested but the structure organizing it is not*. The background is defined but knowledge seems not to accumulate. [102]

The trends of the other categories of citations are somehow easier to explain and tell relatively few of the normalization process. The increasing trend in the percentage of Perfunctory citations (Figure 43), especially in the last decade, is probably a consequence of the general increase in the average number of references per paper. The longer the reference list, the higher is the probability that some of the cited works are not strictly relevant to the citing author's immediate concerns. With regard to the overall proportion of Perfunctory citations (Table 44), this can be compared with results from other studies. As we saw in the Introduction, Bornmann and Daniel report that the proportion of citations classified as "perfunctory" in previous studies ranged from about 10% to 50%. In the current study, Perfunctory citations reached an average of 10% only in the last decade. The overall low proportion may be due to the *discursive* nature of analytic philosophy: analytic philosophers' research practice is based on a continuous debate with peers. Citations are mainly used as "moves in the epistemic game" (to locate in a specific stream of discussion – State of the Art citations –, to attack or defend a position – respectively Critical and Supporting citations). Using a Perfunctory citation in a paper is like making a move without any effect, and this may be the reason why analytic philosophers are inclined to avoid this type of citations.[103]

Acknowledgment citations were never a significative proportion of the sample (Table 44), and the decrease in their percentage is probably due to the simultaneous establishment of

[102] As a Reviewer of the article published in *Scientometrics* suggested, another hypothesis can be advanced to explain these results, namely that the fragmentation of the field is simply the consequence of the enlargement of the documental space analytic philosophers have to confront with. As Quinn says: «Having limited time and energy at their disposal, individual philosophers have to focus rather narrowly to keep up with rapid developments in their areas of specialization» (Quinn, 1987, p. 111). A similar idea can be found in Marconi and Schwartz, both linking the trend towards specialization to the growth of the literature available in analytic philosophy (Marconi, 2014; Schwartz, 1995). We believe that this hypothesis is not in contrast with the one advanced in this study (i.e. the normalization of AP in the form of the emergence of a soft paradigm): normalization and specialization could be indeed two *mutually reinforcing factors* shaping contemporary AP. This interpretation is also consistent with Kuhn's late theory of science: see (Kuhn, 2000), where the philosophers explicitly linked specialization and normal science; see also (Wray, 2011).

[103] However, it is also possible that the understanding of "perfunctory/supplementary" citations used in this study is different from the one employed in previous ones.

manuscript' sections specifically dedicated to acknowledgments (Cronin, Shaw, & La Barre, 2003). Lastly, the low proportion of Documental citation (Table 44) is coherent with the theoretical focus of AP, whose main interest lies in philosophical theorizing rather than in historical reconstruction of past philosophers' thought.

## Sum up and concluding remarks

In this study, we aimed at showing how citation analysis, in the form of citation context analysis, can shed light on the epistemological features of Late Analytic Philosophy, namely on its alleged similarity to a Kuhnian normal science. The basic idea underlying this study is that the normal-scientific phase of a discipline is characterized not only by a certain disposition of the intellectual content (presence of a paradigm) or by the shape of the social level (consensus in the community), but also by a particular configuration of the citation network (the documental space). Our main hypothesis, which is grounded in the empirical results of previous citation context analyses of the sciences, is that the citation network of the normal science is marked by *positive* instead of *negative* citations. In other words, the documents of the documental space of a normal science are inter-connected by epistemologically constructive instead of destructive operations. The fabric of normal science is positively intertwined, whereas the fabric of pre-paradigmatic and revolutionary science is either perforated or negatively intertwined.

We articulated this idea by dividing the notion of positive citation into the ones of State of the art citation and Supporting citation, whereas we rendered the notion of negative citation into the one of Critical citation. The distinction between State of the art and Supporting citations was made in order to account for two different ways in which knowledge can accumulate: 1) by a progressive *organization* (i.e., structuration) of the documental and intellectual levels; 2) by an *accumulation* of knowledge claims, in which the older support the younger. Indeed, the two ways characterize two different levels: the former characterizes the *structure* of the field, the latter the *components* of the structure. To use a metaphor, we could say that the State of the art citations define the setting (the background), whereas the Supporting and the Critical citations the foreground, or that the State of the art citations define the *rules of the game* and the Supporting and Critical citations the *actual moves of the game*.

The citation context analysis showed that in analytic philosophy, State of the art citations increased considerably in the last two decades, that Critical citations decreased almost linearly, and the Supporting citations had an unstable trend. We explained these results by two inter-connected hypotheses: the fragmentation of analytic philosophy and the emergence of a soft paradigm. They are interconnected because they both refer to a dynamic of the structure of analytic philosophy. The fragmentation postulates a progressive division of analytic philosophy into distinct research areas. Each of these areas is defined, at the documental level, by a set of

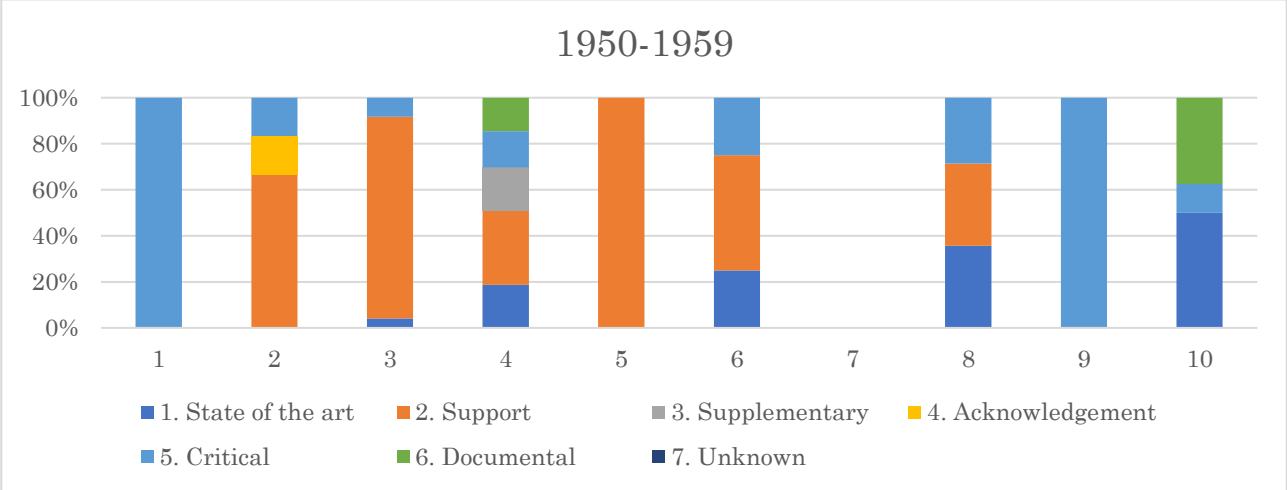
documents (the compasses) which provide, at the intellectual level, the state-of-the-art of that sub-debate. This hypothesis is corroborated by the results of co-citation analysis we discussed in the previous study. The soft paradigm hypothesis, on the other hand, postulates that in Late Analytic Philosophy has emerged the knowledge of the structure of Late Analytic Philosophy itself.

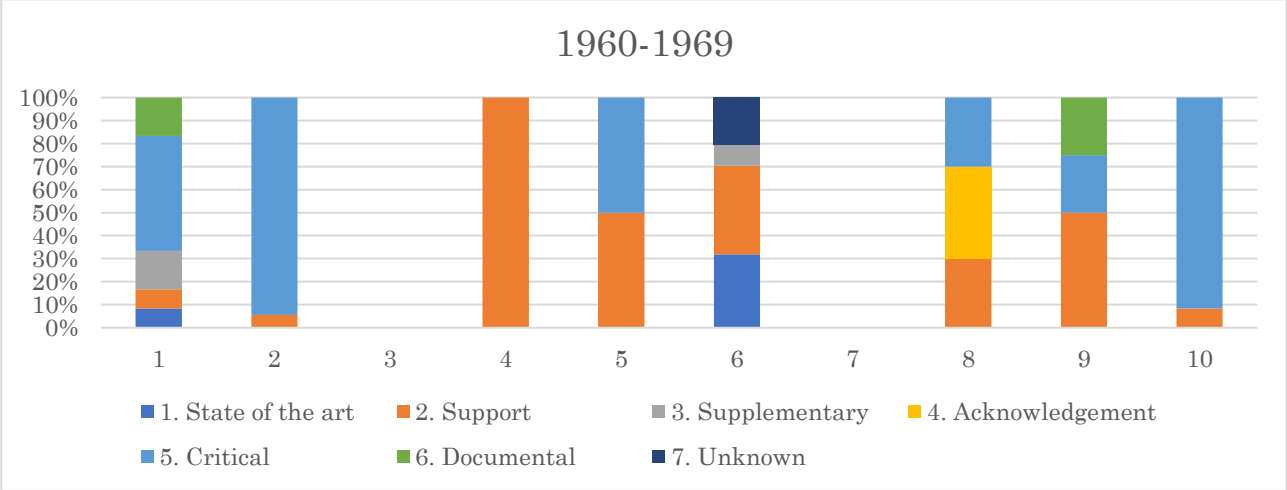
An example will help to clarify the soft paradigm hypothesis. Imagine that I want to work, today, on the philosophy of persistence. In order to do that, I must acquire knowledge about the background and the context of this area of analytic philosophy, i.e., I must know where it is placed in the documental and intellectual space of analytic philosophy. For instance, I must know that it is a topic belonging to the discipline of metaphysics and that, more precisely, to philosophy of time. I must also know what the most important documents (papers, books) of this area are, i.e., I must know both the intellectual and the documental levels of the philosophy of persistence. In my contribution to the philosophy of persistence (i.e., in the paper I submit to a journal), I must show that I know all these things: one way of doing that is by *citing* the right documents (another way is, for instance, to use the technical jargon), i.e., to stitch my contribution in the fabric in the right way. Now, the presence of the soft paradigm is what accounts for the meaning of the word 'must' we have used to describe this situation. 'Must' means that if I *did not know* all these things about the *background*, the gate-keepers of the community (e.g. editorial boards of journals, referees in the peer review), will *prevent* my contribution to access the documental level, i.e., *I will not be able to publish* in the venues where the discussion on the philosophy of persistence takes place. Imagine, counterfactually, that the soft paradigm was not in place. This would have several consequences on our little mental experiment. First, the set of documents constituting the background would not be clear. Second, the very existence of an area called 'philosophy of persistence' could be contested, since I could not rely on any state-of-the-art of it. Thus, I would probably need to spend the beginning of my contribution in *justifying* what I mean by 'philosophy of persistence', why it is interesting, and what relationships it has with other areas of philosophy. All these features are indeed typical of non-normal-scientific phases (pre-paradigmatic or revolutionary). Third, it will be more difficult for me to find the right citations, because I could not rely on a definite portion of the documental space which is labeled 'philosophy of persistence literature'. All this implies that the work of the gate-keepers would be harder: hence, the contributions which access the documental space will be more diverse than the ones who will be published when the soft paradigm firmly controls the structure of the documental space. By this little example, we hope to have shown how the soft paradigm functions, and why its role is analogous to that of the strong paradigms in the classic Kuhnian normal science.

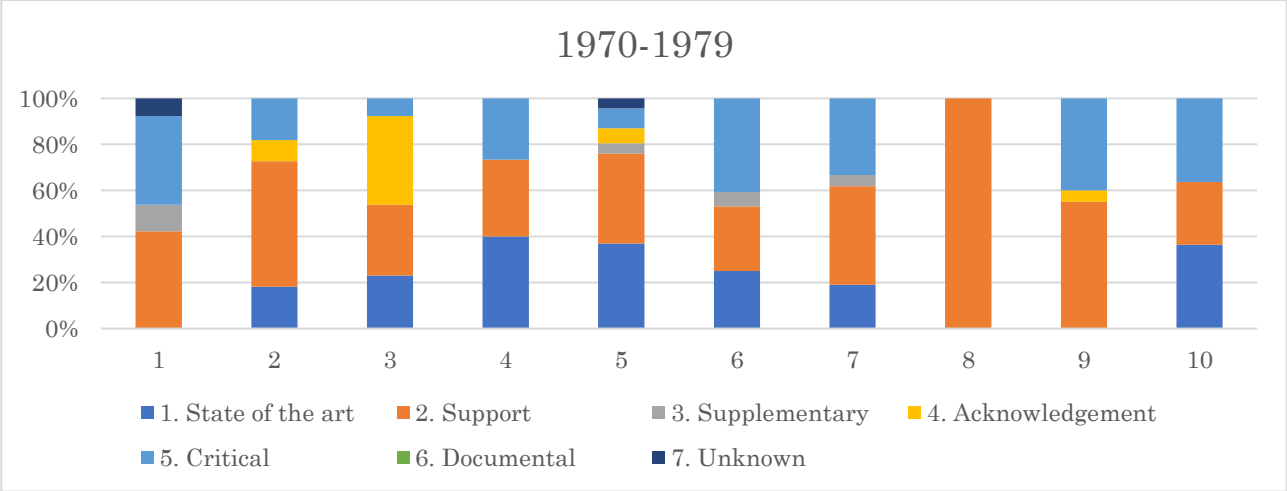
In sum, the main result of our study is that Late Analytic Philosophy can be considered a *sui generis* normal science. It is a normal science to the extent that the structure of Late Analytic Philosophy is shared in the community: the cognitive labor is indeed organized by the division of analytic philosophy into sub-disciplines and sub-areas. However, it is *sui generis* since the organization of the field is not matched by knowledge accumulation: within each of the sub-areas of Late Analytic Philosophy, philosophers debate in the classic philosophical fashion, without uncontested results. Thus, we conclude that Late Analytic Philosophy is a normal science in which only a soft, instead of strong, paradigm has taken over.

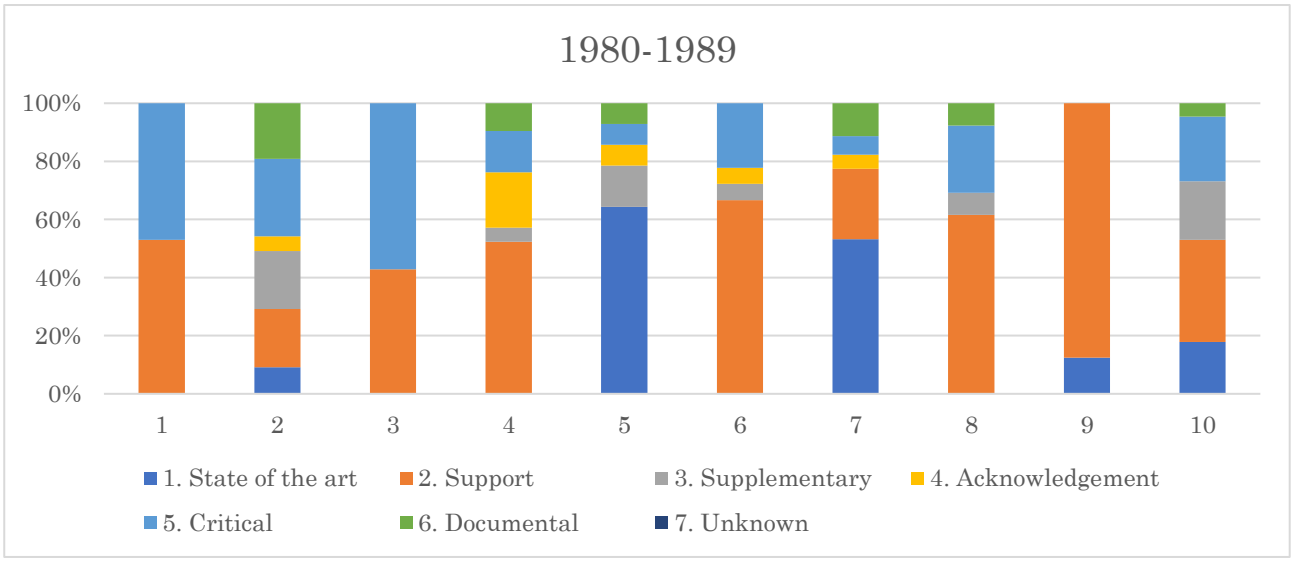
## Appendix

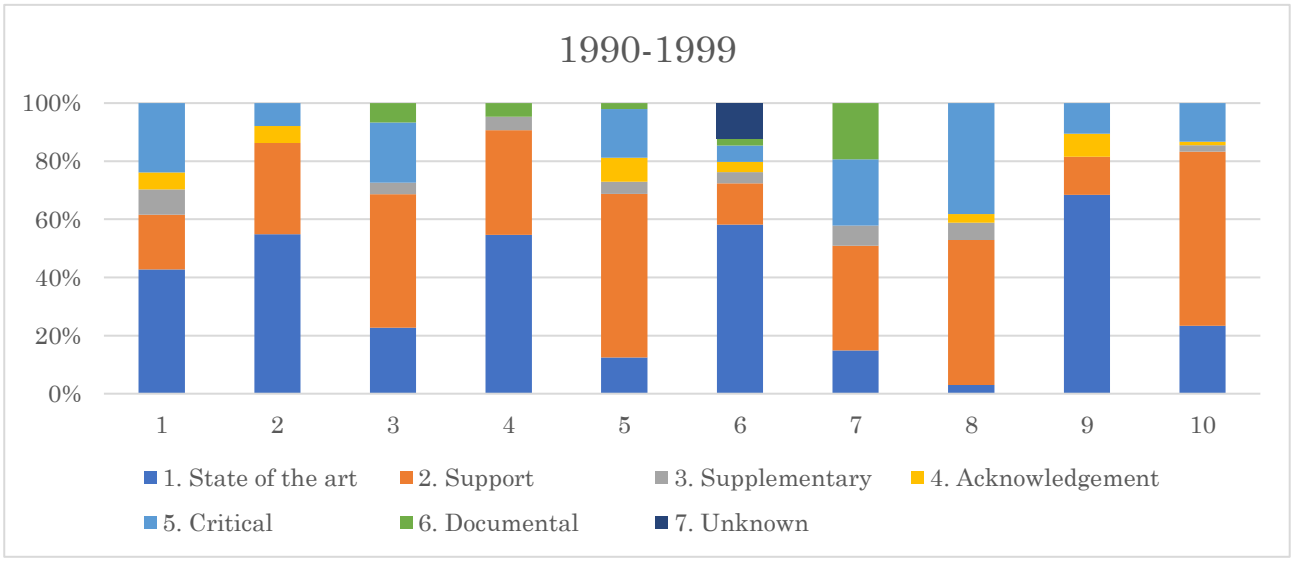
In this Appendix, the decade profiles are reported. In each of them, the percentage of the categories of citations for each of the 10 papers composing the decade are showed. The papers without cited references lack the column.




1980-1989
100%
80%
60%
40%
20%
0%
1
2
3
4
5
6
7
8
9
10
1. State of the art
2. Support
3. Supplementary
4. Acknowledgement
5. Critical
6. Documental
7. Unknown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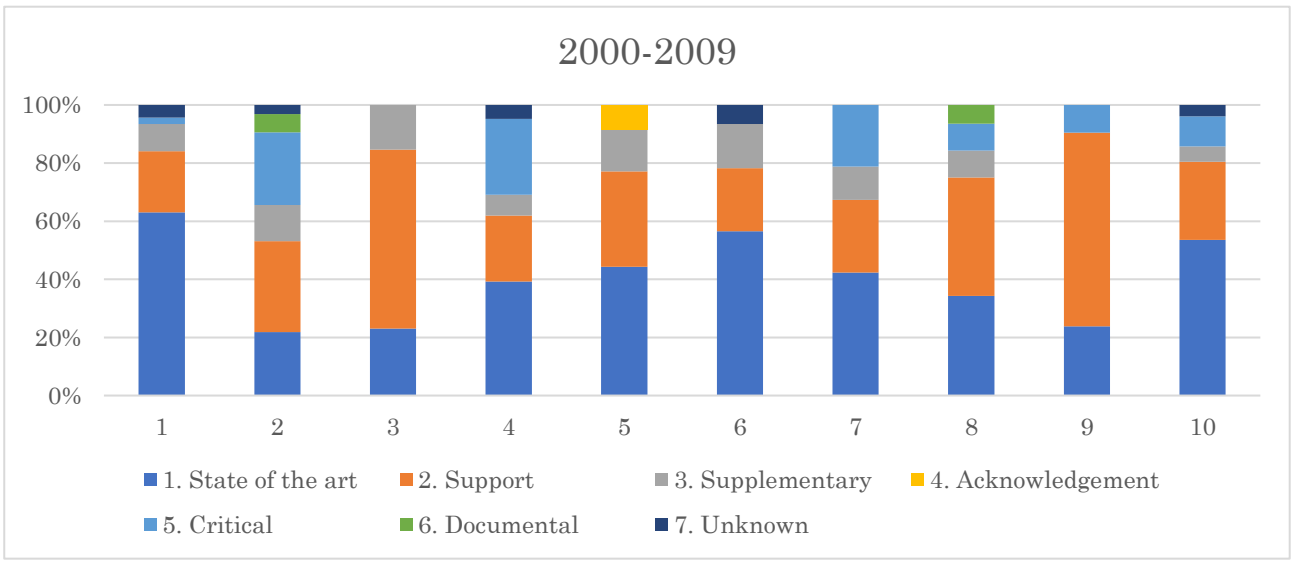
5. Critical
6. Documental
7. Unknown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2. Support
3. Supplementary
4. Acknowledgement
5. Critical
6. Documental
7. Unknown

## Fourth study. Aging and Life

### Introduction

This fourth study investigates the aging process of the literature of Late Analytic Philosophy, i.e., it investigates how back in time analytic philosophers, on average, cite. It is interesting to study the temporal scope of citations in Late Analytic Philosophy, because this sheds light on the relationship that analytic philosophers entertain with their past literature. Furthermore, in the sciences there is a characteristic tendency of citing only the most recent literature, whereas in the humanities the temporal scope of citations is considerably higher. In Continental philosophy, even authors more than two-thousand-year-old, such Aristotle, are sometimes cited as 'contemporary' colleagues. Thus, investigating the temporal dynamics of citations in Late Analytic Philosophy helps to understand better how much it is aligned with the sciences from the point of view of the use of the past literature.

However, it must be underlined that this study shows only preliminary results, and more refined analyses are needed, involving a more advanced mathematical machinery than the one we used here.

#### *The temporal dimension of the documental space*

The documental space of science has not only structural features, revealed by co-citation analysis, and epistemological properties, discovered by citation context analyses. It also has a *temporal* dimension, which is the results of (at least) three basic dynamics:

1. *Growth*. When new journals are founded, and new documents are published, the documental space grows. The growth of the documental space results in an increase in the set of citable documents.
2. *Obsolescence*. Not all the time zones of the documental space have the same probability of being cited. In fact, a portion of the old documents is not anymore cited. Their falling into oblivion is known as *obsolescence*. More generally, the constant movement of the documental space towards the past produces the *aging* of the documents.
3. *Life expectancy*. Once a document enters the documental space, it begins its citation life-cycle: other documents begin to cite it. Characteristically, in a first period the citations it collects grow, then they reach a peak, and finally they decrease to zero: the paper is no more cited, and it falls into oblivion. Life-expectancy is the same process of obsolescence, but it is approached from a different point of view. In life expectancy, the focus is on the destiny of the *cited* documents, whereas in obsolescence, the focus is on the relationship between the *citing* documents and their cited references.

The temporal dynamics of the documental space have attracted the attention of biblio- and scientometricians since the seminal paper by (P. L. K. Gross & Gross, 1927), who analyzed age distribution of journals cited by the Journal of the American Chemical Society. Since their contribution, the study of the temporal dynamics has considerably flourished, producing a plethora of studies mainly based on data coming from library loans and citation indexes. We will not review this huge literature, which is also rich in technical and mathematical details, but we will focus on some key concepts that are recurrent in the study of the temporal dynamics of the documental space. [104]

In particular, Price introduced in the debate two important notions: the concept of Immediacy Effect and the idea that the sciences can be distinguished based on their different aging processes (measured by the Price Index). The first concept was formulated by Price based on the study of the age distribution of the references in SCI papers (Price, 1965). Price discovered that, in science, the most recent papers are most likely to be cited compared to older paper. In other terms, the most recent literature of science is cited more often than one would expect on the basis of the simple probability model – up to 6 times the expected value. He called this diminishing preference of readers for older literature the 'Immediacy Effect' of science. A consequence of the Immediacy Effect is the skewness of cited references temporal distribution: the vast majority of references are made to recent literature (usually, the peak of the distribution occurs 2 or 3 years before the publishing year of the citing article).

Further research partially corrected Price's thesis of the Immediacy Effect. In particular, the development of mathematical models of the age-distribution of references highlighted that the distributions are in fact the results of two distinct processes (Egghe, 1993, 2010; Zhang & Glänzel, 2017b):

> Age-distribution of references given in recent papers will reflect two independent processes: *ageing* (scientists will be increasingly less interested in increasingly older literature) and *growth* (there were simply much less papers published in 1930 as there are in 1990, so there is less to be cited to earlier years) (van Raan, 2000, p. 351)

The mathematical models connecting these two processes show that the lower is the number of citable articles (i.e., the lower is the growth rate of the documental space), the higher will be the age of the cited references. For instance, Larivière et al. showed that during the First and the Second World Wars, when scientists published fewer papers than in the time of peace, the average and the median age of the scientific literature increased (Larivière, Archambault, & Gingras, 2008). On the contrary, in the case of growing literature, the age of the references will tend to

[104] Reviews can be found in (Line, 1993; Line & Sandison, 1974; Vlachý, 1985).

shrink, and the literature will become obsolete faster. In particular, the Immediacy Effect found by Price occurs only in the case of field growing exponentially (Egghe, 1993). Indeed, when Price made the measurement, scientific literature was in a phase of exponential growth. This is no more the case today: in the last decades, from 1980 onward, science seems to be entered a period of steady state (Larivière et al., 2008).

Along with the Immediacy Effect, Price also introduced the idea that hard sciences, social sciences, and non-sciences (i.e., humanities) can be distinguished based on the differences in the aging processes of the respective literatures. Price designed a specific scientometric diagnostic tool for this aim, the so-called Price Index (Price, 1986a). The Price Index is the percentage of references, for a given year, to material that is 5 years old or younger.[105] Price measured the Price Index for journals belonging to each of the above-mentioned categories and found that the Price Index correlated well with the intuitive notions of hard, soft and non-science. In particular, hard sciences are characterized by a high value of the Price Index, the social sciences by an intermediate value, and the humanities by a low value. According to Price, this also means that only the sciences are significantly affected by the Immediacy Effect, whereas in the humanities the distribution of the references is not 'flattened' towards the present. Even, Price observed that non-science journals (e.g. *German Review* and *Isis*) seem actively to ignore their recent literature, since the probability they cite recent contributions is even lower than the expected (Cozzens, 1985). Recently, Larivière et al. have studied the evolution in time of the Price Index and have discovered that, contrary to a widely held belief, the Price Index is not growing in science, but it is decreasing (Larivière et al., 2008). This trend urges some caution before interpreting the Price Index as an indicator of the 'hardness' of a science, since even paradigmatic cases of hard sciences such as physics saw their Price Index decreasing in time. Furthermore, Egghe has demonstrated that the decrease of the Price Index in time is another mathematical consequence of a literature expanding exponentially, and thus, he claimed the phenomenon is lacking any scientometric reason (Egghe, 2010).

Researchers after Price continued to investigate the temporal dynamics of the citation system of science. Before reviewing the three main methods that have been developed to approach this topic, it is important to underline that these studies also have an important *practical* side. As we saw in Chapter 2, the relationship between the theoretical and the practical sides of scientometrics is always very strong.

In the past, the main interest for the aging of scientific documents came from librarians in charge of the management of scientific libraries (Line, 1993; Line & Sandison, 1974). Before the

[105] Price used a threshold of 5 years, but also different thresholds may be used (Glänzel & Schoepflin, 1999).

scientific journals turned to electronic format, a pressing issue for librarians was the managing of the limited space available in libraries. It was crucial to develop a method for understanding when the issues that were no more used by scientists could be discarded. Librarians observed that scientists showed a preference for recent documents and begun to study whether the age of a document was correlated with the decline of its use. They were interested in saving shelf space and how long they need to keep each journal.

With the advent of the Internet and electronic journals, these issues have considerably downsized. Nowadays, the attention for the aging processes comes no longer from librarians, but from *science policy managers* (Costas, van Leeuwen, & van Raan, 2010; Moed, 2017). In fact, a central aspect of the design of the scientometric indicators used in research performance assessment is the determination of the *citation-windows* of the indicators. In order to understand whether an author has reached a significant number of citations, we need to know the average time in which papers in her area receive most of their citations, i.e., we need to determine the right citation-window for that area. For instance, papers in bio-medical areas collect citations faster than papers in mathematics: the former reach their citation peak before the latter. In the context of the evaluation of bio-medical and mathematical researchers such differences should be taken into account. Consequently, the citation-windows of the indicators should be tuned according to the average life-expectancies of the papers. Thus, the study of the aging of scientific literature has today important practical applications in the context of research performance evaluation.

### *Methods for studying the aging of the documental space*

In their classic review, Line and Sandison distinguished three approaches to the study of aging (Line & Sandison, 1974):

1. *Synchronous study*. The researchers study the time-distribution of references based on one fixed source year. This means that all the references of the documents published in year Y are considered, and they are distributed according to their publication year, i.e., their age relative to the year Y.
2. *Diachronous study*. The researchers follow the citations that a set of documents published in the year Y receive in the following years. The citations are distributed according to their distance from the year Y. The year of the citation peak is especially important. This kind of studies produce the life-curves of the papers that are used to determine the citation-windows of scientometric indicators.
3. *Diasynchronous study*. It consists of a series of synchronous studies carried out at different times. This approach allows for the measurement of changes in the aging process.

The synchronous and the diachronous studies are also known, respectively, as *retrospective and prospective citation* approaches (Bouabid & Larivière, 2013). The two different distributions produced by the two kinds of studies are shown in Figure 44.

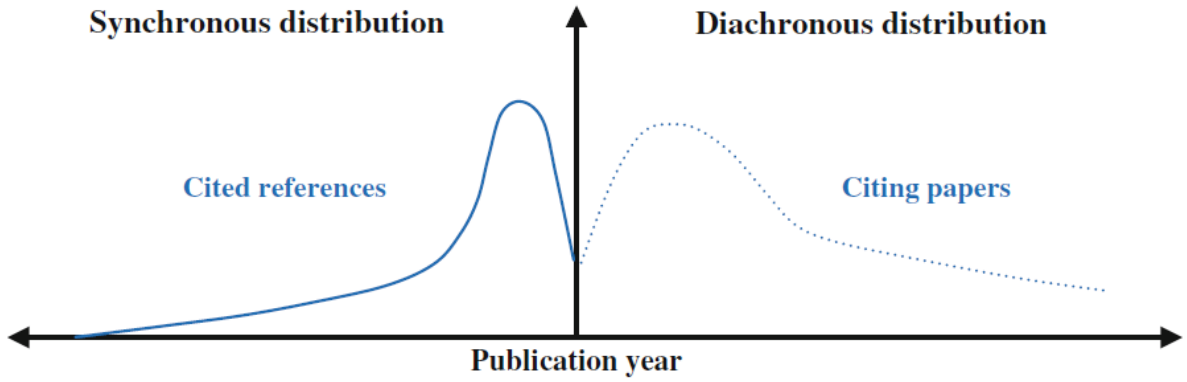


*Figure 44. Schematic representations of diachronous and synchronous citation distributions. Source: Boubadid & Larivière 2013, Fig. 1*

One of the main results of the diachronous or prospective studies has been the discovery that papers can be classified into different categories according to the distribution in time of their citations (Vlachý, 1985). For instance, Costas et al. propose to distinguish three general types of documents: delayed papers, which receive the main part of their citations later than normal papers, 'Flash in the pan' papers, which receive citations immediately after their publication but are not cited in the long term, and normal papers, which show a typical distribution of citations over time (Costas et al., 2010). Moreover, Van Raan has coined the term 'sleeping beauties' for denoting the papers which remain uncited for many years and then are suddenly re-discovered (the princess is 'awakened' by a prince), reaching high numbers of citations (van Raan, 2004). One of the most interesting areas of diachronous studies is the forecasting of citation distributions (See (Zhang & Glänzel, 2017a) and the cited bibliography).

However, it must always be remembered that, besides scientific merit, there are several factors that influence the citations that a document collects in time. Amongst them: author-related factors (professional age, rank of department, scientific reputation, prestige), content (theoretical vs. experimental, subject), publication type (journal vs book, highly cited journal or not, journal reputation), field (disciplinary/interdisciplinary), audience (national/international), language (English or not) (Vlachý, 1985).

Regarding the synchronous studies, which focus on the aging and obsolescence of documents, it must be underlined that we have to distinguish between the processes happening at the documental level and the processes happening at the intellectual level because the two do not always coincide. In fact, theories, ideas, and concepts can be incorporated in the intellectual

system of a discipline even if the original documents in which they were advanced are no more cited and hence have fallen into oblivion, from a documental point of view. Merton called this phenomenon 'Obliteration by Incorporation' (OBI) and it explains why many scientific classics (e.g. Einstein's 1905 paper on special relativity) are no more cited even if their contents are firmly incorporated into the intellectual system of science (Merton, 1988). Line and Sandison highlight that there are many possible destinies for the intellectual content of an obsolete document: it may have incorporated in later work (OBI), it may have been superseded by later work, it may belong to a field of declining interest, it may be no longer considered valid (Line & Sandison, 1974). Therefore, we are not always warranted to deduce from the aging of the documental space, an analogous dynamic of the intellectual level.

### *Aging studies of philosophy*

Until now, no study of the aging process of analytic philosophy has been produced. However, there are few studies containing some data on philosophy in general. Price calculated the Price Index for some philosophy journals and discovered that the P.I. of the generalist *American Philosophical Quarterly* was 12%, whereas science-oriented philosophy journals had higher P.I.s (*Journal of Symbolic Logic,* P.I. = 22%, *Philosophy of Science,* P.I. = 21%) (Price, 1986a). Buchanan and Herubel examined citations in ten Ph.D. dissertations in philosophy and political science and discovered that the two fields differed significantly in the age of the material used (Buchanan & Herubel, 1993). They also found that the monographs cited are, on average, older, than the articles: in philosophy dissertations, only 17.30% of citations went to monographs published in the last 5 years (34.19% in the case of political science), whereas 51.16% of citations went to articles published in the last 5 years (55.11% for political science). Lastly, Cullars carried out a synchronous study on the age of cited references in 183 philosophy monographs published in 1994 (Cullars, 1998). He found that 86.5% of the cited references were published after 1950 and that 36.4% of the cited references were published in the 1980s, the decade before the citing PY. Moreover, Cullars found that the citations to documents published prior to 1960 dropped off drastically. Cullars also cites a report according to which American philosophers consider 'recent' publications up to 20 years, but that the importance of currency varies from specialty to specialty.

## Methodology

We conducted three kinds of analyses. First, a diasynchronous study, in which we analyzed the temporal distribution of the cited references of the 'top' five journals for 7 subsequent intervals: [1980-1984], [1985-1989], [1990-1994], [1995-1999], [2000-2004], [2005-2009], and [2010-2014]. Second, we calculated the average Price Index of the articles of the five journals in each year, from 1980 to 2016. We used two thresholds: the classic 5-year window of Price and a 10-year

window. Thirdly, we conducted a diachronous study, in which we counted the total number of citations that articles published in the 5 journals in 7 subsequent years (1980, 1985, 1990, 1995, 2000, 2005, and 2010) collected in the following years.

The data for the analyses were extracted from the enhanced version of the Web of Science database owned by the Center for Science and Technology Studies (CWTS) of Leiden, during a visiting period between August and September 2017. The queries for the database were coded in SQL with Microsoft® SQL Server T-SQL (Figure 45 shows the code used to calculate the Price Index as an example) and the results were subsequently elaborated with Microsoft® Excel to generate the graphs.

```
-- CALCULATING THE PRICE INDEX IN TOP FIVE, WITH DIFFERENT THRESHOLDS

-- select the references of the items and calculate their age
drop table #age
select a.ut, c.py, a.[/y], (c.py - cast (a.[/y] as float)) as age, b.n
into #age
from wosdb.dbo.cr as a
join wosdb.dbo.ut as b on a.ut = b.ut
join wosdb.dbo.ui as c on b.ui = c.ui
join woskb.dbo.cwts_ut as d on b.ut = d.u
where c.py between 1980 and 2016
        and c.sq IN ('75562J0', '00201J0', '59644J0' , '68594J0', '75555J0')
-- philosophical review, nous, journal of philosophy, mind, philosophy and
phenomenological research
        and d.cwts_dt_no in (2, 4)
drop table #pub
select distinct ut, py
into #pub
from #age

-- select among the references the ones younger than TOT years

drop table #young_ref
select ut, num_ref = nr, pub_year = py, n_young_ref = COUNT (ut)
into #young_ref
from #age
        where age <= 5
group by ut, nr, py
select *
from #young_ref
order by ut

-- calculate the price_index = (100 * n_young_ref / nr) per each publication

drop table #result
select a.ut, pub_year = a.py, price_index_10_year = (case when b.n_young_ref
is null then 0 else ( 100 * cast(b.n_young_ref as float) / num_ref ) end)
into #result
from #pub as a
left join #young_ref as b on a.ut = b.ut

-- average the price index of publications per year

select pub_year, avg_price_index = avg(price_index_5_year)
from #result
group by pub_year
order by pub_year
```

*Figure 45. SQL code for the calculation of the Price Index*

## Results and discussion

### *Diasynchronous study*

The results of the diasynchronous study are shown in Figure 46. Note that the graph begins in 1910 because before this point the references are very scattered in time, resulting in a very noisy pattern that we do not show. In general, only a small portion of the references are given to documents published before 1950.

All the 7 distributions are highly skewed, showing a preference towards recent materials. The curves follow the typical trend of references we found in the sciences (van Raan, 2000). Each of them can be divided into two phases: a first phase characterized by exponential growth (clear when the curves are plotted on a logarithmic scale, see Figure 47[106]), followed by a second phase of steep decline after the reference peak is reached. Table 45 shows data of the peaks. Several observations can be made. First, the average peak occurs 5.57 years before the publishing year. Second, the age of the peaks is slightly increasing, from the first interval (5 years) to the last intervals (7 years).[107] Third, the 'height' of the peaks, i.e., the number of references reached in each peak, is clearly increasing: in the first interval, the height was 804 references; in the last one, 1 339. This increase is matched by the growth of the cited references (a trend we found in all the three previous studies): the total number of cited references increased of 265% from the first to the last interval.

Considering the diasynchronous pattern, we note that the distribution advances in time, meaning that the 'documental research front' of Late Analytic Philosophy is moving forward. If we 'slice' the graph in each year, we can observe how the probability that a document published in that year is cited in the following year decreases over time.[108] For instance, the probability that a document published in 1990 is cited in the interval 1995-1999 is 4.9%, whereas in 2010-2014 is 1.8%.

The diasynchronous pattern also allows to have a rough idea of the 'speed' of the research front, i.e., the velocity by which it is moving forward. This can be deduced from the age of the peaks: it seems that, in each interval of five years, the documental space of Late Analytic Philosophy has moved forward of circa 5 years, with a slight slowdown in the last interval.

[106] Hence, there is linear relationship over long periods of time between the logarithm of the number of references $R(t)$ and the time $t$.
[107] However, there are not enough data to exclude that this trend is a simple statistical oscillation.
[108] The probability is the ratio between the number of cited references of that year and the total number of cited references (the area subtended from the distribution curve).

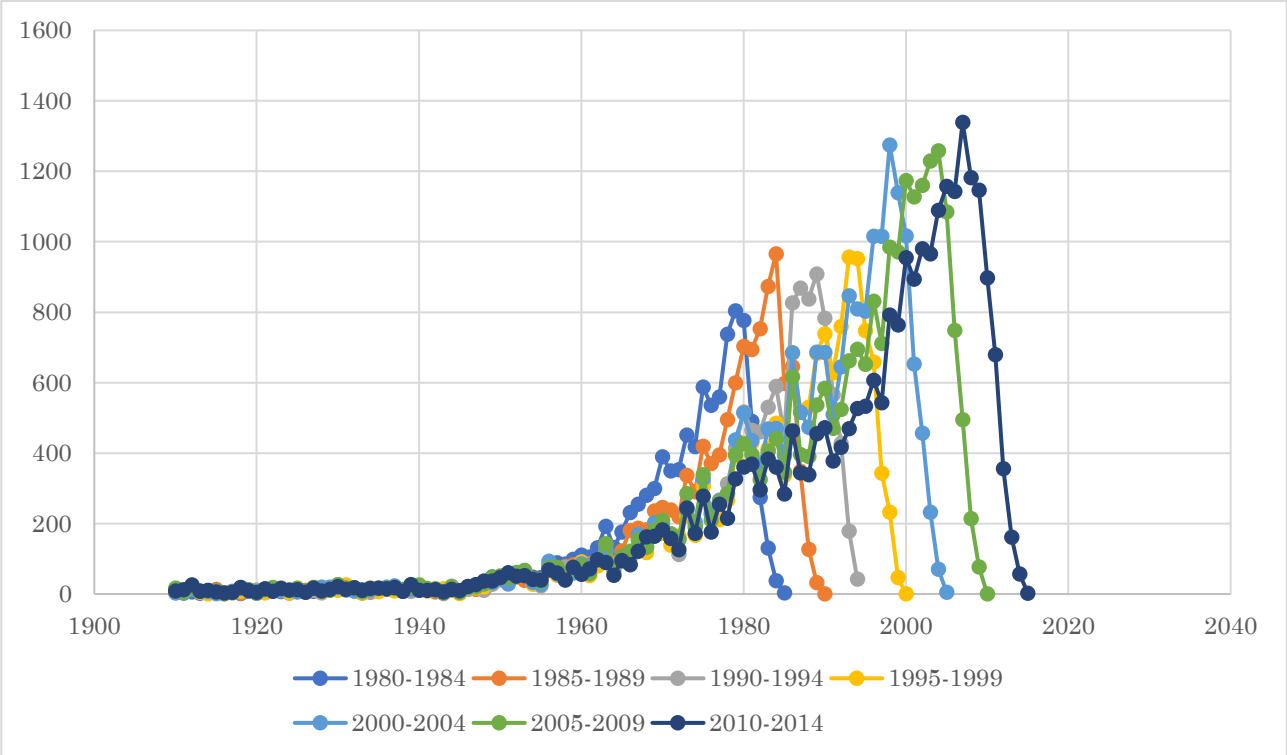


*Figure 46. Age-distribution of cited references in time for 7 intervals of publishing year*

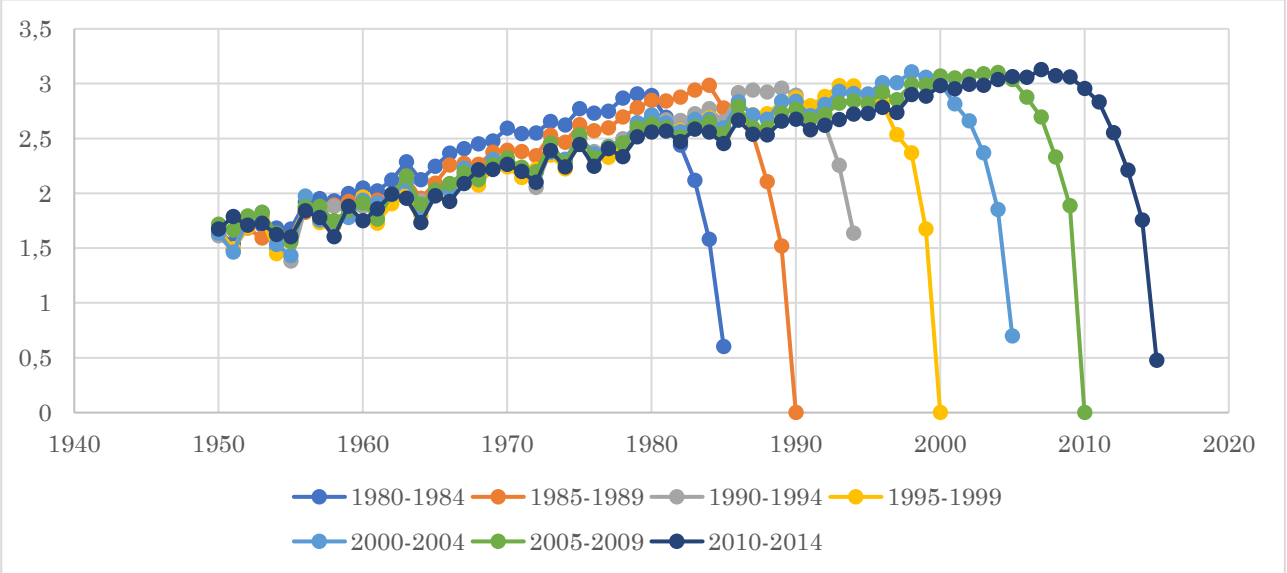


*Figure 47. Age-distribution of cited references plotted on a logarithmic scale*

As we saw in the Introduction, the age-distributions result from two processes: the *growth* of the documental space and the *decreasing interest* of scholars for older literature. To explain our distributions, it must be added another factor, namely the growth in the number of cited references. Further research is needed to understand the relative weight of each of the three processes. In particular, we need to develop mathematical models that can predict the empirical distribution we presented here. Such work is needed before an extrapolation from the documental aging to the intellectual dynamic can be done. We leave this for future work.

| Interval | Peak year | Age of the Peak | Max Cit | Total number of references |
|---|---|---|---|---|
| **1980-1984** | 1979 | 5 | 804 | 9934 |
| **1985-1989** | 1984 | 5 | 966 | 11786 |
| **1990-1994** | 1989 | 5 | 909 | 12984 |
| **1995-1999** | 1993 | 6 | 957 | 15154 |
| **2000-2004** | 1998 | 6 | 1275 | 20906 |
| **2005-2009** | 2004 | 5 | 1258 | 24792 |
| **2010-2014** | 2007 | 7 | 1339 | 26419 |
| **Average** | | 5,57 | | |

*Table 45. Reference peaks*

Lastly, Figure 48 and Figure 49 show the trend of the Price Index (with two different thresholds) over time. We recall that the Price Index is the percentage of references to materials younger than X years. Both graphs show a decreasing trend: the $P.I._5$ is decreased from 31.6% (1980) to 20.67% (2016), the $P.I._{10}$ from 51.01 (1980) to 40% (2016). In general, the Price Index of Late Analytic Philosophy is higher than the value Price found for humanities fields, and even slightly higher than the value he calculated for the science-oriented philosophy journals (which was around 22%). However, it is still distant from the P.I.s of medical areas (50% in 2000) and natural sciences and engineering (45% in 2000) (Larivière et al., 2008). Late Analytic Philosophy seems to be intermediate between hard sciences and humanities, i.e., close to the values of social sciences.

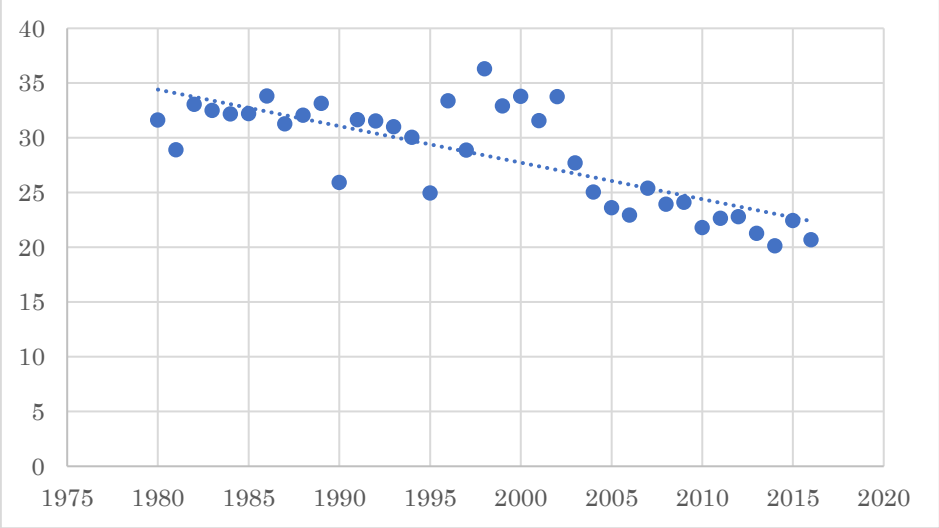


*Figure 48. Price Index of Late Analytic Philosophy over time, 5-year threshold*

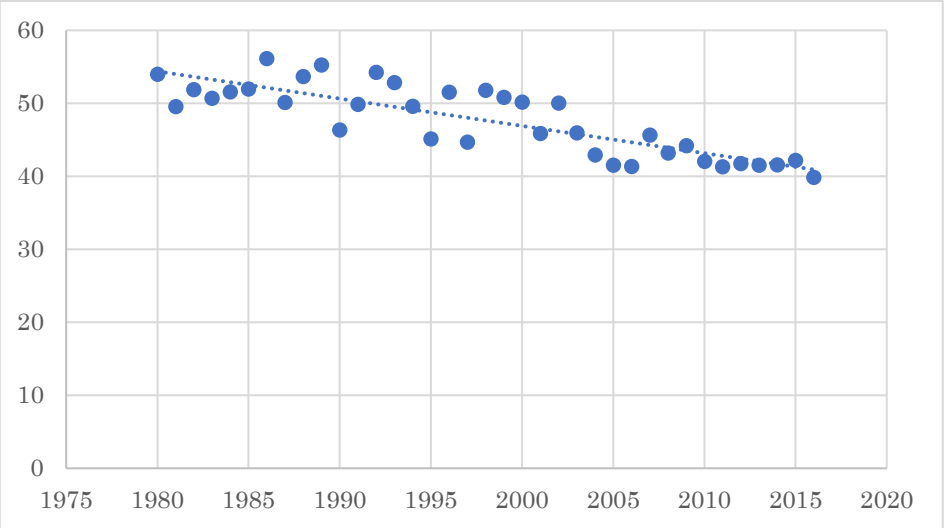


*Figure 49. Price Index of Late Analytic Philosophy over time, 10-year threshold*

### *Diachronous study*

Figure 50 shows the total number of citations that documents published in the five journals in each year receive in the next year (diachronous study). The most interesting finding is that, contrary to the citation distributions of the sciences (Šubelj & Fiala, 2017), the citation distributions of Late Analytic Philosophy do not seem to reach a definite peak. In other terms, the citations do not seem to significantly decrease in time (the only exception is the citation distribution of 1980 papers, which slightly decreases). As it was for the reference distributions, also the citation distributions reach higher heights, i.e., higher number of citations in time. Probably, this is an effect of the increase of the cited references: the more documents cite, the more it is likely that papers are cited. However, once again, most refined mathematical analyses are needed to understand better the relative weight of the different factors shaping the curves, and the relationship between the reference and the citation distributions.

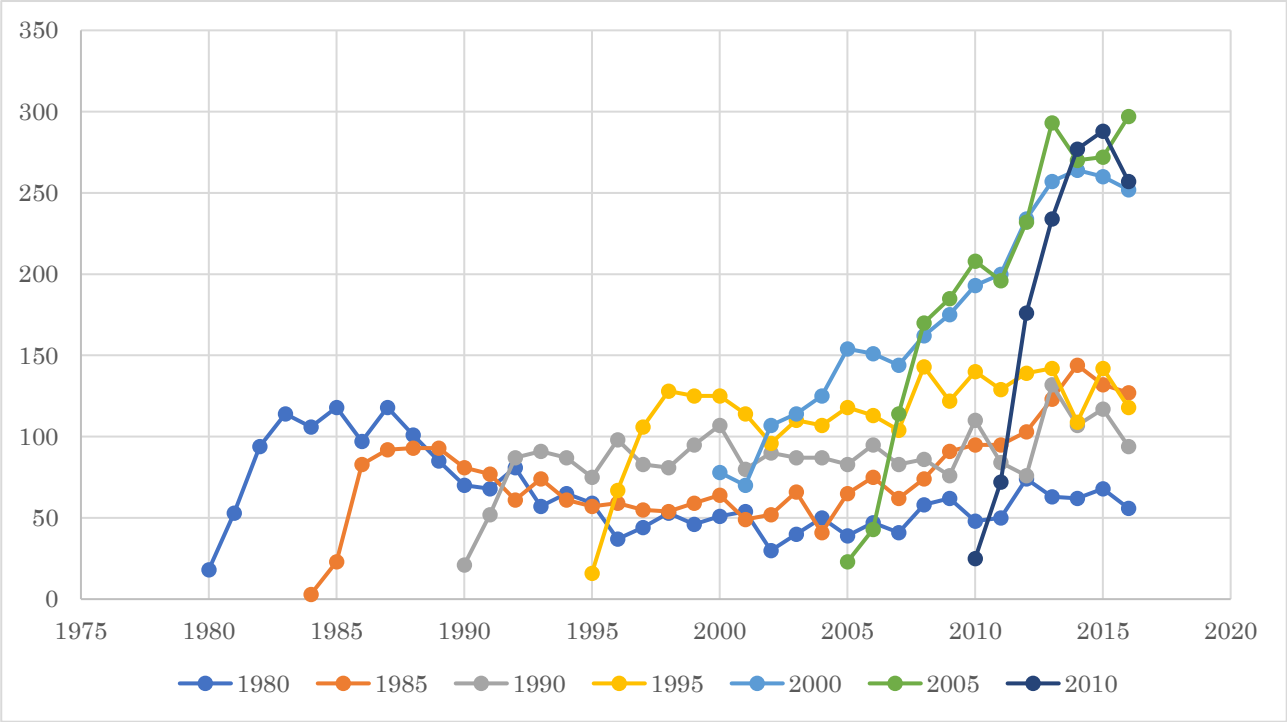


*Figure 50. Distribution of citations over time*

## Sum up and concluding remarks

In this study, we presented some very preliminary results concerning the temporal dimension of the documental space of Late Analytic Philosophy. Our aim was to shed light on the temporal relationship that analytic philosophers entertain with the documental space and to investigate the 'speed', so to say, of the research front of Late Analytic Philosophy. The age-distribution of references and the citation-life of documents can shed light on these topics. However, the analyses revealed that they are complex phenomena that need further research to be understood better.

Recently, Wray has proposed that an indicator of the normalization of a field may be the contraction of the median and average age of the cited references, i.e., that the entering a normal-scientific phase would be marked by a change in the temporal distributions of cited references (Wray, 2018). He suggests that «what we should expect if a field is advancing into a normal science state is that more recently published papers are citing more recently published literature». In this way, the aging process would be framed within the Kuhn's theory of normal science, receiving an epistemological interpretation. As we saw in the Introduction, Price had somehow a similar idea, when he proposed an age-related measure (the Price Index) as a means to distinguish between different kinds of science. Indeed, our first attempt to measure the normalization of analytic philosophy followed the same line of reasoning, before turning to citation context analysis.

However, the results of the diasynchronous study of references are difficult to interpret from an epistemological point of view. As we saw above, age-distributions are determined by different factors, and the trend of average and median age, as well of the Price Index, may be, in the end, no more than mathematical consequences of the process of 'natural' growth of the documental space, as Egghe suggests. Thus, we believe that more research is needed in order to interpret these distributions, also in the case of Late Analytic Philosophy: no clear conclusion can be drawn, for the moment, from them (Petrovich, 2018c).

The distribution of citations revealed by the diachronous analysis is worthy of further investigation too. However, the main result (i.e., that old documents continue to collect citations even after decades) suggests some practical implications. Until now, the use of citation-based indicators for evaluating research performance in the humanities is not widespread. However, if their use will be extended to the humanities, and in particular to analytic philosophy, data suggest that we should pay special attention to the dimension of the citation windows because the life of documents in Late Analytic Philosophy seems to be considerably *wider* than in the sciences. Nonetheless, further research is needed to understand better the life-cycle of documents in Late Analytic Philosophy. For instance, an interesting topic would be to investigate if also Late Analytic Philosophy presents the different kinds of papers, including the 'sleeping beauties', that we find in the sciences.

## Sum up and final remarks on Chapter 3

In this Chapter, we presented four studies, which applied different scientometric techniques to Late Analytic Philosophy. Recall that by 'Late Analytic Philosophy', we mean the *operational definition* of Late Analytic Philosophy we gave at the end of Chapter 2. Hence, Late Analytic Philosophy, in our studies, consists always in the set of all the articles published in the 'top' five journals in a determined time-span, along with their cited references and their citations. We called this complex object, made by documents and links between documents (i.e., citations), the 'documental space' of Late Analytic Philosophy. In fact, the documental space is the *citation network* of Late Analytic Philosophy.

Each of the four studies, by investigating different properties of the documental space, aimed at shedding light on the peculiar features of Late Analytic Philosophy that we highlighted in Chapter 1. In particular, we investigated the *fragmentation*, the *specialization*, and the *normalization* (i.e., the similarity to a Kuhnian normal science) of Late Analytic Philosophy. Already in Chapter 1, we noted that these features are peculiar to the extent that they are somehow difficult to approach by the traditional methods of the historiography of philosophy. Indeed, they do not concern any specific intellectual content (a theory, a concept, an idea) of Late Analytic Philosophy. Rather, they regard the whole field, i.e., the *structure* in which the intellectual contents are produced. Furthermore, they do not seem to be the result of the action of any specific individual (for instance, fragmentation is not the outcome of a philosophical theory advanced by an author) but the product of a myriad of *unintentional* actions which shape, in overall, the collective structure of Late Analytic Philosophy.

In the four studies, we developed these ideas by choosing a research method (citation analysis) that allows reaching a *massive* and *panoramic* point of view (Petrovich, 2018b). 'Massive' because software such as VOSviewer allows processing many more documents than the ones that could be close read, and 'panoramic' because it allows reaching a distant point of view from which we can grasp the whole field, in its structure and dynamics. The science maps that we presented in the second study are the epitome of the massive and panoramic history that can be done by citation analysis (in that case, co-citation analysis). However, each of the diagrams we presented is an example of the massive and panoramic history of Late Analytic Philosophy, since they condense, so to say, the actions of thousands of actors.

The massive and panoramic study of the documental space of Late Analytic Philosophy has suggested an important hypothesis, what we have called the *feedback hypothesis*. In Chapter 2, we organized the system of relationships between the social and the intellectual level by pointing out the existence of an intermediate layer, the documental level. The documental level

is the set of documents which are produced by the epistemic actors and that embody the intellectual content. As we noted in Chapter 2, the relationships between the levels can be framed in a Popperian terminology, by conceiving the documental level as the *ontological interface* between the 'Third World' of pure concepts and theories and the 'Second World' of epistemic actors. Now, the feedback hypothesis claims that the documental level is not an inert or neutral membrane between the social and the intellectual, between individuals and knowledge. On the contrary, the documental level has a 'life on its own' which shapes the actions of the individuals contributing to it. Hence, epistemic actors are both active and passive with respect to the documental level. Their activity consists in: producing the documental space by publishing new documents, managing it by controlling the editorial boards of journals, and sewing its fabric by citing other documents. At the same time, they are passive because their *possible actions* are shaped by the structure and the dynamics of the documental space. The documental space functions as an environment for epistemic actors: it sets different costs for different actions. For sure, it can be modified, but in order to do that, epistemic actors need to face the inertia of the environment.

Another way of formulating the feedback hypothesis is by saying that *the documental space presents a resistance to change* which conditions the actions of the epistemic actors. This resistance takes different forms and each of the studies we presented can be interpreted, from a certain point of view, as highlighting a different dimension of the inertia of the documental space of Late Analytic Philosophy. In the first study, it takes the form of the increasing average number of cited references per paper, in the second, the form of the clusterization pattern pushing towards specialization, in the third, the form of the rising tide of State of the art citations, in the fourth, the form of the ageing-distribution of cited references.

The hypothesis of the feedback mechanism discloses a new dimension in the history of Late Analytic Philosophy: *the history of the documental space itself*. The four studies of this Chapter are indeed contributions to such *documental history*. We hope to have shown that scientometrics is a crucial gateway to the documental space since it provides important methods to probe its structure and dynamics.

In the next and final Chapter, we will develop the notion of documental history by discussing its relationship with traditional historiography of philosophy, on the one hand, and sociology of philosophy, on the other hand. Thus, we will return to some of the methodological topics that we have already encountered in Chapter 1. This time, however, we will discuss them in the light of the results of the four studies of this Chapter.

# Chapter 4

At the end of the previous Chapter, we introduced the notion of 'documental history' as the methodological approach to the history of (late analytic) philosophy that focuses on the documental level. In Chapter 2, we defined this level as the interface between the intellectual level (the domain of intellectual contents such as concepts, theories, and arguments) and the social level (the domain of the social actors and their interactions). The documental history aims to describe and analyze the structure and the dynamics of the documental level. For doing this, it makes use of different kinds of citation analysis drawn from the field of scientometrics.

This Chapter aims to clarify further the idea of documental history by discussing it in the light of the current *methodological debates in the historiography and the sociology of philosophy*. The historiography of philosophy has a two-thousand years history, which dates back to the book Alpha of Aristotle's *Metaphysics*, the first main example of historical reconstruction of past philosophers' doctrines. On the other hand, the sociology of philosophy is a more recent research programme, which finds its roots in the classics of sociology (Marx, Durkheim, Weber) and the sociology of knowledge (*Wissenssoziologie*) promoted by Karl Mannheim. Recently, the sociology of philosophy saw major contributions in the works of Collins, Bourdieu, Gross, and Kusch (Bourdieu, 1991; R. Collins, 1998; N. Gross, 2008; Kusch, 1995).[109]

Regarding the historiography of philosophy, our aim is *not* to reconstruct all the positions and views that have been developed from Aristotle onwards.[110] Rather, we will focus on the recent debates, which, in the context of English-speaking philosophy, began with the historical and methodological works of Quentin Skinner and which found an important milestone in the

[109] See (Camic & Gross, 2001; Heidegren & Lundberg, 2010) for an overview of the sociology of philosophy.
[110] An excellent reconstruction of the history of the historiography of philosophy, from the Antiquity to Hegel, is provided in (Braun, 1995). Note that Lucien Braun was a student of Georges Canguilhem. See also the monumental four-volumes history of general histories of philosophies edited by Santinello and Piaia (Santinello & Piaia, 1979).

volume *Philosophy in History. Essays on the Historiography of Philosophy* edited by Skinner, Rorty, and Schneewind (Rorty, Schneewind, & Skinner, 1984).

Regarding the sociology of philosophy, we note that sociologists have also discussed several methodological concepts developed in the historiography of philosophy. Indeed, the fields of historiography and sociology of philosophy partially overlap since, often, the sociology of philosophy is associated with an 'externalist' approach to the history of philosophy, and sociology of philosophy is referred as 'external history of philosophy'. In fact, even the relationship between historiography and sociology of philosophy is not clearly established: sometimes the sociology of philosophy is taken to be a part of the historiography of philosophy (Gracia, 2000), sometimes it is conceived as a sub-area of sociology (Heidegren & Lundberg, 2010), sometimes even it is proposed as a contribution to philosophy *tour court* (Kusch, 1995). In general, the methodological debates both in historiography and sociology of philosophy are characterized by a flourishing of different taxonomies and classifications, in which almost every author proposes her own way of classifying approaches and methods.

Therefore, before addressing the topic of the relationships between the documental approach, the historiography of philosophy, and the sociology of philosophy, we need to *systematize* the methodological options that are currently available within the historiographical and the sociological debate. In particular, we propose to distinguish *three main theoretical issues* around which the discussion turns. We believe that, even if these problems are deeply inter-connected, it is better not to confuse them (as it is frequently done) but to discriminate them from an analytical point of view clearly.

Once these issues are clarified, it will be easier to specify the defining traits of the documental history and highlight what is its contribution, respectively, to the historiography and the sociology of philosophy.

## Three main issues in historiography and sociology of philosophy

In the recent debates in historiography and sociology of philosophy, three different theoretical issues are often discussed at the same time, as if they were declinations of the same problem. However, they raise from three different types of theoretical questions, whose answers do not necessarily overlap or overlap only partially. These issues are:

1. The problem of *understanding the meaning* of philosophical texts. What is the meaning of a philosophical text? What factors should we take into account in order to understand that meaning correctly?

2. The problem of *determining the causes* of philosophical change. What is the cause of the change from philosophical theory A to philosophical theory B? What is the engine of the changing of philosophical contents in history?
3. The problem of *explaining individual intellectual actions.* Why does a philosopher produce this philosophical content instead of that? What are the determinants of the intellectual behavior of philosophers?

For each of these problems, different solutions have been proposed by both historians and sociologists of philosophy. Moreover, even if both historiography and sociology of philosophy addresses all the three problems, the two disciplines tend to focus more on some of the questions instead of others, putting different emphasis on the questions that they deem to be central.

### Understanding the meaning of philosophical texts: textualism vs. contextualism

The first problem concerns the *meaning* of philosophical texts. According to Skinner, this problem is the «basic question of the history of ideas». From a methodological point of view, it consists in asking «what are the appropriate procedure to adopt in the attempt to arrive at an understanding of the work?» (Skinner, 1969, p. 3). We can distinguish the following sub-problems in the problem of meaning:

1. The problem of *anachronism*: should we reconstruct the meaning of philosophical texts in their own terms, or are we allowed to translate the past terminology into our contemporary conceptual framework? Is the meaning of the words used by past philosophers the same than the one we currently attribute to them, or as it changed in time? Is the meaning of philosophical concepts and problems stable in time or has it shifted?[111]
2. The problem of the *textual context*: in order to understand a philosophical text, should we focus only on the target text, or should we contextualize it in a network of texts (e.g. the entire *oeuvre* of the author, or the whole controversy to which the text belongs)? Should we consider only philosophical texts, or should we widen the scope to other disciplines, including e.g. scientific, literary, political texts?
3. The problem of the *background*: what is the role of the social, political, religious, and economic background of the text? Should we consider these non-textual factors as shaping the meaning of philosophical texts, and hence as essential ingredients in our

[111] Clearly, the problem of the meaning-shift in the history of philosophy is the counter-part of the same problem in the history of science. This problem was brought to the attention of philosophers by Kuhn and Feyerabend and fueled new theories of meaning in the philosophy of language (e.g. the causal theory of reference proposed by Kripke and Putnam). It is this kind of debates that Rorty, Skinner, and Schneewind have in mind when they write their Introduction to (Rorty, Schneewind, & Skinner, 1984).

> comprehension of that meaning, or are philosophical texts autonomous from these background conditions, so that we can ignore them?

The answers that historians and sociologists of philosophy have given to these questions can be divided into two general positions, which represent two opposite approaches to the problem of meaning. We can call them *contextualism* and *textualism* (Gracia, 2000). Skinner provided the first definition of these two approaches.

> The first […] insists that it is the *context* "of religious, political, and economic factors" which determines the meaning of any given text, and so must provide "the ultimate framework" for any attempt to understand it. The other orthodoxy […] insists on the autonomy of the *text* itself as the sole necessary key to its own meaning (Skinner, 1969, p. 3)

Thus, according to contextualism, the text is not an autonomous unit, but must be contextualized at different levels: it must be contextualized in the network of texts to which it belongs, but also in the wider social, political, and religious background. Only by taking into account all these contextual and extra-textual factors, the meaning of the texts can be rightly understood. Note that such contextualization functions at the same time as a *historicization* of the text itself, i.e. the meaning of the text is meant to be essentially bound to a set of historical circumstances. It follows that any extrapolation of the text from its context and background will result in a misunderstanding of its very meaning. Specifically, if a contemporary terminology is superimposed on it, it will result in an *anachronistic* reading of it. Indeed, Skinner draws an important methodological consequence from contextualism. This consequence is a constraint on the possible meanings that the historian of philosophy can attribute to a text:

> Any plausible account of what the agent meant must necessarily fall under, and make use of, the range of descriptions which the agent himself could at least in principle have applied to describe and classify what he was doing (Skinner, 1969, p. 29)

This principle asserts that the contextual and background factors cannot be ignored in the understanding of meaning, because they provide «an ultimate framework for helping to decide what conventionally recognizable meanings, in a society of *that* kind, it might in principle have been possible for someone to have intended to communicate" (49). Thus, according to Skinner, the context plays a central *methodological* role in the understanding of philosophical texts: it is not a side concern, but an essential condition for the main task of the historian of philosophy. Rorty has called the kind of history of philosophy that is produced following the Skinner's principle 'historical reconstruction', whereas, Peckhaus, more recently, has called it 'contextual history of philosophy'. Contextualist history of philosophy «combines the traditional history of

ideas with investigations into the personal, social, institutional and cultural conditions for the production of philosophical knowledge» (Peckhaus, 2000, p. 179).

Clearly, sociologists of philosophy have favored a contextualist approach to the history of philosophy. In particular, they have stressed the importance of the non-philosophical textual context and of the socio-political background for the understanding of philosophical texts. Bourdieu, in particular, in his study of the philosophy of Heidegger, has insisted on the need of a 'dual reading' of philosophical texts (Bourdieu, 1991). The double-reading approach consists in treating the philosophical text as conveying, at the same time, two kinds of meaning: on the one hand, meanings that can be recognized as philosophical by the philosophical community (e.g. a philosophical theory); on the other hand, meanings which are part of the political struggle of the society to which the philosopher belongs. In the case of Heidegger, Bourdieu shows that the conceptual dichotomies that we find in the ontology of *Being and Time* (such as the couple authenticity/inauthenticity) can be found at the same time in the political discourse of the radical conservatives intellectuals of the Weimar Republic. They are in fact isomorphic to politically-laden dichotomic couples spread in the radical conservative environment, such as the contrapositions between *Volk* and mass, *Kultur* and civilization, Germany versus Britain and France. Thus, according to Bourdieu, the ontology developed in *Being and Time* expresses not only a philosophical view, but also a *philosophically sublimated* anti-modernism, elitism, and radical conservatism. Bourdieu's form of contextualism consists in stressing the importance of the political and extra-philosophical context in order to understand correctly the meaning of philosophical texts, which need to be always read with a 'dual-reading' approach.

In the context of the historiography of philosophy, Laerke has recently proposed a theoretically-elaborated form of contextualism, which stresses the importance of the *textual network* for the correct understanding of the meaning of past philosophical texts (Lærke, 2013). Laerke shares with Skinner the idea that the understanding of meaning is the main task of the historian of philosophy: «it is uncontroversial that the interpretation of past philosophical texts is indeed what the historian of philosophy is concerned with» (Lærke, 2013, p. 3). However, contrary to Skinner, he argues that the meaning of past philosophical texts is not reducible to the intention of the author of the text. On the contrary, according to Laerke, the meaning is determined by the whole historical debate that the text is considered a contribution to by those who write or read it. Thus, the correct methodology for the historian of philosophy consists in placing the text in the wider textual network to which it belongs:

> The relevant intellectual context for establishing the true historical meaning of a given past philosophical text is circumscribed by the totality of other texts contributing to the historically determined controversy to which the text in question is also a contribution,

> the "controversy" being here defined as a given cluster of texts that historically "gathers" around the text in question and that, as it were, constitute a historical commentary on the text (Lærke, 2013, p. 18)

The three examples of contextualism we have just discussed focus each one on one of the three sub-problems of the general problem of meaning: Skinner insists on contextualism as a means to avoid anachronism in historical reconstruction, Bourdieu highlights the importance of the socio-political background as a key to unveil the double philosophical and political meaning of philosophical texts, Laerke argues that the meaning of the text is not defined once and for all by the intention of the author, but it is shaped and negotiated by the entire textual context of the text in question.

As we said before, the opposite view to contextualism is textualism. According to textualism, the text is an independent unit, whose meaning can be understood without considering neither the textual context (what Laerke calls the controversy of the text) nor the non-textual background. Thus, textualists believe that the manifest content of the text entirely conveys the meaning of it: «the *text* itself should form the self-sufficient object of inquiry and understanding» (Skinner, 1969, p. 4). Textualism refuses contextualism because it claims that contextualism, reducing the philosophical text to its historical circumstances, amounts *per* se to denying that philosophical texts contain elements of timeless interest or claims to ahistorical truth. Textualism underlies what Rorty calls the historiographical genre of the 'rational reconstructions'. In a rational reconstruction, the philosophical text is not considered as a product of its time, but as the ahistorical expression of a determinate philosophical theory or view. Thus, the philosophical doctrines are discussed as if they were contemporary to the historian. Peckhaus has called the rational reconstruction a 'philosophical approach' to the history of philosophy. According to this approach,

> texts dealing with philosophical problems and their solutions are analyzed and interpreted in order to make them understandable and to reveal their potential, but also to give rise to thoughts in historical argumentation to serve the purposes of contemporary systematic philosophy. In the purest form of this approach the historian abstracts form the historical context of the text, i.e., the contingent circumstances of the formation and formulation of the thoughts expressed in the text. (Peckhaus, 2000, p. 180)

A clear consequence of textualism is the rejection of Skinner's constraint: the textualist historian is free to translate the terminology and the concepts of the past texts into the ones familiar to him. Several analytic philosophers practiced this kind of history in the middle phase of analytic philosophy: a prominent example is Strawson discussing Kant's *Critique of Pure*

*Reason* (Strawson, 1995). The plain anachronism of works like this prompted the reaction of historians of philosophy like Skinner. In fact, (Skinner, 1969) is a close inspection of the several dangers that the textualist approach falls into (besides anachronism, there is also the danger of hypostatizing ideas, thinking that they recur multiple times in history – a danger that Skinner sees particularly in the history of ideas promoted by Lovejoy).

In the last decades, the history of analytic philosophy, and the history of logical empiricism in particularly, has increasingly abandoned the pure textualist for the contextualist approach (Giere & Richardson, 1996; Hardcastle & Richardson, 2003; Stadler, 2001; Uebel & Richardson, 2007). One of the most prominent examples of this turn is the work of Galison (Galison, 1990, 1996). Galison has shown extensively how the cultural background of the post-war Vienna is essential to understand the meaning of Carnap's *Der logische Aufbau der Welt*. In particular, Galison highlights how the word *Aufbau* had a peculiar meaning in the context of the reconstruction after the war, being it associated with the ideas of a rupture with the past and of a radical transformation of social, political, educational and even architectural practices. It was then particularly well fitted for expressing the modernist stance of the Vienna Circle to which Carnap belonged. Thus, Galison shows that the true meaning of the *Aufbau* can be appreciated only if it is set into the broader textual and non-textual (socio-political) context in which Carnap wrote it. The underlying contextualism is evident.

In sum, the first theoretical problem that we find in the methodological discussions in historiography and sociology of philosophy is the problem of how to deal with the *meaning* of philosophical texts. We called the two opposite answers given to this problem contextualism and textualism. According to the former, the meaning of the philosophical texts is essentially shaped by both the textual context and the non-textual background. Hence, a correct understanding of the meaning of the texts involves the reference to both these factors. According to the latter, the text is an independent unit, whose meaning is fully contained in its manifest content. Hence, no reference to the broader historical, intellectual, or social context is necessary to grasp it.

### Discovering the determinants of philosophical change: internalism vs. externalism

The problem of understanding the meaning of philosophical texts should be distinguished from another problem that, even if its closely related to it, it is different. This problem concerns the determination of the *causes of philosophical change*. By philosophical change, we mean the basic historical fact that philosophical contents *change* in time: new philosophical views are created, positions that were once dominant lose their ground, old theories are rediscovered and adapted to new theoretical concerns, new philosophical sub-disciplines emerge, others evaporate, etc.[112]

[112] Our notion of 'philosophical change' is clearly modelled on the notion of 'scientific change'.

One of the main purposes of both historiography and sociology of philosophy is to *explain* the dynamics of philosophical change by highlighting the factors (be them reasons or causes) that produce it:[113]

> Identifying the causes that give rise to philosophical views […] is the core of the history of philosophy, for the core of all history is the explanation of why something occurred and the why something occurred is what we generally identify as the causes of it. […] For a history of philosophy, this explanation involves establishing the causes that gave rise to the views of particular authors at particular times. (Gracia, 2000, p. 203)

Skinner has clearly pointed out the difference between the problem of *understanding the meaning* of philosophical contents and the problem of *explaining their causes*. Drawing from the work of Davidson, he notes that there is a difference between the antecedent *causal conditions* of an action and the *point* of the action itself. This difference also holds for the philosophical contents: one task is to explain their *occurrence* by highlighting their causes, another task is to understand their *meaning* – meaning that, according to Skinner, coincide with the intention of the original author. As Skinner says:

> It may still be strenuously doubted, however, whether a knowledge of the causes of an action is really equivalent to an understanding of the action itself. For as well as – and quite apart from – the fact that such an understanding does presuppose a grasp of antecedent causal *conditions* of the action taking place, it might equally be said to presuppose a grasp of the *point* of the action for the agent who performed it. […] Even if the study of the social context of texts could serve to *explain* them, this would not amount to the same as providing the means to *understand* them. (Skinner, 1969, pp. 44–46)

Now, it is clear that the problem of understanding the meaning and the problem of explaining the occurrence are not completely independent. Indeed, in order to explain something, we need to understand *what* this something is. Analogously, the explanation of the philosophical change needs at the same time an understanding of what is changing, i.e. the understanding of the meaning of philosophical contents; otherwise, the explanation is pointless. However, the two problems are analytically distinct and the answers that have been proposed to the problem of explaining philosophical change are not coincident with the ones given to the problem of understanding the meaning of past philosophical texts, even if historians and sociologists often associate them.

[113] «I am interested in understanding the dynamics of philosophical controversies and the causes of their emergence and termination» (Kusch, 1995, p. 2)

In particular, we can distinguish two main positions regarding the problem of philosophical change: we can call them *internalism* and *externalism*. According to internalism, philosophical contents develop in time following their inner logic. Hegel clearly epitomizes internalism, in so far as he argues that the philosophical theories develop one into another following the dialectical logic, culminating into Hegel's system itself (as it is well known, Hegel's philosophy of history is intrinsically teleologic) (Hegel, 1996). However, one needs not be Hegelian for being internalist. In fact, in the contemporary historiography of philosophy, internalism corresponds to the weaker claim that philosophical contents change because they are modified by the interplay of *arguments and reasons* that philosophers employ in time. In other words, according to internalism, philosophical contents change because there are (good) reasons for changing them: for instance, the demise of psychologism is explained by arguing that Husserl and Frege *refuted* it. As a result of the refutation, philosophers moved forwards towards other topics (Kusch, 2000). Another example of the internalist approach is the explanation provided by Soames and Misak of the success of logical positivism in America (Misak, 2010; Soames, 2008). According to them, «the philosophical merits of analytic philosophy and the welcoming, or at least compliant, nature of pre-1950s American philosophy facilitate the growth of mid-century analytic philosophy in America» (Katzav & Vaesen, 2017a, p. 785). Thus, the internalist explanation refers only to intellectual factors (such as arguments or refutations) in order to explain philosophical change. From a methodological point of view, internalism pushes the historian of philosophy towards a careful analysis of the argumentative and logical structure of past philosophers' texts. Therefore, it is often associated with a textualist position regarding the meaning. The reason is that, usually, internalists think that the meaning of the *philosophical* text, as opposed to the meaning of, say, the literary text, is of *rational* kind. Indeed, Rorty's term 'rational reconstructions' is perfectly suited to characterize histories of philosophies that are both *textualists* at the level of meaning and *internalists* at the level of change, since it stresses the pivotal role of reason in this kind of history of philosophy. Reason is taken to be central both for understanding the meaning of philosophical texts and for explaining why philosophical contents change in time.

*Externalism* is the opposite view to internalism. According to externalism, the determinants of philosophical change are not intellectual reasons, but several kinds of non-intellectual *causes*. Usually, these causes are not directly represented in the philosophical text but are part of its non-textual background: this is the reason why usually externalism is often associated with contextualism regarding the meaning.[114] Kusch's study of the rise and fall of psychologism in

[114] Note however that this should not be always the case. For instance, imagine a sort of 'hermeticist' reading of history of philosophy. Such a reading would focus only on the texts, without considering the

the German-speaking philosophy between 1880 and 1920 is a good example of an externalist account of a philosophical change (Kusch, 1995). Kusch is interested in determining why the controversy over psychologism at the beginning of the Twentieth century attracted the attention of the whole German-speaking philosophical community, producing a true tide of texts, arguments, reciprocal accusation of psychologism, whereas after the First World War philosophers quickly abandoned the topic. Following the Sociology of Scientific Knowledge promoted by the Edinburgh School, and adopting the terminology coined by Henry Collins, Kusch wants to discover the «mechanisms of closure» of the controversy (Kusch, 1995, pp. 25–29). Kusch' study aims to demonstrate that the closure mechanism involves essentially *social elements*. In particular, he shows that the controversy over psychologism was caused by the struggle between philosophers and the emerging experimental psychologists for controlling the chairs in the German philosophy departments. Thus, it was mainly rooted into opposite professional interests between two academic groups: philosophers were threatened by the expansion of experimental psychologist in their departments (between 1892 and 1914, experimental psychologists passed from holding 7% of the professional philosophical chairs to an impressive 22%). The 'pure philosophers' arrived even to organize a petition to all German universities in which they demanded that no more chairs in philosophy be filled with experimental psychologists. In the traditional history of philosophy, the defeat of psychologism is attributed to Husserl's and Frege's refutations: philosophical change is explained based on an intellectual factor (a winning stream of arguments). In Kusch's account, on the contrary, the controversy is not resolved but simply *abandoned*: philosophers changed their focus of attention. This was caused, in turn, by a complex set of *socio-political factors*. On the one hand, the politicians had become disenchanted with the experimental psychology, that had not delivered the kind of applicable knowledge that it has promised to produce. Thus, no new chairs were funded, and philosophers quickly managed to regain several chairs earlier been held by experimentalists. On the other hand, and most importantly, the First World War deeply changed the generation of students that arrived at the university in the 1920s. This generation, that had experienced a long and bloody war, was no more interested in the dry and 'intellectualistic' dispute over psychologism. It was more attracted by the 'existentialist' themes that could be found in the non-academic philosophy, such as Spengler's *Der Untergang des*

context, but would look for a secret meaning within the text itself. Then, it could argue that the 'true causes' of philosophical change lie in the dynamics of the secret meaning and not in non-textual factors such as social and political factors. From a certain point of view, Hegel's approach to the history of philosophy is similar: indeed, Hegel claims to have discovered the true law of philosophical change (the dialectics). This law was unknown to the past philosophers but was nonetheless guiding their philosophies. At the same time, the dialectical logic is immanent to philosophy, so that Hegelian explanations of philosophical change do not include non-intellectual, e.g. social, causes.

*Abendlandes* (1918). Heidegger and Scheler, along with different forms of *Lebensphilosophie*, quickly become the heroes of this generation. Thus, the debates over psychologism were forgotten and Husserl acquired the status of the philosopher who refuted definitely the 'philosophical mistake' of psychologism.

As we can see from this brief summary, Kusch's reconstruction involves several sociological factors: professional interests, struggles over professional chairs, wars, changing in the mentalities. These factors play an essential causal role in determining the outcome of the controversy. In fact, they are more important, from a causal point of view, than the philosophical reasons and arguments: according to Kusch, 'psychologists' were not won by Husserl's and Frege's arguments but by a constellation of sociopolitical factors. From this point of view, its reconstruction is a clear example of the externalist history of philosophy.[115]

In the History of Analytic Philosophy, several historians have recently argued that the emergence of analytic philosophy, as well as its dominant position in the UK and in the US, should be explained by an externalist approach, i.e., by referring to social, political, and institutional factors, instead of an internalist approach that would refer to the philosophical superiority of analytic arguments over the ones of their competitors (pragmatists in US, British idealists in UK).

As we saw in Chapter 1, according to (Akehurst, 2010), the dominance of analytic philosophers in the UK is the result of the peculiar «cultural politics» of the fathers of British analytic philosophy (Russell and Moore) and of the second generation of analytic philosophers (comprising Oxford philosophers like Ayers, Ryle, Austin, and Berlin). Contrary to the traditional image of analytic philosophers as detached from political issues and struggles, Akehurst shows that these philosophers were deeply concerned with the chaotic times in which they lived: the rise of analytic philosophy indeed coincide with one of the most turbulent periods of the Twentieth century (the two World Wars, the appearance of fascist and communist ideology) and many of the most significant analytic philosophers were also soldiers, intelligence officers or code breakers. Akehurst shows that the self-image of the analytic movement was deeply shaped by a nationalist effort to distinguish 'Britishness' from the 'Continent', and in particular from Germany. German philosophy, and Idealism in particular, was seen by Russell

[115] From a theoretical point of view, however, Kusch's position is more elaborate. In fact, he refuses the dichotomy between rational arguments and social factors because he claims that arguments and theory *are* social entities (a position he calls 'sociologism'). Drawing on Davidson's 'anomalous monism', Kusch argues that the social 'supervenes' on the rational (Kusch, 2000). Thus, probably, Kusch would deny of being classified as an 'externalist', because he would argue that there is no real difference between externalism and internalism: internal, intellectual reason *are*, according to him, external causes because they can be causally effective *in so far as* they are social institutions.

and Moore as irrational and directly tied to the rise of Nazim. Their struggle against Idealism was thus deeply motivated in a political struggle against Nazi Germany. Akehurst describes its reconstruction of the emergence of analytic philosophy in Britain as a contribution to what he calls «a cultural history of philosophy» (Akehurst, 2010, p. 6). The cultural history of philosophy aims at explaining philosophical change by including cultural factors (such as nationalist beliefs) which internalist history of philosophy does not consider as causally interacting with philosophical theories. As Akehurst says:

> What I am suggesting is that the history of philosophy is not governed only by the making and refuting of 'strictly' philosophical arguments in the very narrow sense that this phrase has taken on within analytic philosophy. To be sure, good (and bad) philosophical arguments are active in history. People do, sometimes, change their minds in response to a sound argument. 'Strictly' philosophical ideas do therefore have a role in historical explanation. But so, as recent studies have shown, do other things; […] There are significant factors outside the 'strictly philosophical' which have molded the development of philosophy. (Akehurst, 2010, pp. 8–9)

(McCumber, 2001) and (Reisch, 2005) are two other important examples of the externalist approach. They aim at showing how the history of analytic philosophy in the United States was deeply influenced by a non-philosophical factor, namely the advent of McCarthyism and the Cold War in the Fifties. McCumber focuses on the impact of McCarthyism and the struggle against communism on the American academy in the Fifties. He argues that academic philosophers suffered more than other academics from McCarthyite attacks. According to McCumber, philosophers responded by narrowing the scope and the object of philosophy, leaving aside potentially dangerous topics such as political philosophy and normative ethics. In the Fifties, analytic philosophy's claim that philosophy should be concerned only with linguistic analysis resulted then particularly suitable for offering American philosophers a 'shelter' against McCarthyite attacks. Thus, the turn of American academic philosophers to analytic philosophy is explained as a defensive move against a hostile political environment.

On the other hand, Reisch reconstructs the story of the logical positivist movement in America. In particular, he focuses on the transformation of logical empiricism from a deeply political and openly socialist movement – as it was in the Interwar period of the Vienna Circle – into a scrupulously non-political, technical, and quasi-scientific academic group in the United States. According to Reisch, the Cold War played a central role in such change. Several main exponents of logical empiricism emigrated in the United States to escape the rise of Nazism. Besides having to adapt to an intellectual environment that was very different from the German one, after the war they also had to face the political control of McCarthyism on universities. Edgar

Hoover's FBI even scrutinized Carnap and others. The core of Reisch's reconstruction is that the original movement of logical empiricism comprised two groups: the first one saw in Neurath is charismatic leader and believed that philosophy of science should embrace not only formal, abstract studies of scientific theory and scientific language, but also socially and politically relevant topics (this group will lead the project of Unity of Science Movement); the other (including, amongst others, Carnap, Reichenbach, and Feigl) favored a narrower discipline, confined to topics such as induction, explanation, and technical semantics. According to Reisch, McCarthyism and the Cold War induced a loss of influence and leadership of the first group and the rise and success of the latter.

To sum up, the second theoretical issue regarding historiography and sociology of philosophy is the problem of the determinants of philosophical change. Two positions can be distinguished: *internalism* and *externalism*. According to the former, philosophical change is caused by the logical interplay of rational arguments and theories; according to the latter, philosophical change is caused by a complex set of non-philosophical factors that comprise cultural, institutional, professional, and socio-political factors.

### Explaining the individual intellectual action: autonomism vs. heteronomism

The third theoretical problem common to historiography and sociology of philosophy is the problem of *explaining the individual intellectual actions*. This problem comprehends questions such as the following: Why does a certain philosopher produce this instead of that philosophical content? Do philosophers behave according to reasons, following standards of rationality, or are they more interested in power (e.g. academic power) than truth? Are philosophers aware of the *true* causes that determine their intellectual behavior? Are their actions free or do social and political factors shape them? Are philosophers' views autonomous or are they the product of the *Zeitgeist*?

We can distinguish two approaches to the problem of intellectual action: *autonomism* and *heteronomism*. According to autonomism, philosophers are the primary sources of their actions, i.e. their intellectual actions are *not* determined by factors which are external to the control of philosophers themselves. Otherwise said, philosophers are aware of their motivations for acting intellectually in the way they do.

Autonomism occurs in two variants: *intellectualist* autonomism and *strategist* autonomism. According to the former, the intellectual actions of philosophers should be explained by the philosophical reasons (i.e. arguments and theories) that the philosophers themselves use to motivate their intellectual actions. The general scheme of the intellectual autonomist explanation in the history of philosophy is the following (Gracia, 2000, p. 204):

A held Q because:

a. A knew that P ⇒ Q
b. A knew that P, and
c. A knew that [(P ⇒ Q) ∧ P] ⇒ Q

Most of the traditional historiography of philosophy uses such an explanatory scheme. Indeed, according to Garcia, this is even the only kind of explanation in which the historian of philosophy is interested:

> The historian of philosophy *qua* historian of *philosophy* […] is not interested in those causes but rather in the philosophical reasons why A held P. And this is so because those are the factors that would have, or actually impressed, A when A was acting as a philosopher. (Gracia, 2000, p. 204)

In other terms, intellectual autonomism is defended as the only option that respects the *rationality* of philosophy as an intellectual enterprise because it respects the *philosophical reasons* that philosophers give in their arguments.

On the other hand, according to *strategist* autonomism, the philosophers are not moved primarily by rational arguments, but by strategic considerations, such as conquering prestige or academic power. The explanation of intellectual actions should therefore include a power-seeking element in the behavior of philosophers. Note that also the strategist autonomism attributes rationality to philosophers, i.e. treat them as rational and autonomous agents: however, this is not the 'logical' rationality of intellectualist autonomism, but the *means-end rationality* typical of rational choice theory in economics. Philosophers act rationally because they use philosophical actions as a *means* to a (non-philosophical) *end*. Thus, the scheme of the explanation of their action is the following (Gracia, 2000, p. 205):

A held Q because:

a. A wanted to get X, and
b. Holding Q was a way of getting X

In the sociology of philosophy, the monumental work of Collins rests on the autonomist-strategist assumption (R. Collins, 1998). According to Collins, philosophers compete for the attention space of the philosophical community and avoid being pushed to the periphery of the philosophical discussions (Heidegren & Lundberg, 2010; Lamont, 2001). Acquiring a central position in the attention space allows them to maximize what Collins calls the 'Emotional Energy', i.e. that feeling of confidence, elation, and spiritual strength that, according to Collins, all human beings – including philosophers – seek. Thus, philosophers attempt to

> match up their CCs [cultural capitals] and EEs [emotional energies] to their best advantage as an open bargaining process […] Each person is trying to get the best intellectual status membership he or she can, not only directly but also vicariously. Everyone is attracted to thinking high-status ideas as well as associating with high-status persons (R. Collins, 1998, p. 39)

Therefore, in Collins' theory, the correct explanation of the action of philosophers should always involve a strategic element: philosophers would develop their views and arguments in order to maximize their emotional energy and to occupy a central position in the 'attention space'. Bourdieu's sociology of philosophy shares the strategic element with Collins' theory: according to Bourdieu, philosophers act in the 'philosophical field' (*champ philosophique*) taking rival standpoints and trying to win advantage for their own thought. The philosophical field is essentially a competitive arena, in which any actors seek for its own interest. What makes it *philosophical* is that the philosophers' struggles must be translated into the language of philosophy and cannot be pursued directly by political-academic means. Gracia, who openly defends the intellectualist autonomist option, accuses the strategist version of autonomism as being essentially flawed, because it «implies that the history of philosophy is a grandiose hoax and that philosophers are malicious hypocrites or stupid dupes, for their views are not held because of the philosophical value they see in them and the reasons they explicitly give for them» (Gracia, 2000, p. 207).

Now, both variants of autonomism share the idea that philosophers act *autonomously* in their intellectual action: intellectualism claims that philosophers are autonomous in seeking the truth, strategism that they are autonomous in seeking their self-advantage. *Heteronomism*, on the other hand, contends that intellectual actions are the results of deep historical or sociological causes that the philosophers are not even aware of. Thus, philosophical actions should not be explained referring to individuals but *collective and deep mechanisms*, such as mentalities, fields, paradigms, and social structures. These factors are conceived as the true engines behind history, as the silent 'masters of puppets' which govern the actions of individuals. Thus, the philosopher is not seen as the autonomous center of the intellectual action, but as the *resultant* of several historical and anonymous forces. An example of the explanatory scheme of heteronomism is the following (Gracia, 2000, p. 205):

> A held Q because:
>
> a. A was a part of society S, and
> b. S encouraged belief in Q

The cause of the intellectual action is a *collective*, *non-individual* element (the society S) which is seen as the main determinant of the individual intellectual action. Now, heteronomism can be easily confused with externalism in the explanation of the philosophical change. However, the two positions must be distinguished: heteronomism is the claim that collective structures (such as institutions, social structures, mentalities) *prevail and determine* the individual action. Externalism, on the other hand, is compatible with both autonomism and heteronomism. An autonomist externalist account will focus on the actions that individual philosophers will put in place in order to *react to* external pressures. It would maintain that the individuals are the protagonists of the story. On the other hand, an heteronomist externalist account will assume that individual philosophers' actions are the *product of* external causes, which will be the true actors of the story.[116]

In the historiography of philosophy, it is difficult to find clear examples of heteronomism. However, if we widen the scope to include also the history of ideas, then the archeology of knowledge developed by Foucault is a good example of heteronomism (Foucault, 2002). As Gutting and Oksala summarize:

> The key idea of the archaeological method is that systems of thought and knowledge (epistemes or discursive formations, in Foucault's terminology) are governed by rules, beyond those of grammar and logic, that operate beneath the consciousness of individual subjects and define a system of conceptual possibilities that determines the boundaries of thought in a given domain and period. (Gutting & Oksala, 2018)

Indeed, the general idea underlying heteronomism, i.e. the idea that the subject is not free, but it is the 'product' of the structure, is a key feature of French structuralism, to which Foucault, in his first period, belonged (Gutting, 1989). The archaeological method, according to Foucault, allows the historian of thought to operate at an 'unconscious level' that displaces the 'primacy of the subject', i.e. that shows how the intellectual actions are not freely determined by the subjects, but are the resultant of silent, deep historical factors such as the *epistemai*. Heteronomism is epitomized clearly by a famous passage in *The Order of Things,* where Foucault claims that the philosophies of Hobbes and Hume have only become possible *because of* the configuration of the episteme in the Modern Age.[117] Foucault's example shows that

[116] In fact, the division between autonomism and heteronomism is a special case of the broader philosophical problem of the freedom of individual actions.

[117] «The dissociation of the sign and resemblance in the early seventeenth century caused these new forms - probability, analysis, combination, and universal language system - to emerge, not as successive themes engendering one another or driving one another out, but as a single network of necessities. And it was this network that made possible the individuals we term Hobbes, Berkeley, Hume, or Condillac.» (Foucault, 1970, p. 63)

heteronomism is not necessarily associated to externalism: the causes of intellectual actions can be individuated in a sort of 'intellectual unconscious', the set of silent assumptions and presuppositions that constitutes the episteme, instead of in the social and political sphere.

To sum up, the main positions to the problem of explaining individual intellectual actions are autonomism and heteronomism. According to the former, philosophers behave autonomously, i.e. they are autonomous centers of intellectual action. Autonomists then divide into intellectualists, according to which reasons and arguments determine intellectual actions, and strategists, according to which philosophers behave strategically in order to maximize their own advantage. On the other hand, heteronomists claim that the individual philosophers are not aware of the 'true' causes moving them. Hence, intellectual actions are the result of deep, collective factors that individual philosophers cannot control.

Figure 51 summarizes the three main issues in historiography and sociology of philosophy: the problem of understanding the meaning of philosophical texts, the problem of discovering the determinants of philosophical change, and the problem of explaining the individual intellectual action. The answers given to each of the problems can be divided into two opposite views: textualism versus contextualism, internalism versus externalism, autonomism (in its two variants: intellectualism and strategism) versus heteronomism.

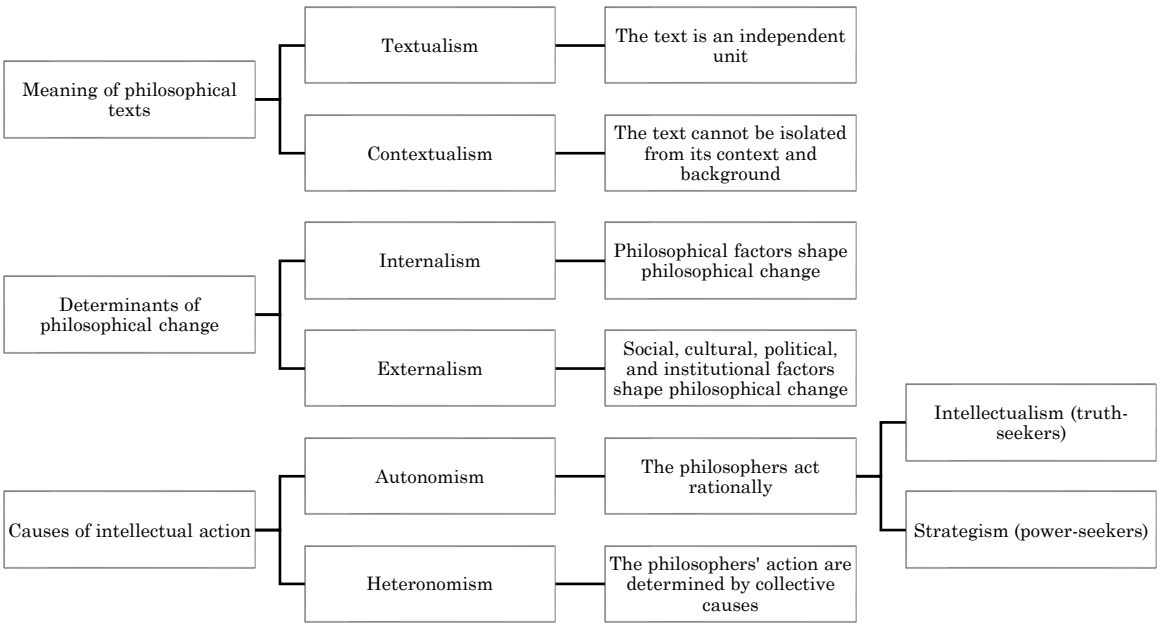


*Figure 51. The three main theoretical issues in historiography and sociology of philosophy and the main views associated with them*

Note that, even if we extrapolated the six views from real studies in historiography and sociology of philosophy, it is better to consider them as *methodological ideal-types* than as pure empirical descriptions. Very few studies follow just one view: most of them focus alternatively on the text

and the context, explain some episodes in internalist terms and other in externalist terms, consider philosophers sometimes as acting based on philosophical reasons and sometimes as children of their time. Therefore, our classificatory scheme should be considered as an *analytical tool*, not as a fixed taxonomy. Its purpose is to unveil and clarify some methodological assumptions in the historiography and sociology of philosophy, not to classify each actual study in one and only category. As we said in the Introduction, our main aim in developing it was to clarify the notion of documental history, not to provide a definite review of the state-of-the-art in the historiography and sociology of philosophy.

## The documental history and the three issues

In this Section, we discuss the position of the documental history in relation to the three theoretical problems of meaning, change, and action. As we will see, documental history's theoretical status is not easily reducible to one of the existing views: however, it is close to some of them and distant from others. In particular, documental history is closer to contextualism regarding the meaning, to externalism regarding the change, and to heteronomism regarding the action.

### Documental history and the problem of meaning

In the context of the problem of the meaning of philosophical texts, the first thing to notice is that the documental history does not focus on the individual text. As we saw in Chapter 3, the direct object of documental history is the *documental space*, which is basically a *set* of documents arranged in a *formal structure* made of nodes (the documents) and links (the relationships based on citations, e.g. co-citations). Thus, the documental space is a network of documents that can include thousands of documents and thousands of citations. Now, if the meaning of a text is taken to be a property of the individual text, as textualism holds, then documental history has simply nothing to say about the problem of meaning because the *single* text is never an object of documental history. Documental history studies always a *set* of texts, in which the single document is considered as a node in a network. On the other hand, if we take contextualism and if we claim that the individual text should always be contextualized in order to understand correctly its meaning, then documental history offers several powerful techniques to delineate the *textual context of a text*. These techniques are co-citation analysis and clustering: the science maps we used in the second study of Chapter 3 are indeed powerful means to determine the clusters of texts to which an individual text belongs. Furthermore, the longitudinal co-citation analysis allows to observe how the same text changes its place amongst other texts, i.e. how it 'moves', so to say, in different contexts over time (see the study of the 'trajectories' of late analytic philosophy classics in Chapter 3). Therefore, if we accept the contextualist theory of meaning proposed by Laerke, according to which the meaning of the philosophical text depends on the

other texts that gather on it, then we can say that the documental history allows, if not directly to analyze the meaning of philosophical texts, at least to *delineate empirically* the context from which the meaning depends. From this point of view, documental history would result to be a contextualist approach to the problem of meaning.

However, as we saw above, according to contextualism the text is part not only of a textual context, but also of a broader social, institutional, political, religious background. What is the relationship between the documental history of the non-textual background? Once again, such background is *not* directly the object of the documental history. The documental space studied by the documental history is a network of documents: no extra-documental object is directly present in the network as an element of it. However, a part of the background can be *inferred* from the properties of the network. Specifically, by analyzing the *affiliations* of the authors of the documents, we can reveal the *institutional* dimension of the documental space. We have done this in the first study of Chapter 3, where we analyzed the most cited institutions and countries of Late Analytic Philosophy. Now, the extrapolation of the institutional level from the documental space clearly does not show *per se*, that the institutional factors do shape the meaning of the philosophical texts. However, this analysis can highlight some *disproportions* in the distribution of institutional properties (such as the ones we found in the case of Late Analytic Philosophy) that can suggest that the institutional factors are not neutral. Thus, the analysis of the documental history can foster further research on the institutional background and, from this, further social and political factors can be taken into consideration in the historical reconstruction.

Thus, regarding the problem of meaning, the documental history is characterized by a double *indirect* relationship: the documental space is connected (but not coincident) with both the intellectual content (the layer of meaning) and the social background (the layer of non-textual factors). In general, then, documental history is useful to study the meaning of philosophical texts only in the light of contextualism, and, specifically, by adopting a contextualist theory of meaning, such as the one proposed by Laerke, in which the meaning is a *holistic property* of a set of texts.

### The problem of philosophical change from the perspective of the documental history

In the case of the problem of meaning, documental history offers new techniques but does not advance any theoretical claim, apart from a general endorsement of contextualism. It is in the context of the problem of philosophical change that documental history puts forth a positive thesis. This positive thesis, which is at the same time the *justification* of the interest of documental history, is that the documental space is not a neutral medium, *but that it causally*

*interacts with philosophical contents*. In other terms, the structure and the dynamics of the documental space are *part of the mechanism that governs the philosophical change*.

In Chapter 3, we formulated this thesis as the *feedback hypothesis*, i.e. the hypothesis that the structure of the documental space constrains the possible actions of intellectual actors. According to the terms we used in this Chapter, this formulation is better suited to the problem of explaining individual actions. However, the feedback hypothesis can be easily reframed in the context of the problem of philosophical change, by saying that documental history takes an *externalist approach* to philosophical change by highlighting a *new causal layer*: the documental level. Thus, according to documental history, philosophy does not change only because of the rational interplay of the intellectual contents (i.e. because of the dynamics of the intellectual level), but also because of *external factors*. However, documental history adds to the layer of sociological and cultural factors (such as the ones highlighted by Kusch, Akehurst, McCumber, and Reisch in the classic externalist approach to the history of philosophy) a new layer, *the layer of documental factors*. In the perspective of documental history, thus, the philosophical change is also shaped by documental factors, which correspond to the *specific configuration of properties of the documental space in a given moment*.

In the four studies of Chapter 3, we investigated some of these documental factors: specifically, we considered the average number of cited references, the co-citation links, the literature clusters, the epistemological functions of citations, the temporal distribution of the documental space. These factors determine the number of connections that new documents should have with the other documents (first study of Chapter 3), what are the clusters of documents to which they belong (second study of Chapter 3), what are the boundaries of the relevant state-of-the-art literature (third study of Chapter 3), how old is the literature that can be employed, and, conversely, how long do documents 'live' in the documental space (fourth study of Chapter 3).

Now, the documental factors do not govern the philosophical change in the sense that they determine the development of specific intellectual contents instead of others. They do not have a direct impact on individual philosophical notions and concepts. Rather, documental factors shape the *general form* in which intellectual contents are produced: *they shape the collective structure of the literature containing intellectual contents*. Thus, the documental history is a *panoramic history* which focus neither on the specific intellectual content nor the micro-sociology of a philosophical group. From this point of view, it should be distinguished both from the traditional historiography of philosophy, centered on one or few authors, and from the brand of sociology of philosophy which focuses on the micro-sociological explanation of the trajectory

of one philosopher.[118] The panoramic approach of documental history is well-suited to grasp phenomena such as specialization, fragmentation, and normalization because they are structural and collective properties of philosophy, which can be seen only considering philosophy as a whole. The documental history does this by analyzing the documental space from a *distant* point of view.

However, the distant perspective does not correspond, in the documental history, to a sort of ethereal conception of philosophy. The documental space, in fact, is not a pure space free from *power dynamics*. Quite the opposite: the documental history shows that the documental space is *unequally distributed*. For instance, we saw that the 'top' five journals are heavily inter-connected, forming a sort of core of Late Analytic Philosophy. This means that controlling these journals ensures a considerable power on the documental space. In other words, the documental history highlights clearly the *central role of the gatekeepers* of the documental space, such as the editorial boards of the journals. Thus, the documental history promotes further research on the role of the gatekeepers in the governing the philosophical change, a topic that only recently has started to be investigated. In particular, Katzav and Vasen have shown in a series of papers that the editors of *The Philosophical Review, The Journal of Philosophy* and *Mind* played a key role in assuring to analytic philosophy the dominance of British and American Philosophy, basically by actively marginalizing other approaches to philosophy (Katzav, 2018; Katzav & Vaesen, 2017a, 2017b).

## The individual and the structure: documental history and the explanation of individual action

The position of documental history regarding the problem of explaining the individual intellectual action can be defined as a peculiar form of heteronomism. According to heteronomism, the individuals are not the primary centers of intellectual actions. Rather, they are determined by deep factors that shape their behavior. In the perspective of documental history, the documental space is indeed one of these deep factors. As we saw in Chapter 3, the main claim of documental history is that the configuration of the documental space, with its structure and dynamics, constraints the number of possible intellectual actions of the actors. Clearly, this does not mean that the documental space causes the actions of the individual actors *deterministically*, i.e. we cannot predict from the state of the documental space what will be the action of a certain individual. Nevertheless, the documental space constitutes one of the *environments* in which the actors act. As such, it creates a system of trends and patterns which *incentives* certain behaviors instead of others. The individual perceives the influence of the

[118] See for instance the study of Richard Rorty in (N. Gross, 2008) and of Derrida in (Lamont, 1987).

documental space as a *pressure* to shape its own contribution in accordance with the dominant trend of the documental space itself: for instance, a deviation from the state-of-the-art literature that is standardly cited in a sub-area of the documental space will be perceived as a shortcoming of the new contribution. Even worse, the lack of these references will probably result in the rejection of the contribution because it cannot be correctly placed in the documental space.

Now, the peculiarity of the heteronomism of documental history consists in the fact that the documental space is not considered as an external entity, ontologically different from the actions of the individual actors. Indeed, the documental space is no more and no less than the result of the incessant action of the individuals who publish and cite documents. From this point of view, the individuals are in total control of the documental space. The heteronomism derives from the fact that this is true *only if* we take the standpoint of the *collectivity* of the actors, but it is not true at the level of the single individual. In other terms, the collectivity of actors can (and indeed do) change the documental space, but the isolated individual has a too limited power to alter the structure of the space significantly.[119] The heteronomism is a consequence of the essential inequality that affects the feedback mechanism. If we consider the totality of the social level, i.e. the totality of the actors producing the documental level, then the documental space depends totally on, and it is reducible to, the dynamics of the social level (the level of the actors). However, if we take the standpoint of the isolated individual, then the documental space stands as an external and independent system which has the power to constraint individual intellectual behavior. At the level of the individual, the documental space acquires an objective status, in the sense that it becomes a *Gegen-stand*, an objective reality that is opposed to the subject.

In Chapter 3, we called the peculiar objectivity of the documental space the 'inertia' of the space and we compared its influence on the behavior of individuals to the effect of gravitational force on the masses. Apart from these metaphors drawn from physics, the relationship between the epistemic actors and the documental space is a special case of the core problem of any social science, namely the *relationship between the agent and the structure*. According to methodological individualism, social structures are no more than theoretical abstractions from the habitual and interdependent actions of individual human beings: they do not play a true *causal* role in shaping their actions. According to structuralism, on the other hand, structures are «a basic, non-reducible feature of the world and the actions, values, self-images and the like of individual human agents must conform to these structures because the individual agency,

[119] Note however that some individuals, such as the gatekeepers, have more power to influence the documental space. Nevertheless, even their power does not extend over the totality of the documental space.

properly understood, is in fact constituted by such structures» (Miller, 2014). The theoretical part of documental history, thus, is deeply connected with the core problem of the social science.

## Sum up of Chapter 4

In this Chapter, we developed the notion of documental history by discussing it in the light of the current methodological debates in the historiography and sociology of philosophy. Documental history is the name we gave to the research programme based on the application of scientometric, citation-based methods to the history of philosophy and that was exemplified by the four studies of Chapter 3.

In the first section of the Chapter, we proposed to distinguish three main problems that are common both to the historiography and the sociology of philosophy. We showed how these problems have a double theoretical and methodological status: on the one hand, they are special cases of more general philosophical, meta-philosophical, and sociological problems (such as the problems of meaning and meaning-shift, the relationship between the material, social base and the intellectual output, or the interaction between the individual and the social structure); on the other hand, they have direct consequences on the way the history of philosophy is reconstructed. We called the three problems: the problem of understanding the meaning of philosophical texts, the problem of discovering the determinants of philosophical change, and the problem of explaining the individual intellectual actions. Each of these problems comprehends several questions, whose answers can be grouped in two main options for each of the issue.

Regarding the problem of meaning, we have distinguished between contextualism (according to which the meaning of philosophical texts can be grasped only taking in consideration the textual context and the non-textual background) and textualism (according to which the meaning of the philosophical texts is entirely expressed by the manifest content of the texts). Regarding the problem of philosophical change, we have distinguished between internalism (according to which philosophical contents change in time because of rational elements such as arguments and refutations) and externalism (according to which external, non-philosophical factors cause the change of philosophical contents). Lastly, we divided the views about the problem of intellectual actions into autonomism (according to which intellectual agents are independent centers of intellectual actions) and heteronomism (according to which the intellectual actions of individuals are constrained by deep, collective factors).

In the second section of the Chapter, we discussed the position of the documental history in relation to these three main problems. We argued that documental history is methodologically constrained to accept a form of contextualism since it never focuses on the individual texts but

always on a network of text. Therefore, if we accept a contextualist theory of meaning, the documental history offers a set of robust methodologies to determine the contexts of texts empirically. Furthermore, by studying the distribution of some scientometric properties (such as the affiliations of authors) it can stimulate research on biases happening at the social level that can have a consequence on the meaning of texts.

However, we believe that the main theoretical and methodological contributions of the documental history do not concern the problem of meaning, but the two problems of philosophical change and intellectual action. The main contribution of documental history is the highlight of a causal layer which is distinct both from the logical interplay of intellectual contents (studied by internalists) and the social dynamics of social actors (studied by externalists). This is the layer of the documental level. Documental history claims that the documental space is not causally neutral but that it shapes the actions of epistemic actors actively. Thus, the documental space is a further factor governing philosophical change. However, we argued that it plays an indirect role: it does not directly affect the intellectual contents, but the *conditions* in which they are produced. These conditions emerge at the documental level as the structural phenomena of specialization, fragmentation, and normalization.

Therefore, we hoped to have shown that a) the documental history, thanks to its methodological shift towards scientometric methods, can achieve an understanding of these traits of Late Analytic Philosophy that is not accessible to the traditional textualist-internalist historiography of philosophy or the more recent brands of contextualist-externalist sociology of philosophy; b) the documental history is a successful answer to the Rescher's Methodological Challenge of developing a statistically oriented history of philosophy.

In the Conclusions, we will complete the presentation of documental history by suggesting some further lines of research.

# Conclusions

We have come a long way. We started off in Chapter 1 by discussing the manifold meanings of 'analytic philosophy' and we arrived, in Chapter 4, to delineating a new approach to the history of Late Analytic Philosophy that we called 'documental history'. In between, we introduced the field of scientometrics, discussed the main theoretical frameworks of citation theory, and, most importantly, presented four empirical studies of Late Analytic Philosophy based on scientometric methodologies. In the Conclusions to this work, we want first to recap the long argumentative thread which (we hope) connects these diverse topics. In doing that, we will also highlight, chapter by chapter, our main claims, in order to provide a clear overview of the work. Then, in the second part of the Conclusions, we will advance some lines of research that are open for future investigations.

## A general overview of the dissertation

Chapter 1 had two key aims. The first section aimed to fix the use of the term 'analytic philosophy' for our study. The second section aimed to present six features of Late Analytic Philosophy that render it a tricky object to study by the traditional methods of the historiography of philosophy.

The first claim of the Chapter is that the term 'analytic philosophy' has *no* uncontested meaning neither within the Analytic-Continental debate nor in the discipline of the History of Analytic Philosophy, i.e., the two academic discourses in which it appears. The second claim is that the two meanings of the term are the referential and the performative. In the former case, 'analytic philosophers' refers to an object, whereas in the latter case it fulfills a rhetorical function. Furthermore, we claimed that we should distinguish between two types of referential use: a first one, according to which 'analytic philosophy' refers to an intellectual entity (i.e., a set of intellectual commitments), and a second one, according to which it refers to a social entity (i.e., a group of philosophers in the academia). At the end of the first section of Chapter 1, we declared that, in this study, we would use 'analytic philosophy' only in its referential use. In particular, we wanted to avoid all the evaluative elements that are typical of the performative use.

However, we left open whether we use the term to refer to an intellectual or a social entity. We returned to this issue at the end of Chapter 2, when we claimed that our referential use of (late) analytic philosophy does not correspond to any of the previous types, but to a documental object.

The second part of Chapter 1 focused on Late Analytic Philosophy, which we introduced first on a purely chronological basis as the analytic philosophy of the last thirty-forty years. Based on a review of both analytic philosophers' perceptions and historians of philosophy' accounts, we claimed that Late Analytic Philosophy is characterized by six peculiar features: growth of the discipline, fragmentation, specialization, professionalization, technicalization, and scientific style of intellectual production.

Chapter 2 opened with the claim that these six features pose a *severe methodological challenge* to the historian of Late Analytic Philosophy – what we called Rescher's Methodological Challenge, referring to Rescher's project of developing a 'statistical', instead of biographical history of philosophy. The difficulties arise primarily from the quantitative dimension of the historical material that should be handled, which overcomes the cognitive powers of the individual researcher. Secondly, we noted that phenomena such as fragmentation and specialization are different compared to the traditional objects of the history of philosophy. They regard the overall structure of Late Analytic Philosophy, not a specific intellectual content such as a philosophical view or theory. Therefore, we argued, the traditional method of the historiography of philosophy (i.e., the close reading of texts) is not adequate to investigate these aspects of Late Analytic Philosophy. The main claim of Chapter 2 is that scientometrics, i.e., the quantitative study of science, offers the methodological tools that we need to investigate these phenomena.

In the central section of Chapter 2, we presented scientometrics and citation analysis. We highlighted the peculiarity of this field, which, compared to history, sociology, and philosophy of science, has a distinctive applied side (the evaluation of scientific performance). Then, we focused on the core notion of scientometrics (the notion of citation), and we grouped the different theories of citation into three main approaches: the socio-psychological, the indicator-centered, and the epistemological one. Each of the approaches interprets the meaning of citations differently. We claimed that scientometrics could provide the methodological tools to the study of Late Analytic Philosophy only if citations are considered in the light of the epistemological approach, according to which citations are links in the *epistemic structure* of a discipline.

However, if we want to apply citation analysis to Late Analytic Philosophy, we need to transform Late Analytic Philosophy into something that can be handled by citation analysis. We did this by *operationalizing* Late Analytic Philosophy into a citation network, i.e., a set of publications

mutually connected by citations. We called this object the *documental space* of Late Analytic Philosophy, and we distinguished it both from intellectual and sociological definitions of Late Analytic Philosophy discussed in Chapter 1. The operational definition of Late Analytic Philosophy as a documental space resolved finally the issue of defining the object of this study that we left open in Chapter 1. Thus, if in Chapter 1 we declared that we would have used 'analytic philosophy' only in its referential use, in Chapter 2 we specified that Late Analytic Philosophy, in our study, refers to a special kind of object: a documental space.

Therefore, Chapter 1 and Chapter 2, taken together, achieve three goals: a) fix the reference of the term 'Late Analytic Philosophy' for this work, b) highlight the six peculiar features of Late Analytic Philosophy that are difficult to investigate by close-reading (posing hence the methodological challenge), and c) present citation analysis as the new method, drawn from scientometrics, that can answer the methodological challenge positively.

Finally, Chapter 3 presents the concrete application of scientometric methods to Late Analytic Philosophy. The Chapter comprises four studies based on citation analysis. They can be divided into two groups. The first group, which comprises the first and the fourth study, offers new data on the documental properties of Late Analytic Philosophy. They analyze the distribution of scientometric properties and the aging process of Late Analytic Philosophy literature. The second group, which comprises the second and the third study, addressed the six features of Late Analytic Philosophy directly. The second study investigated the changing morphology of Late Analytic Philosophy by using a science-mapping technique known as longitudinal co-citation analysis. The main finding was that fragmentation and specialization are indeed features of Late Analytic Philosophy, hence confirming the qualitative perceptions of analytic philosophers and historians of philosophy. The third study investigated the normalization of Late Analytic Philosophy, i.e., the approaching of Late Analytic Philosophy to a Kuhnian normal-scientific phase of intellectual production. This process comprehends the three features of technicalization, professionalization, and, clearly, the para-scientific style of intellectual production. We studied the normalization process by analyzing how the epistemological functions of the citations changed over time (citation context analysis). The results showed that analytic philosophy normalized in a peculiar way: a soft, instead of a classic strong, Kuhnian paradigm characterizes Late Analytic Philosophy. Interestingly, we showed that the soft paradigm regards the structure of Late Analytic Philosophy, a result that corroborates the findings of the co-citation study. Thus, the second study developed and refined the claim, advanced by analytic philosophers and historians of analytic philosophy, that Late Analytic Philosophy is a normal science.

The four studies of Chapter 3 did not only provide new data on Late Analytic Philosophy and its peculiar features. They also suggested a theoretical hypothesis about the role of the documental space. We called it the *feedback hypothesis*. According to the feedback hypothesis, the documental level is not an inert interface between the epistemic actors (the philosophers) and the intellectual contents (the philosophical theories). On the contrary, it interacts with the actors, shaping their possible actions. The documental space has, therefore, an autonomous power on individual actors. This power takes the form of the structural constraints that the documental space poses to the individual contributing to it. If the application of scientometrics to the study of Late Analytic Philosophy is the fundamental *methodological* claim of this work, the feedback hypothesis amounts to its central *theoretical* claim.

At the end of Chapter 3, we called the investigation of the properties and effects of the documental space on the philosophers the *documental approach* to the history of Late Analytic Philosophy. Chapter 4 discussed the place of the documental history of philosophy in the context of the other approaches to the historiography of philosophy (including the sociology of philosophy). We claimed that the methodological discussions in the historiography of philosophy could be reduced to three main problems (the problems of meaning, change, and action) and then, for each problem, we grouped the answers given by historians and sociologists of philosophy into two competing views. Lastly, we discussed the position of the documental approach about each of the problems and the competing views.

Thus, our long road started off with a methodological problem and ended up with a new *methodology* (the documental history of philosophy) and a new *theoretical claim* (the feedback hypothesis). However, we believe that these two results are not the end of the road but just the starting point for new investigations. Therefore, we want to conclude this work by suggesting some further lines of research.

## Further lines of research

### Expand the scope of documental history

When we operationalized Late Analytic Philosophy in Chapter 2, we considered the first five journals of the ranking appeared on the *Leiter's Report* blog. The journal co-citation analysis revealed that these journals form a self-referential citation set, i.e., they cite mostly themselves. Thus, we argued that they form the *core* of Late Analytic Philosophy. The first line of further research for the documental history of Late Analytic Philosophy is to investigate the scientometric properties of the *periphery* of the field. It would be interesting to use the co-citation analysis to compare the documental space of the peripheric journals with the one of the

core journals, in order to understand whether they share the same highly-cited references and the same structural patterns (fragmentation and specialization).

### Mapping the documental relationships between science and philosophy

In the last decades, certain areas of philosophy have become increasingly interested in the results of the empirical sciences. Some philosophical areas, such as the philosophy of mind and the philosophy of language, even claim to have contributed to the birth of inter-disciplinary fields such as the cognitive science (Leydesdorff & Goldstone, 2014a). Other areas, such as the philosophy of physics or the philosophy of biology, maintain to have a strict connection with the science they focus on. It would be interesting to reconstruct the history of the relationships between philosophy and the sciences with the tools of the documental history. What is the relationship between the philosophical and the scientific documental spaces? Is the intellectual interaction reflected in the citation flows? Do philosophers cite scientists? What kind of scientific articles do philosophers cite: the theoretical articles, the experimental articles, or the popularizing production (such as books)? Is the scientific literature cited by the philosophers the most recent one, or does it suffer from a temporal lag? Do scientists cite philosophers? For what aims? In what kind of scientific production? All these questions are part of a research programme in the documental history of the science-philosophy interaction.

### Documental history and research evaluation

As we noted in Chapter 2, scientometrics has always had an applied side in the context of the evaluation of research performance. In this work, we have underlined many times that our analyses of Late Analytic Philosophy are descriptive and not normative. When we discussed the meaning of the citation ranking of analytic philosophers in the second study of Chapter 3, we stressed that the equation between high citation rates and 'philosophical quality' could be done only based on a normative theory of citations, and we explicitly adopted the epistemological framework in order to avoid a normative interpretation of citation scores. However, we cannot ignore the fact that research evaluation is a reality in the contemporary university:

> Over the last decades, public institutions have experienced considerable changes towards greater efficiency and more direct accountability in many Western countries. To this end, new governmental practices, that is, new public management, have been established. These practices did not stop at the gates of the universities. In the past, scientific freedom guided practices at universities, and quality assurance was achieved endogenously through peer review and rigorous appointment procedures for professorships. This sufficed as accountability to the public. Over the last decades, the university was

> increasingly understood as an institution that renders services to the economy, students and the public in general. (Ochsner, Hug, & Daniel, 2016, pp. 1–2)

In the past, research evaluation has regarded mainly the sciences. However, at the least from the turn of the century, many efforts and projects have been developed to extend it also to the humanities (and the social sciences). Such efforts have often met the skepticism, if not the active resistance, of humanities scholars. European projects such as ERIH (the European Reference Index for the Humanities), which was the first European attempt to classify the humanities journals according to scientific quality, have been abandoned. The Association of German Historians even boycotted the research rating of the German Council of Science and Humanities (*Wissenschaftsrat*). However, we have to face the reality that these defense mechanisms are not effective in today's world and especially for the future of the humanities. As van den Akker notes:

> In the near future, in a world that increasingly asks for justification of public funds, in a world where at the same time public money becomes scarcer and less amounts have to be distributed among more players, in a world where research funds are being concentrated and distributed on a highly competitive basis, we as humanists have to take the stand and declare that we are grownups who want to play the game. (van den Akker, 2016, p. 24)

In order to 'play the game', however, it is necessary to know better *how the humanities function* and, most of all, what are the *differences* between the diverse areas within the humanities. We think that the documental history of philosophy can play a central role in this task. We still do not know enough about how the humanistic knowledge evolves, and how it is disseminated:

> Bibliometrics adapted to the humanities can serve as tools to study publication and citation habits and patterns as well as to complement peer review. Knowing more amount publication and citation habits also make it possible to broach delicate issues in research practices. (Ochsner et al., 2016, p. 6)

Even if the results of the documental history are descriptive, they provide nevertheless *useful information* to the policymakers. For instance, the study of the citation life of papers in Late Analytic Philosophy we provided in the fourth study of Chapter 3 provides necessary information for tuning the citation-windows of citation-based research assessments of Late Analytic Philosophy. Therefore, we believe the documental history should be a crucial component of a research programme aiming at providing *evidence-based policies* for the research evaluation of the humanities.

Therefore, we hope that the future of the documental history will not be only in the realm of pure, academic research. We hope that it will be able to join scientometrics into the arena of policies and politics of research.

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