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# Towards a history of behavioral and experimental economics in France\*

Dorian Jullien<sup>†</sup> and Alexandre Truc<sup>‡</sup>

November 29, 2024

## Abstract

**Abstract:** Existing histories of behavioral and experimental economics (BE-XP) are mostly focused on the intellectual and institutional developments of these approaches in the United States of America – and to a lesser extent in Germany. While a seminal contribution to these approaches was produced in the early 1950s in France by Maurice Allais, the literature is rather silent on how BE-XP developed subsequently in France. We propose to fill this gap by comparing the history of BE-XP in France to international trends previously identified in the literature. We show that after an ambivalent influence of the work of Allais (1953) on BE-XP in France during the 1980s, that influence rapidly faded. BE-XP in France then largely follows international trends. We nevertheless identify some heterogeneity across the French territory and the development of at least two national specificities on the measurement of utility and the modeling of social preferences.

**Keywords:** Behavioral economics, Experimental economics, History of economics

**JEL Codes:** B21, B40

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# 1 Introduction

The history of the behavioral and experimental approaches in economics (henceforth BE-XP), i.e., the use of insights from psychology or laboratory experiments in economics, has been documented in several contributions (Sent, 2004; Lee and Mirowski, 2007; Fontaine and Leonard, 2012; Heukelom, 2014; Svorenčik, 2015; Cot and Ferey, 2016). Most of these works note the foundational impact of Maurice Allais on BE-XP through his early 1950s critique of expected utility theory, which he elaborated in France. For example, Heukelom (2014, chapter 2) dedicates substantial attention to the contribution of Allais in his history of behavioral economics.<sup>1</sup> Another illustration is to be found in the retrospective reflections of experimental economists collected by Harro Maas and Andrej Svorenčik through a witness seminar, in which Frans von Winden recalls that :

“many of these things [i.e., the behavioral and experimental approaches] escaped the minds of many people in Europe, except for the German speaking countries where there was already pretty soon an association in the mid ‘70s. There was the very important early work by Allais. But apart from that little was going on.” (Maas and Svorenčik, 2016, p.44)

Despite the widely acknowledged seminal contribution of Allais produced in France, these histories of BE-XP primarily weave a narrative that unfolds in the United States of America (henceforth the U.S.), and - to a lesser extent - in German-speaking countries. There remains a notable absence of a comprehensive account detailing the development of behavioral and experimental approaches in France and how it relates (or not) to Allais’ contribution. One exception to this absence of France in BE-XP history can be found in Daniel Serra’s (2022, Appendix 1) recent book which offers a valuable compilation in one appendix of key protagonists and institutions in the development of the experimental approach in France.<sup>2</sup>

In this paper, we propose a sketch of the history of BE-XP in France that builds on Serra’s account. Our added value is two-fold. First, using quantitative and qualitative historiographical methods, we propose a systematic account of the evolution of BE-XP contributions in France, and compare it to international trends previously identified in the literature. Second, Serra’s presentation of key actors highlights the importance of a geographical dimension in the way BE-XP developed in France; to explore this insight, we adopt a more explicit historiographical position based on spatial approaches of knowledge production.

This historiographical position is inspired by contributions constitutive of the so-called “spatial turn” initiated in various social sciences in the 2000s especially in the history of

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<sup>1</sup>Some French economists have also called him a “precursor” of behavioral economics (Sterdyniak, 2011)

<sup>2</sup>Strictly speaking, Serra (2022, Appendix 1) offers more a set of valuable elements to make the history of BE-XP in France than a history of BE-XP in France. Indeed, his account mostly consists in presenting, site by site, people, institutions and dates that were important in the development of experimental economics. There are very few elements about the scientific contributions produced by the individuals and institutions he discusses (and to be fair he does not claim to do so as this is just a short appendix to his book in which the history of BE-XP is told without a specific focus on France). Obviously, our approach is different in the sense that we focus precisely on these elements and we do so with a bottom-up and quantitative historiographical approach.

sciences and in the history of ideas (e.g., Livingstone, 1995, 2002; Withers, 2008; Finnegan, 2008; Withers, 2009; Besse, 2010; Orain and Feuerhahn, 2017). Roughly put, the main point is that the spatial configuration in which a given set of scientific contributions is produced is not a neutral container of that production but actively participates in shaping its content. A spatial configuration can be understood at different scales, e.g., by looking at how a given science is produced between different countries, between different cities of the same country, or between different buildings of the same research center, among other possible scales. The cultural and social characteristics of each of these entities, e.g., countries, cities, buildings, and so on, thus become explanatory factors of the science under historical scrutiny. This paper only partially adopts a historiographical position influenced by the spatial turn in so far as we are interested in the geographical structuration of knowledge production but without identifying the cultural and social characteristics of the different spaces of knowledge production that can explain the content of the knowledge produced. For reasons of space constraints and data availability, we only stick to identifying the relationship between (i) the different cities in which BE-XP is produced in France and (ii) the intellectual content of that production. We believe that depicting the evolution of these two points on the whole metropolitan French territory from the 1980s till the end of the 2010s (accompanied by a systematic comparison of what happens in the U.S. and in German-speaking countries) is in itself a valuable contribution to the history of BE-XP. More generally, the history based on our analysis of citation practices and the content of publications presented here will be a basis for exploring different aspects of this history from data collected through interviews and archives.<sup>3</sup>

One main takeaway of our study is that, after an ambivalent influence of the work of Allais (1953) on early BE-XP in France, that influence disappears. BE-XP in France then largely follows international trends, although with some heterogeneity across the French territory (e.g., concerning the measurement of risk preferences in Paris and the modeling of social preferences in Toulouse). Our contributions with respect to the historical literature on BE-XP (see section 2) are twofold. Firstly, we tell the story of what happened in France (i.e., we investigate an object on which there is nothing) and identify some dynamics of research that are unique, which therefore complete the historical literature on BE-XP. Secondly, we confirm some trends of research previously identified at the international level (of which the research conducted in France is a part of). Our study also calls for the need to conduct similar ones on other European countries to investigate the extent to which the specificities we claim to observe in France are not also present in other countries.

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<sup>3</sup>That the spatial turn is really a “turn” is controversial. Many social scientists, including historians of sciences and of ideas, such as Michel Foucault, focused on the geographical dimension of knowledge production without saying it as explicitly as the proponents of the spatial turn did (Feuerhahn et al., 2017, p.211). It could be argued that historians of economics have also focused on this dimension without saying it explicitly, for example by working and comparing different research sites such as the MIT, the Cowles Commission, the RAND Corporation, the economics department of the University of Chicago and so on (e.g., Emmett, 2010; Düppe and Weintraub, 2014; Weintraub, 2014; see also Svorenčák, 2018 who uses the distinction between space and place in his account of the creation of experimental economics laboratory in the U.S.)

The paper is structured as follows. The first section sketches the history of BE-XP in the U.S. and in German-speaking countries. The second section briefly presents the methodology – based on bibliometric network analysis – we employed to construct a corpus of papers published by researchers based in France on topics related to BE-XP. The ensuing three sections propose a history in three periods of BE-XP in France and highlight the main connections and differences with how these approaches developed in the U.S. and in German-speaking countries.

## 2 Historical context outside of France

The contributions that are usually taken to be seminal to each approach were made by economists or psychologists working in the U.S. Regarding the history of experimental economics, this is the case for the market experiments conducted by economist Vernon Smith at Purdue University (Indianapolis, Indiana) in the late 1950s. This is also the case, regarding the history of behavioral economics, for the (classroom) experiments on individual behavior conducted by economist Richard Thaler at Cornell University (Ithaca, New York) who was inspired by the work of psychologists Daniel Kahneman and Amos Tversky conducted in Israel during the 1960s – though both Kahneman and Tversky did their PhD in the U.S. and returned to the U.S. by the end of the 1970s (first through Canada for Kahneman) and eventually collaborated with Thaler. Given this particular historical context, it is not surprising that the in-depth historical accounts of behavioral economics provided by Heukelom (2014) and of experimental economics provided by Svorenčík (2015) tell a mostly-American story of these two approaches.<sup>4</sup>

The history of both approaches is partly constituted by a tension between them (Heukelom, 2011; Svorenčík, 2016). Roughly put, market experimentalists emphasized how market institutions push individuals to behave in accordance with rational choice theory. The focus of this research program was on how different rules of market exchanges (mostly based on auction theory) lead more or less rapidly to market equilibria. On the other hand, deviations from rational choice theory due to various decision biases were emphasized by contributors to the behavioral approach. One of the main outcomes of this research program was the use of experiments to observe a large set of behavioral “anomalies” and the proposition of various models inspired by insights from psychology to account for these anomalies (Camerer et al., 2004). The rationality or irrationality of the behavioral regularities studied in this research program has often been an explicit point of contention with proponents of more standard economic approaches, as well as with market experimentalists (Heukelom, 2014).

It can be argued that the historical development of behavioral economics has been slightly less American-centered than that of experimental market economics. One of the three main research themes in behavioral economics, namely the study of pro-social behavior (e.g., altruism, reciprocity, and the like), has been significantly prompted by contributions from

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<sup>4</sup>In this paper, we are primarily interested in the “new behavioral economics” inspired by the work of Kahneman and Tversky than in the “old behavioral economics” inspired by the work of Herbert Simon and others, to use Sent’s 2004 useful labels.

economists based in German-speaking countries. For instance, Werner Güth and his colleagues (1982) from Universität Köln in Germany designed what is now known as the ultimatum game, a very popular experimental design that consists in letting a subject share a sum of money with another one, who can either accept the proposed allocation (in which case both subjects get what the first one decided) or reject it (in which case both get nothing). The observed behavioral tendencies usually go against the standard game theoretical predictions of the first player offering the smallest possible share or the second one accepting the smallest possible share (see Guala, 2008 for more advanced theoretical explanations). Another example is the model of inequity aversion proposed by Fehr and Schmidt (1999), respectively from the University of Zurich in Switzerland and the University of Munich in Germany. This model is meant to account for a large set of behavioral regularities related to interpersonal decisions that include both some of the kind that are observed in the ultimatum game and others more aligned with standard game theoretical predictions such as the ones observed in market experiments. These two examples are significant because the study of pro-social behavior is the biggest research theme in behavioral economics (in terms of the number of publications) and Fehr and Schmidt's (1999) contribution is one of the most cited models in BE-XP (Truc, 2022a).<sup>5</sup>

The other two main research themes in behavioral economics were both developed (i) before the study of pro-social behavior and (ii) in the U.S. The oldest one is the study of behavior under risk. That was the research theme of Allais' (1953) contributions, in which he presented empirical results of the choices of economists and decision theorists between lotteries. One of his most well-known results was that people preferred the certainty of winning a large sum of money over a very small risk of winning nothing (with a high probability of winning much more), but when both options became riskier in the same proportion, they preferred the riskiest one. Such change of attitudes, from being risk averse to being risk-seeking, contradicted expected utility theory and was exhibited by proponents of that theory – this is why such effects are called “Allais paradoxes”. Mongin (2014) has shown that Allais considered that the behaviors observed in his experiments were rational and therefore that expected utility theory was not a good norm of rationality. This position was also adopted by decision theorists of different nationalities, such as John Quiggin's (1982) rank-dependent expected utility theory, although these theorists were less radical than Allais in considering that expected utility theory was still a good start to think about the rationality of choices under risk. However, this story does not really correspond to how that early work of Allais is retrospectively mobilized by most economists (Mongin, 2014, p.745) and especially by behavioral economists. On their account, Allais' experiments were meant only as a criticism of the descriptive interpretation of expected utility theory (i.e., as a theory of how people actually make decisions under risk) and not of its normative interpretation (i.e., how rational people should behave).<sup>6</sup>

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<sup>5</sup>A few historical elements about the development of experimental and behavioral economics in Germany are discussed in Svorenčík, 2015, p.25, footnote 25).

<sup>6</sup>Let us stress that our goal is to produce a broad history BE-XP in France from which more specific episodes or lines of arguments can be subsequently investigated and contextualized. Our goal is not to put the received view on the legacy of Allais for BE-XP research under historical scrutiny (e.g., was it

In a famous 1979 paper, Kahneman and Tversky replicated the experiments from Allais – while giving them some specific names such as “the certainty effect” for the one described above – and extended them (notably to the domain of monetary losses), while proposing an alternative formal model: “prospect theory”, which is often considered as marking the birth of behavioral economics (Heukelom, 2014; Thaler, 2015). This model accounts for all the behavioral regularities exposed in their paper, but is clearly not compatible with rational choice theory in general and with expected utility theory in particular. Later, Tversky and Kahneman (1992) proposed another version of that model: “cumulative prospect theory”. It can be argued that this version is less clearly incompatible with rational choice theory (notably because it does not allow for violation of first-order stochastic dominance). In particular, it is conceptually close to rank-dependent expected utility theory. Up until the mid-1990s, the study of behavior under risk was the main research theme in behavioral economics in terms of the number of publications (Truc, 2022a,b, p.225, figure 4)

The second-oldest research theme in behavioral economics is the study of inter-temporal behavior. It started in the early 1980s, with some papers by Thaler (Thaler, 1981; Thaler and Shefrin, 1981), and is then mostly pursued by George Loewenstein (Loewenstein, 1987, 1988; Loewenstein and Thaler, 1989) first at the University of Chicago. Some of the main contributions to this topic consist in experiments in which the patience or impatience of the subjects is influenced by factors that should not be influential according to rational choice theory. For instance (Thaler, 1981), subjects tend to prefer, on the one hand, one apple now over two apples tomorrow (hence displaying a form of impatience) but, on the other hand, two apples in one week and a day over one apple in one week (hence displaying a form of patience). This kind of behavioral regularity is incompatible with the exponential discounting of time in rational choice models, which prevents dynamically inconsistent choices. Theoretical accounts of these regularities by behavioral economists have consisted in models using hyperbolic discount functions, the most popular of which in terms of citation is by far David Laibson’s (1997) quasi-hyperbolic model, which he developed at Harvard University (for more on the history of this research theme, see Grüne-Yanoff, 2015, 2016; Vallois, 2017).

Finally, it can be argued that the middle of the 2000s marked a rupture in the evolution of behavioral economics (Jullien, 2018). Before this period, (classical) contributions in behavioral economics consisted, for the most part, in studying behavior *within* either one of the three aforementioned dimensions *separately*, i.e., either under risk *or* over time *or* regarding other people. These contributions on risk preferences, time preferences, or social preferences were mostly made by economists based in the U.S and, to a lesser extent, in German-speaking countries. After this period, there has been a growing number of contributions that study behavior *across* these three dimensions, e.g., when risk and time jointly affect behavior, or when risk and other people jointly affect behavior, and so on. In other words, since the mid-2000s, bridges have been established between the three main research themes. Economists from countries other than the U.S and German-speaking ones seem to

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really experimental economics if he did not provide real financial incentives? What is the role played by the multiplicity of alternative models to expected utility in the latter remaining the main normative one?). Furthermore, we do not believe that all the historical trends we identify below can be relevantly related to the issue of the legacy of Allais in France (this is at least not the case for all our periods).

be more visible in these contributions than they were in the contributions from before the mid-2000s.

### 3 Methodology

#### 3.1 Construction of corpus

To study the evolution of BE-XP in France, we used a mixed of qualitative and quantitative approaches with a focus on publications. For the quantitative approach, we gathered a corpus (dataset) of articles with two characteristics: they must be strongly related to BE-XP and authored by at least one researcher based in France. Figure 1 represents our methodology in four steps, which can be explained as follows.

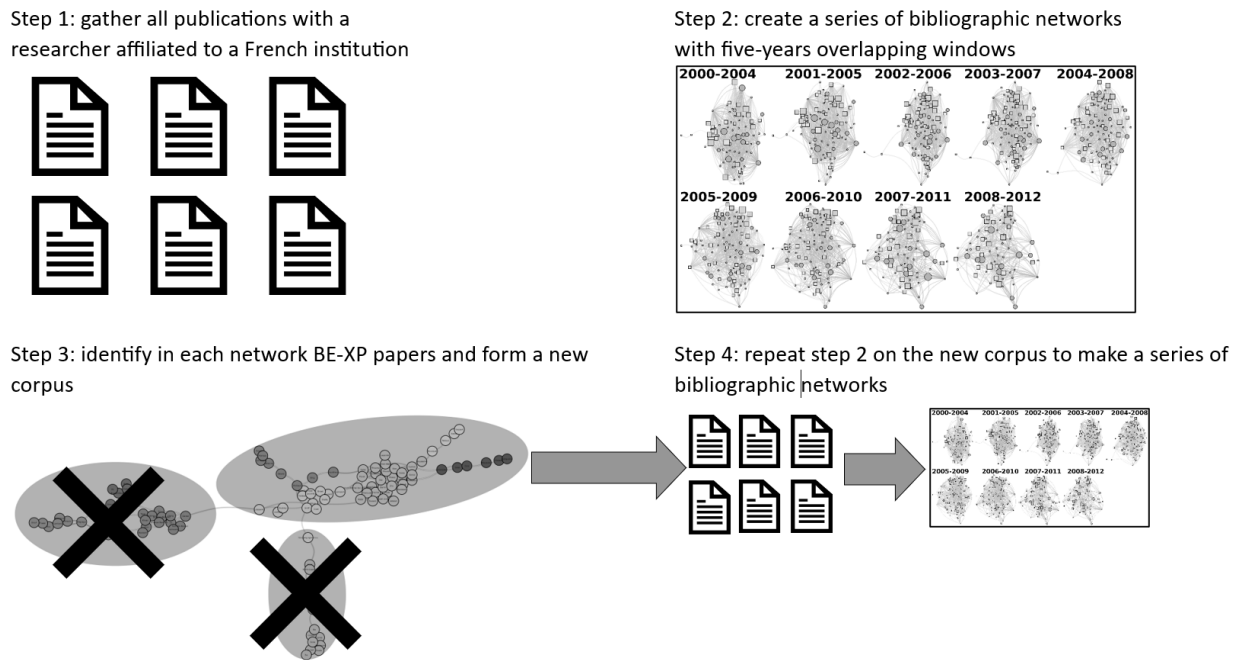


Figure 1: Construction of our corpus

1. Step 1: we gathered all publications on Web of Science starting in 1990 (1) with at least one researcher affiliated to a French institution and (2) published in economics journals according to the National Science Foundation disciplinary classification<sup>7</sup>. This corpus can be identified as all French-related economics publications (27 434 articles).

<sup>7</sup>Limiting ourselves to economics journals is necessary to avoid muddling the corpus with a lot of irrelevant articles from psychology. While this approach might miss BE-XP articles published elsewhere, it is important to consider that most BE-XP articles are cited by economics journals and published in economics journals (Braesemann, 2019; Truc, 2022b). Consequently, there are no reasons to think the network structure and cluster analysis would be significantly altered by including other journals (one exception might be



2. Step 2: using Goutsmedt and Truc’s (2021) R networkflow package, we made a dynamic bibliographic coupling analysis of all these French-related economics publications. Bibliographic coupling analysis identifies the relation between two articles by using the number of common references they share. This resulted in the identification of 26 networks.<sup>8</sup>
3. Step 3a: to identify relevant groups of articles that use similar references, we used the Leiden algorithm (Traag et al., 2019) and performed a dynamic cluster detection in all these networks (Goutsmedt and Truc, 2021). We then refined the initial set of 470 clusters (e.g., macroeconomics, finance) by keeping only the ones that had in their 20 most cited references at least one article whose first author was a well-cited behavioral or experimental economist.<sup>9</sup> This first automatic selection resulted in a shorter list of 37 clusters with 3 511 articles.
4. Step 3b: we then manually reviewed the remaining 37 clusters. This involved examining individual articles and the most cited references to identify and remove any false positives – clusters that had no relation with BE-XP research according to us. We ended up with 16 clusters and 1 839 articles that form the corpus on which we conducted our quantitative analysis.

## 3.2 Network construction

From this corpus of BE-XP-related publications authored by at least one researcher affiliated to a French institution, we conducted an extended network analysis (Step 4). We constructed a series of overlapping bibliographic coupling networks with five-year time windows (1996-2000, 1997-2001...).

Our corpus being a narrow specialty of economics, we can expect the networks to have some degree of homogeneity. This makes it more challenging for cluster detection algorithms to detect sub-specialties because many articles might have at least one reference in common, even if they talk about different things. To take into account this particularity, the usual way of measuring similarity between articles – which we used for the constitution of the corpus – is not the most appropriate to create the networks. That usual way consists in weighting the relationship between two articles by the number of references in common, whether these references are rare or common across the whole network, and whether the articles citing these

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neuroeconomics which would deserve a study of its own). In addition, for each cluster, we identified the most cited references, including references published outside of economics. If there are important and influential BE-XP articles published in non-economics journals, they would be captured in our analysis through these most cited references.

<sup>8</sup>More precisely, the specific parameters of the co-occurrence function used are a time window of 5 years, an edge threshold of at least 3 references in common, and the coupling strengths weighting method (Shen et al., 2019)

<sup>9</sup>The full list of authors: Daniel Kahneman, Richard Thaler, Amos Tversky, Colin Camerer, Matthew Rabin, George Loewenstein, David Laibson, Ernst Fehr, Terrance Odean, Werner FM De Bondt, Andrei Shleifer, David Hirshleifer, Vernon Smith, Charles Plott, Stephen Rassenti, Elizabeth Hoffman, Alvin Roth, John Kagel, Charles Holt, John Ledyard, Urs Fischbacher, Reinhard Selten.

Filtering steps	Number of article
Step 1: all articles with at least one French affiliated author	27 434
Step 3a: after automatic cluster filtering	3 511
Step 3b: after manual cluster filtering	1 839
Step 4: after components filtering	1 819

Table 1: Number of article at different steps of the corpus-creation process

Window	Number of article in network	Number of article in corpus
1996-2000	18	48
2001-2005	135	160
2005-2009	303	317
2010-2014	608	636
2014-2018	812	826

Table 2: Number of article in networks and corpus

references have long or short bibliography (Shen et al., 2019). A more appropriate tool for a very narrow specialty like ours is the backbone extraction using stochastic degree sequence model (Domagalski et al., 2021). Simply put, backbone extraction creates a simplified version of the network to capture its core structure. Rather than using weights, backbone extraction compares the bipartite network (the network with articles and references) with a null model to identify significant links from those that would be expected by chance in a random network. For example, the link between a review article with a long bibliography and a reference that is highly cited by many articles in the network (e.g., Kahneman and Tversky, 1979) has a high probability of being identified as non-significant. The bibliographic network (bipartite network projection) is then created using only significant links. Overall, the backbone of a network seeks to preserve the network’s underlying structure by filtering out less important or noisy edges.

Finally, for each network, we removed isolated articles and small components (connected groups composed of less than 10 articles).<sup>10</sup> This process resulted in networks focused on well-connected components and offered an additional opportunity to filter false-positive BE-XP articles that made it to this step. This resulted in 19 networks between 1996 and 2018 composed of 1,819 unique articles.

### 3.3 Analysis and complementary qualitative approach

As a preparatory step for analysis, we used cluster detection (as in Step 3a) to organize the networks and corpus into suitable units for further exploration. For the cluster analysis, we used the Leiden algorithm (Traag et al., 2019) to identify relevant groups of articles within each network. To track clusters across networks and over time, we used the dynamic cluster

<sup>10</sup>In network analysis, components refer to disjoint groups of articles within a larger network. These groups of articles are connected to each other, but not connected to any nodes outside the group.

analysis function of the R networkflow package proposed by Goutsmedt and Truc (2021) and grouped clusters that were similar across time windows (i.e., if a cluster in the 2001-2005 network is made of similar articles as another cluster in 2002-2006 network, the cluster are identified as the same one).

Cluster analysis serves a dual purpose in our investigation of BE-XP research. First, it helps us identify distinct groups within BE-XP (e.g., on inter-temporal decisions). Second, it allows us to differentiate core BE-XP research from thematically related research that cannot be characterized as BE-EXP research. For instance, the algorithm can distinguish different clusters that, on first impression, are all about the same theme, e.g., decisions under risk and uncertainty, but once we go through the clusters we realize that they clearly constitute different literatures.

Finally, for visualization purposes, nodes (i.e., articles) are color-coded according to their clusters and projected into a two-dimensional space using the Force Atlas 2 algorithm (Jacomy et al., 2014). This algorithm facilitates the creation of an informative visual representation of the network structure by placing similar articles close together. It's important to emphasize that these figures function as heuristic devices to enhance reader comprehension of the analysis discussed throughout the paper, and do not constitute the primary analytical tool. The actual quantitative analysis relies on a variety of network metrics and detailed tables, and not on the visualizations.<sup>11</sup>

In some cases, our quantitative analysis provides valuable information by itself. For example, our method for identifying article clusters is based on cited references and does not take into account where the articles were produced. Consequently, if we find clusters that align with a particular geographic area, this suggests a high degree of geographical specialization in the research topic of that cluster (see Goutsmedt and Truc, 2023 for another example of bibliographic coupling analysis used for spatial considerations). However, in most cases, it is important to emphasize that a lot of the interpretative work involves both quantitative and qualitative analysis. The quantitative analysis helped us identify relevant groups of researchers and gather a variety of information: who are the most productive authors, in which institutions they are situated, what are their most cited references, and in what journals are these articles published. However, ultimately, interpreting this vast data set requires a nuanced cross-examination of the quantitative data, the articles themselves, and the existing literature in the history of economics. For example, to evaluate whether BE-XP becomes more applied over time, we looked at both quantitative data (e.g., the rise of applied journals and references in a cluster) and qualitative data (e.g., research programs and trajectories of authors or the content of the articles in the cluster).

Similarly, while we were able to identify around 1 900 BE-XP relevant articles from our corpus, our story also relies on publications that are not in it. One advantage of our corpus-construction procedure is that we do not use any pre-existing categorization of BE-XP to identify relevant articles (e.g., JEL codes). However, because our approach relies extensively on cluster analysis, we are only able to detect BE-XP papers as long as they form particular

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<sup>11</sup>For example, while the spatial arrangement of clusters in the visualizations offers an initial impression of their relationships, we employed matrix analysis for a more precise identification of closely related clusters

clusters or if the share of BE-XP articles within a non-BE-XP cluster is high enough that it impacts the 20 most cited references (Step 3a). Before the mid-1990s, BE-XP research in France was in an early stage, characterized by few contributions that had limited connections between them. Hence our approach is not ideal to identify the very early contributions to BE-XP in France. To address this limitation, we also used more traditional means of historical inquiry to identify relevant articles, especially for the 1980s and early 1990s. This involved searching for keywords in economics journals for specific periods and snowballing from the bibliographies, looking at all publications of individuals in our quantitative corpus to find BE-XP articles before the 1990s, or investigating the origins and networks of these authors (e.g., supervisor, senior co-authors).

## 4 The 1980s: the ambivalent influence of Allais in early BE-XP

The 1980s saw both the publications of canonical BE-XP papers in the U.S. and in German-speaking countries as well as the institutionalization of these approaches with the foundations of journals such as the *Journal of Economic Behavior and Organization* and organizations such as the Society for the Advancement of Behavioral Economics (SABE) and the Economics Science Association (ESA) (Heukelom, 2014; Svorenčík, 2015). As far as we know there were no French researchers involved in the foundations of these organizations. But that does not mean that BE-XP did not start developing in France at the time.

Our network analysis of publications by researchers based in France does not detect any publication related to BE-XP prior to the 1990s. However, at least two distinct sets of contributions related to BE-XP by researchers based in France can be found in the 1980s with more traditional means of historical inquiry. These two sets of contributions consist of papers written or co-written by Michèle Cohen and Jean-Yves Jaffray, on the one hand, and by Bertrand Munier on the other hand.

Cohen and Jaffray are two mathematicians trained in mathematical economics who did most of their careers in Parisian universities. They published experiments on behavior under risk and uncertainty throughout the 1980s as well as alternative models to expected utility theory (Cohen et al., 1987; Cohen and Jaffray, 1988a,b; Jaffray, 1988a,b)<sup>12</sup>. In these papers, their position on the issue of the rationality or irrationality of empirical deviations from expected utility theory aligns with that of the decision theorists depicted in section 2: they tend to consider that these deviations are instances of rational behavior (like Allais but unlike Kahneman and Tversky) while seeing expected utility theory as a good start from which to work on new and more general models of rational behavior under risk and uncertainty (unlike Allais and also unlike Kahneman and Tversky). Their experimental work consisted of 45 minutes of private interviews with students during which they tried to replicate Allais' as well as Kahneman and Tversky's experiments. Their contributions were to design experimental conditions that allowed for disentangling the cognitive processes at stake in the

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<sup>12</sup>Their first experiments were conducted in the late 1970s and published in Cohen and Jaffray, 1981

observed decisions and to compare different elicitation techniques to find the most precise way of measuring utility. While this is consistent with experimental work from other decision theorists in the U.S. (see the references cited by Cohen and Jaffray, 1988b, p. 178), this is somewhat different from behavioral economists' quest to find new "anomalies". It should also be noted that they mobilized much more the work of Kahneman and Tversky (even though they are often in disagreement with them) than that of Allais to situate their contributions.

Munier is an economist trained in monetary economics and general equilibrium theory during the 1960s at the Université d'Aix-Marseille in the south of France, who then moved to the Ecole Normale Supérieure at Cachan near Paris in the mid-1980s. During the 1980s, he started to work on the economic analysis of individual behavior under risk and dedicated substantial attention to behavioral and experimental approaches. All of his writings on that topic in the 1980s consist of syntheses of empirical challenges to expected utility theory and alternative non-expected utility models (Munier, 1984, 1988, 1989a,b). In these papers, Munier defends an interpretation of these empirical and theoretical contributions that is strongly influenced by the work of Allais on the topic. This interpretation is that these contributions imply "an important renewal of the very conception of rationality in economics" (Munier, 1984, p.65). Most of these programmatic writings were meant to raise awareness among economists that expected utility theory, used as the basis of most models in economics, was facing strong criticisms from researchers specialized in the study of individual decision-making. While he always acknowledged that the work of Kahneman and Tversky is an important criticism of expected utility theory, he often spent more time on other less well-known contributions because he considered as early as 1988 that "everyone knows or has at least heard of "prospect theory"" (Munier, 1989a, p.19). Munier often promoted BE-XP and alternative approaches, but also emphasized Allais' scientific merits. For example, Kahneman and Tversky's certainty effect is presented as a more general case of the "Allais paradox" (Munier, 1989b, p.314), and while Quiggin (1982) and Yaari (1987) models were published before Allais (1988), he emphasize the "Allais-Quiggin-Yaari formulation" (Munier, 1989b, p.311, footnote 9) were being discovered independently (Munier, 1989c, p.17) because "Allais was not aware of their contributions" until June 1986 when a working version of his was already circulating (Munier, 1989b, p.311, footnote 8).

Outside of his writings, Munier also promoted research related to BE-XP in the 1980s in France through other means. Firstly, he organized the third edition of the Foundations of Utility and Risk (FUR-III) conference at the Université d'Aix-Marseille in June 1986 (Munier, 1988). This is a well-known international conference that was first organized in Oslo (Norway) in 1982 by Ole Hagen (a behavioral scientist) and Allais; and then every two years over the world – the 1986 edition was the first one in France. It is worth noting that, apart from Munier's contribution, the only other ones from researchers based in France to the proceedings of that conference were from Cohen and Jaffray (although Allais was there (Munier, 1989b, p.311, footnote 8)). Secondly, he supervised the PhD thesis of Mohammed Abdellaoui, who defended in 1988 what is probably the first dissertation in BE-XP in France. Thirdly, he created a research center called the GRID (Groupe de Recherche sur l'Information et la Décision) at the Ecole Normale Supérieure (Cachan), which focused on the study of

behavior under risk and uncertainty (Serra, 2022, Appendix 1).

Overall, throughout the 1980s, we find that the influence of the work of Allais on research related to BE-XP is ambivalent, compared with that of the work of Kahneman and Tversky, which is immediately considered as central – but not discussed as being so different than the work of other decision theorists such as (Quiggin, 1982). In a sense, that is intriguing because we also observe that, for Cohen, Jaffray and Munier, the behavior of individuals incompatible with expected utility theory tends to be interpreted as rational – which goes against Kahneman and Tversky’s interpretation and is aligned with that of Allais or decision theorists such as Quiggin. Our goal is not to explain this puzzle, however, but only to remark that, at least in the 1980s, the issue of the interpretation of observed behavior under risk as rational or irrational is explicitly discussed. We can also remark that we do not find any work related to time or social preferences or using market experiments over that period, while they were developing in the U.S. and in Germany. Finally, most of the research discussed in this section was produced by scholars in universities located in Paris or nearby (with the exception of the early work of Munier, conducted at the University of Aix-Marseille) – and we find no publications in BE-XP involving co-authorship between researchers based in France and abroad. The emphasis of all the researchers we discussed over this period on technical issues related to the measurement of utility seems quite different from the search for ever-new behavioral “anomalies”, which is characteristic of BE-XP research over this period in the U.S. and in Germany (see section 2). We will see that this emphasis impeded a dynamic of specialization as this French specificity lasts until the end of our history.

## 5 1990s-2005: the (late) proliferation of experimental economics laboratories in France

During the first half of the 1990s, BE-XP in France remained confined mostly to the Parisian region and was done by the protagonists introduced in the previous section. However, things changed rapidly from the second half of the 1990s onward.

In the Parisian region, Munier’s GRID at Cachan had its first computerized room dedicated to experimental economics in the early 1990s, and Munier organized another FUR conference there to which Kahneman and Charles Plott (a pioneer of the experimental market approach from the U.S.) participated. We find a couple of contributions related to BE-XP from the previous period’s protagonists, but not enough yet for a network analysis. Munier published two papers with Abdellaoui that seek to improve the measurement of utility function in experiments on behavior under risk – one in which they present the results of some replications of Kahneman and Tversky’s work (Munier and Abdellaoui, 1991) and another one in which they introduce a software to conduct computerized experiments on behavior under risk (Abdellaoui and Munier, 1994). The latter project is driven in part by the time it saves compared to “traditional questionnaires” (*ibid*, p.150) – used for example by Jaffray and his co-authors in their personal interviews with the subjects.<sup>13</sup> Jaffray, on his part,

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<sup>13</sup>This might well be one of the first attempts at computerizing experiments on individual decisions in

Rank	Uncertainty	Risk (3)	Risk and Time
1	Gilboa and Schmeidler (1989)	Yaari (1987)	Kahneman and Tversky (1979)
2	Schmeidler (1989)	Rothschild and Stiglitz (1970)	Tversky and Kahneman (1992)
3	Ellsberg (1961)	Quiggin (1982)	Abdellaoui (2000)
4	Epstein and Wang (1994)	Hong et al. (1987)	Quiggin (1982)
5	Gilboa (1987)	Landsberger and Meilijson (1994)	Gonzalez and Wu (1999)

Table 3: Most cited references in the three clusters related to risk and uncertainty (2001-2005)

co-authored an experimental paper (Essid et al., 1991) – still using personal interviews – to estimate the function of his alternative model to expected utility theory (Jaffray, 1988b) and to test different ways of eliciting preferences under risk in order to find the best way to measure them. In these papers involving Munier and Jaffray, references to (Allais, 1953) are quasi-nonexistent (which contrast sharply with Munier’s work from the previous period) as are the discussions of the rationality or irrationality of the observed behavior (although when there are some, the position is similar to the one depicted in the previous section, i.e., compatible with Allais’ and incompatible with Kahneman and Tversky’s).<sup>14</sup>

While for the first half of the 1990s, we do not detect any network of publications, suggesting that BE-XP did not yet constitute a strongly connected field of research in France, we find a network of 18 connected papers (see online appendix) in the second half of the 1990s that form three distinct clusters labeled (1) *Risk and Uncertainty (Theoretical Application)*, (2) *Risk* and (3) *Uncertainty* (Table 3). They are mostly about individual decisions under risk and uncertainty, but only the *Risk* cluster can be qualified as related to BE-XP and mostly contains empirical work. This cluster notably includes the experimental work of Abdellaoui (2000), who developed sophisticated techniques to measure or estimate utility, preferences, and beliefs within the theoretical framework of Tversky and Kahneman (1992). The only theoretical reference in this cluster is from (Chateauneuf and Wakker, 1999), who axiomatize this theory (Tversky and Kahneman, 1992) for decision under risk (while other axiomatizations already existed for decision under uncertainty).

These two kinds of French contributions contrast sharply with contributions in BE-XP in the U.S. or in German-speaking countries during the same period. Firstly, we can note a thematic difference: these contributions focus only on decisions under risk, while contributions on inter-temporal and inter-personal decisions were growing abroad. Secondly, the question of whether behavioral theories depict rational or irrational behavior does not seem to attract a lot of attention in France, as compared with abroad (e.g., Smith, 1991; Loewenstein, 1999) or with the 1980s in France. Thirdly, we can note a methodological difference that was already present in the previous period: they are not trying to observe new anomalies to rational choice theory or to offer models to account for such anomalies (à la Rabin, 1993;

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economics, at the very least in France. Although the development and spread from the U.S. of computerized market experiments are well documented by (Svorenčik, 2023), there is no trace of a link between this trend and the computerization of experiments on individual decisions.

<sup>14</sup>In a lengthy and very pedagogical paper in French reviewing alternative models to expected utility theory, Marc Willinger (1990) explicitly argues, intensely citing Allais in his arguments, that anomalous observed behaviors are rational.

Laibson, 1997; Fehr and Schmidt, 1999). Instead, they are making technical contributions in the service of behavioral theory. This technical dimension makes these contributions much closer to standard decision theory than the ones of behavioral or experimental economists from the U.S. or German-speaking countries. This proximity with standard decision theory can be appreciated by the fact that the other two clusters in the network connected to the *Risk* cluster are clearly about standard decision theory. They are constituted by contributions that often address the same problems as in the *Risk* cluster (e.g., how to theoretically account for the Allais paradox), but propose solutions that are closer to the standard representation of the rational economic agent (e.g., rank-dependent expected utility, Choquet expected utility). It is worth noting that Allais' (1953) paper is not much cited in these three clusters. It does not even figure among the thirty most cited references in the two non-BE-XP clusters and it ranks only as the 11th most cited reference in the *Risk* cluster (see online appendix). Finally, more than 75 percent of the authors in these three clusters are based in Paris or nearby confirming the weight of the Parisian research groups in the early years of French BE-XP.

We do find some papers unrelated to behavior under risk and authored by scholars from outside of Paris in our network analysis for the second half of the 1990s. However, because they are relatively isolated, they are disconnected from the main component of the network. Unlike the cluster *Risk* discussed above, they do not seem to constitute what could be considered (yet) as a research community in France. A couple of these papers are related to the study of social preferences and experimentally investigate miscellaneous issues. These isolated papers are also much closer to experimental papers in the Kahneman, Tversky, and Thaler tradition (e.g., Medinger, Robin and Ruffieux, 1999; Willinger, 1996; Güth, Marchand and Rullière, 1998) or in the Smith's tradition (e.g., Noussair, Robin and Ruffieux, 1998) – or they are just using the experimental method for standard decision theory in neither Kahneman and Tversky's nor Smith's fashion (e.g., Rauchs and Willinger, 1996). Compared to the tense situation between behavioral economists and market experimentalists in the U.S during the 1980s and 1990s, in France, the same authors contribute to these different approaches suggesting less hostility between them. This could be due to the lack of an established experimental tradition in France at that time, inducing a convergence of interest between the behavioral and experimental market approaches, as the main goal of experimentalists was to establish experiments as a legitimate tool in economics in their particular institutional context. These researches are also characterized by an openness to international collaboration. One striking example is the publication involving German economist Güth with French economists Marchand and Rullière in the *Revue Economique*, a French journal (Güth et al., 1998). Güth is an influential author in the history of behavioral economics with respect to the role of the ultimatum game in the study of pro-social behavior (see section 2). Such collaboration not only fueled the surge in BE-XP's popularity in France but also guided the development of French BE-XP towards an internationally shared area of inquiry, i.e., the study of social preferences. It is also worth noting that most of the French economists cited in this paragraph were actively trying to build the institutional grounds for the development of BE-XP in their own universities (the information in the next two



paragraphs is mostly based on Serra, 2022, Appendix 1).

## 2001-2005

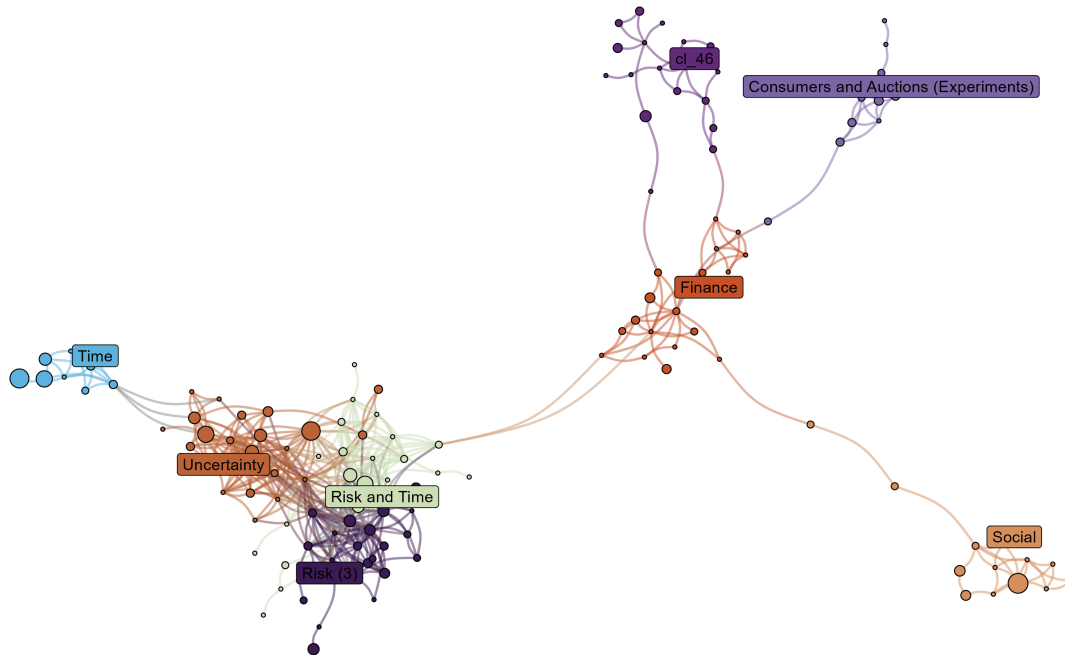


Figure 2: Bibliographic coupling of BE-XP-related publications from French economists (2001-2005). Nodes (articles) are color-coded according to their cluster. A connection between two nodes means that the corresponding articles have a significant number of references in common. The distance between nodes approximates the similarity of bibliographies.

One way in which this was done was by harnessing the expertise of renowned research centers from the U.S. in designing laboratory experiments. In Grenoble (in the French Alps close to Italy and Switzerland), Michel Hollard and Bernard Ruffieux got interested in the experimental market approach and went to the U.S. to meet with Smith and Plott. They then opened a computerized room dedicated to experimental economics in the early 1990s with the help of one of Plott's technicians. The creation of such computerized rooms allowed French BE-XP to conduct experiments and made the increasing number of BE-XP publications outside of Paris possible. Grenoble only marked one of such attempts at creating a dedicated space for BE-XP in France as the end of the 1990s marked a period of institutional effervescence.

As far as we know, it is not clear when and where the first experimental economics laboratory was founded.<sup>15</sup> It probably occurred between 1996 and 1998 either in Lyon by

<sup>15</sup>We make a distinction here between computerized rooms dedicated to experimental economics (e.g., at

Jean-Louis Rullière – who was part of Munier’s team at GRID in the early 1990s – and Marie-Claire Villeval or in Strasbourg by computer scientist Kene Boun My, Anthony Ziegelmeyer (a PhD student in economics), and his advisor Marc Willinger. Both Lyon and Strasbourg more generally played pivotal institutional roles. For example, Willinger organized the first Journée Française d’Economie Experimentale (French Experimental Economics Day) in 1995 at Strasbourg and the French National Center for Scientific Research (CNRS) organized its first thematic school on BE-XP in Lyon in 2000. Lyon’s and Strasbourg’s facilities would be followed by the experimental economics laboratory of the Université Paris 1 Panthéon-Sorbonne created in 2001 by Claude Meidinger, a specialist on the epistemology of economics who was converted to experimental economics by Munier at the GRID in the early 1990s. In 2002, a well-known business school, the INSEAD opened its own experimental economics laboratory within Paris as well. After leaving Strasbourg, Willinger created an experimental economics laboratory in 2003 in Montpellier (south of France). The same year, David Masclet and Laurent Denant-Boemont, both of whom were trained in Lyon (i.e., in the same team as Rullière and Villeval) founded an experimental economics laboratory in Rennes (north-east of France).

The establishment of these many experimental economics laboratories paved the way for more BE-XP publications during the early 2000s. In our network analysis, we jump from 18 papers between 1996 and 2000 to 135 papers over the 2001-2005 period (Table 2). Among the 8 clusters of that network (see Figure 2), 4 can be characterized as BE-XP: *Time, Risk and Time, Social and Consumers and Auctions (Experiments)*. Two main remarks are worth making about this thematic structure. Firstly, it is well aligned with the thematic structure of BE-XP at the international level presented in Section 2: a distinction between experimental market economics (*Consumers and Auctions (Experiments)*) and behavioral economics, which is itself divided into three research domains: behavior under risk (*Risk and Time*<sup>16</sup>), inter-temporal behavior (*Time*)<sup>16</sup> and other-regarding behavior (*Social*). Secondly, that thematic structure maps onto a geographical one: experimental markets are studied in Grenoble, behavior under risk is studied in Paris (or in the Parisian region), inter-temporal behavior is studied in Toulouse (south-west of France, Table 4) and other-regarding behavior is studied in Lyon and Strasbourg (as well as in Paris but to a significantly smaller proportion than the one for behavior under risk)<sup>17</sup>. In other words, the proliferation of different research themes in the first half of the 2000s goes hand in hand with a geographical diversification of research sites on BE-XP across the French territory. Furthermore, it seems that different research strategies emerge in this thematic proliferation and geographical diversification. These strategies are worth discussing because they are for the most part geographically situated and they point to what may be national specificities of BE-XP in France.

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the GRID and in Grenoble in the early 1990s) and experimental economics laboratories in so far as the latter is endowed with a full-time lab manager and a dedicated platform to manage a pool of subjects whereas the former is not.

<sup>16</sup>That cluster survives until the end of our entire time frame of analysis (i.e., until 2018) and bears its name mostly because it contains several contributions on risk and time preferences, which are investigated separately or jointly, *in the 2010s*. In the 2000s, it remains a cluster mostly about risk preferences.

<sup>17</sup>See this geographical information in online appendix

City	N	Share
Toulouse	25	52%
Paris	13	27%
London	3	6%

Table 4: Share of papers with at least one author affiliated to a particular city in the *Time* cluster of the 2005-2009 network

We observe a number of international collaborations, mainly with researchers from the U.S. and Germany, on both experimental markets in Grenoble and the study of social preferences in Lyon and Strasbourg. These collaborations lead to publications in prestigious generalist (“top 5”) journals of experiments that fit quite well with the experimental literature on these topics at that time. More generally, collaborations with German economists intensified on the topic of social preferences Anderhub et al., 2004; Abbink et al., 2003 with contributions well aligned with what is being published in German-speaking countries or in the U.S. on the topic. Indeed, experiments in France use the same games as in other countries, especially the public goods game (e.g., Masclet et al., 2003; Masclet, 2003 and the trust game (e.g., Willinger et al., 2003; Cochard et al., 2004). Furthermore, the most applied contributions are to labor economics (Rob and Zemsky, 2002; Auriol et al., 2002; Masclet, 2003; Tournadre and Villeval, 2004), as it is the case in Germany for instance (Fehr et al., 1993, 1996). Strikingly, Willinger’s most cited paper is based on a comparison of social preferences between French and German subjects (Willinger et al., 2003).

Concerning BE-XP research on behavior under risk, there is, on the one hand, some continuity with the previous network (1996-2000). The work of Abdellaoui remains central with the only paper on this theme published in a prestigious generalist journal (*Econometrica*) being single-authored by him. Furthermore, his two contributions over this period are still characterized by the same French specificity noted previously, i.e., technical contributions oriented towards a better measurement of behavior that may deviate from (subjective) expected utility theory in ways that are already identified by some pre-existing empirical results (Abdellaoui, 2002; Wu et al., 2005). On the other hand, there are now a few experimental papers resembling BE research in the U.S., i.e., that seek to identify relatively new deviations or “anomalies” from rational theory (e.g., Etchart-Vincent, 2004; Schmeltzer et al., 2004). Nathalie Etchart-Vincent’s (2004) study of the effect of the magnitude of consequences on probability weighting in the domain of losses is characteristic of this type of research (and is the most cited from this period in our whole corpus).

The BE-XP research on inter-temporal behavior identified through our network analysis is peculiar for a number of reasons. Firstly, it is produced mostly by two theoreticians who did not work on matters related to BE-XP before the 2000s: Jean Tirole (at the Toulouse School of Economics, where there were no specific facilities for BE-XP at that time) and Roland Bénabou, a French economist at Princeton in the U.S (Benabou and Tirole, 2002, 2003; Battaglini et al., 2005). Both Tirole and Bénabou were trained as engineers at the Ecole Polytechnique in France and did their PhD at MIT. Secondly, in their contributions to behavioral economics, Tirole and Bénabou take a theoretical perspective on time preferences

that is specific compared to what is produced on this topic in the U.S. but similar to the one they have at the same period on social preferences. That specificity is twofold and is expressed in the general programmatic approach to behavioral economics that Tirole presented in his “Rational Irrationality” presidential address to the *European Economic Association* in 2002. On the one hand, he emphasizes theoretical contributions with strong unifying cross-disciplinary ambitions:

“a unified approach to social psychology should start from a single view of the individual’s preferences, cognitive machinery and basic problem-solving strategies. While incentives and feedback, and therefore behavior, are highly context-dependent, the underlying “fundamentals” are the same whether the individual is engaged in self-regulation [i.e., related to time preferences] or interacting with others [i.e., related to social preferences].” (Tirole, 2002, 652)

On the other hand, he tends to consider that most observed behaviors under theoretical scrutiny, including inter-temporally inconsistent behavior, are not necessarily irrational: “I find it very unproductive to marvel at the stupidity or irrationality of the human mind (this reaction may be attributed to the fact that I almost invariably fall into the traps built by the experimenters!)” (ibid, 640). In line with the contributions on risk discussed in the previous section, that way of seeing some form of rationality in behavior that seems at odds with rational choice theory appears specific with respect to U.S. behavioral economists (see also, e.g., Etchart, 2002 on inter-temporal behavior).

By the end of the first half of the 2000s, BE-XP in France was marked by the following specificities. First, it appears to lag behind international trends in terms of diversification and priorities. While research on behavior under risk held a quantitatively dominant position in France, at the international level it was research on social preferences that was the most prolific research theme (Truc, 2022a). Second, the work of (1) Abdellaoui and others on the measurement of behavior under risk and of (2) Bénabou and Tirole with a strong ambition of theoretical unification are quite unique with respect to the BE-XP published in prestigious generalist journals on risk and time preferences over the period. While the work of Abdellaoui, Bénabou, and Tirole is quite distinct from the BE-XP produced abroad, they are among the few French researchers who managed to publish BE-XP in the top 5 leading generalist journals (along with Masclet et al., 2003 on social preferences). Finally, the dynamic of specialization on technical issues related to the measurement of utility that we observed in the previous section is still at play regarding BE-XP on behavior under risk. It remains predominantly conducted in the Parisian region and its key figures maintain close ties with non-BE-XP research focused on risk and uncertainty, which is also primarily conducted in the Parisian region. This connection, driven by a shared interest in risk and uncertainty and geographical proximity appears to play a bigger pivotal role in shaping the field than any potential common interest between BE-XP research groups separately working on risk, time, and social preferences (see Table 5. This observation, together with the centrality of Abdealloui in the research on behavior under risk, could be interpreted as a sign of BE-XP in France being subjected to a path-dependency set by Allais and Munier, even though Allais’

Behavioral Approach		Standard Approach	
Risk and Time	Social	Risk (3)	Uncertainty
Paris (23%)	Lyon:Eculy (31%)	Paris (59%)	Paris (58%)
Paris:Cachan (18%)	Paris (31%)	Bordeaux:Pessac (14%)	Toulouse (17%)
Paris:Cergy-Pontoise (14%)	Strasbourg (23%)	Toulouse (14%)	Fontainebleau (12%)

Table 5: Share of papers with at least one author affiliated to a particular city in the 2001-2005 network

(1953) paper is no longer in the thirty most cited references by BE-XP on behavior under risk during the first half of the 2000s. Besides the dynamic of specialization that is proper to the study of risk preferences, we also observe a convergence with international trends regarding the study of social preferences that is partly driven by collaborations with German economists.

## 6 2005-2018: following international trends with some twists

BE-XP in France continued to grow at an ever greater pace from the second half of the 2000s up until the end of the 2010s notably in terms of institutional developments (Serra, 2022, Appendix 1). Experimental economics laboratories were established across the territory over the decade: at the Burgundy School of Business in Dijon in 2008 (east of France), at the Toulouse School of Economics in 2010, at the Université of Nice Sophia-Antipolis (now Université Côte d’Azur) in 2013 (south-east of France), at the Université Catholique de Lille in 2015 (north of France) and at the Université de Franche-Comté in Besançon in 2017 (north-east of France). In other words, the institutional effervescence depicted in the previous section continues over that decade. But we also observe several events that can be interpreted as signaling an institutional consolidation of BE-XP in France especially in Lyon (ibid). For instance, it is in Lyon that the French Economics Association (AFSE) dedicated a 2007 workshop on experimental economics or that the ESA organized its European Meeting in 2008. It is also in Lyon that the French Experimental Economics Association (ASFEE) was created in 2009, with Villeval (who was and still is in Lyon) as its first president. Villeval also became president of the ESA Europe in 2012 and of the ESA in 2019. As far as we know, one of the most significant event from an institutional point of view that occurred in Paris over that decade was the creation of the Economics and Psychology master program by economist Louis-Levy Garboua and psychologist Todd Lubart in 2010, jointly attached to the Université Paris 1 Panthéon-Sorbonne and the Université Paris Cité.

This institutional dynamism all over the country is unsurprisingly mirrored by a corresponding trend in intellectual production. The number of PhD defenses in BE-XP grows exponentially from the end of the 2000s onward (see Figure 3) as does the number of publications (Table 2): we pass from 135 papers in the 2001-2005 network to, (i) 303 papers in the 2005-2009 network (Figure 4), (ii) 686 papers in the 2011-2015 network (Figure 5), and (iii) 812 papers in the 2014-2018 network (Figure 6). The geographical distribution of

contributions on different themes in BE-XP is much more even than in the previous period (see Table 6) except for contributions from more standard approaches (the *Risk and Time (standard)* and *Uncertainty* clusters) that are still quite concentrated in Paris (Table 6) over the 2014-2018 period.

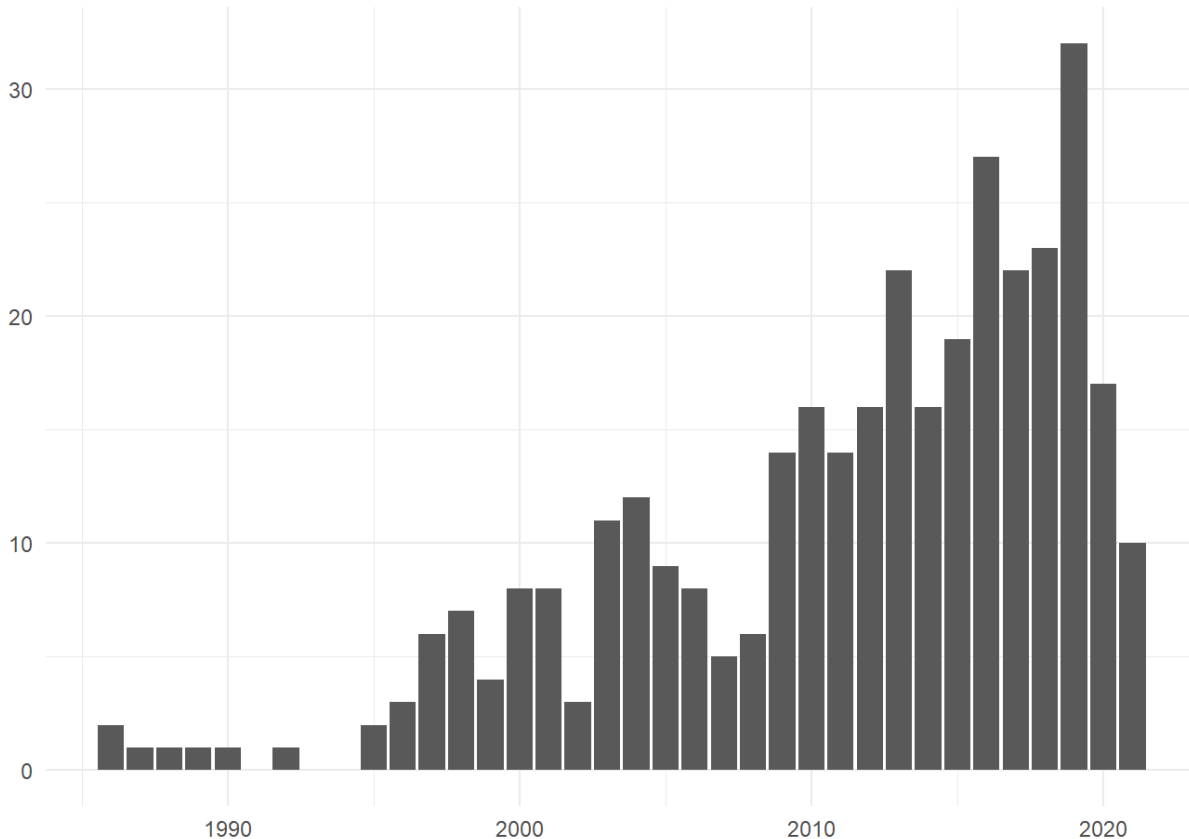


Figure 3: Number of BE-XP-related thesis defended in France

Research on social preferences quantitatively explodes over the period and ends up dominating research on risk and time preferences. Contributions related to social preferences represent 24% of the 2014-2018 network *versus* 11% of the 2005-2009 network, at the expense of risk and time preferences (14% of both the 2014-2018 and 2005-2009 networks, see Table 7). While this dynamic is in line with what is observed at the international level (Truc, 2022a,b), it started relatively late in France. This surge of social preferences came with an increasing centrality of Lyon in BE-XP research with Villeval as a key figure on the international scene, especially at the European level. We cannot say whether Villeval's research and commitment to international institutions nourished the explosion of research on social preferences or whether the enthusiasm for social preferences at the national and international levels encouraged Lyon's dynamic in BE-XP. Nevertheless, we can certainly say

2005-2009

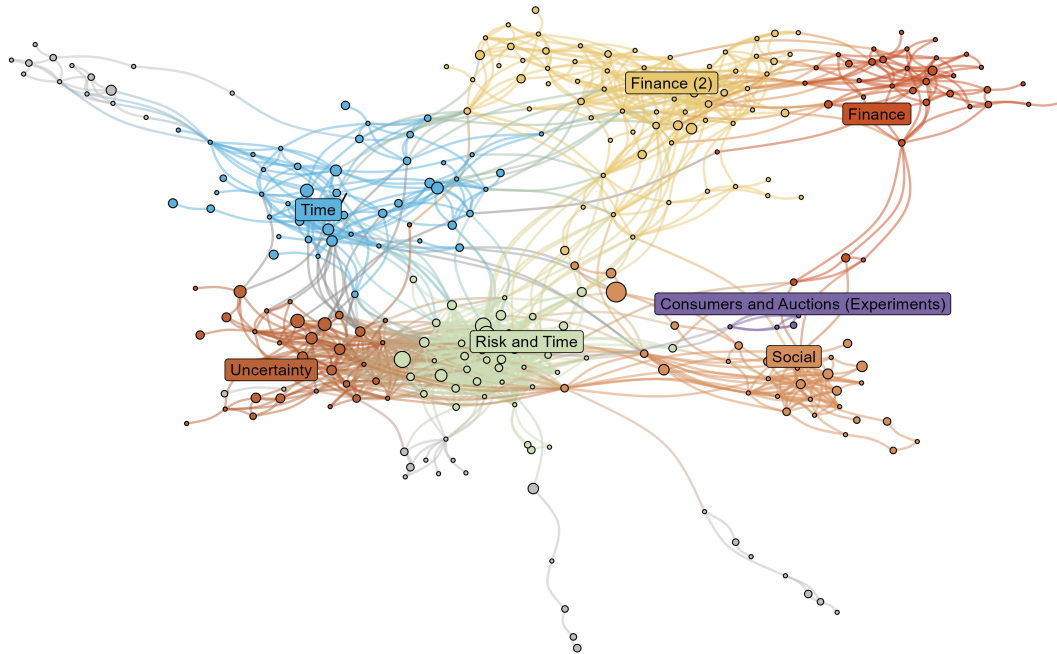


Figure 4: Bibliographic coupling of BE-XP-related publications from French economists (2005-2009). Nodes (articles) are color-coded according to their cluster. A connection between two nodes means that the corresponding articles have a significant number of references in common. The distance between nodes approximates the similarity of bibliographies.

that Lyon's early specialization in social preferences granted them a unique position within the landscape of BE-XP in France.

The most salient change concerning the previous network regarding this theme is that there are now a few *theoretical* contributions on social preferences (Bénabou and Tirole, 2006; Benabou and Tirole, 2006; Bénabou and Tirole, 2009; Benabou and Tirole, 2010; Bénabou and Tirole, 2011). They are made by Bénabou and Tirole in the same spirit of theoretical unification expressed by (Tirole, 2002) about time preferences and discussed in the previous section. Their theoretical contributions seek to explain a wide range of pro-social behavior observed in different disciplines (economics, sociology, anthropology, psychology) by adding motivations related to *social image*, i.e., norms, and *self-image*, i.e., identity (Bénabou and Tirole, 2006) to the more traditional distinction between self-interested and altruistic motivations one can find in other models of social preferences produced in the U.S. or in Germany (e.g., Rabin, 1993; Fehr and Schmidt, 1999).

Research on social preferences is mostly experimental, generally conducted within specialized experimental research centers (as with Lyon in France or Zurich in Switzerland) or

2010-2014

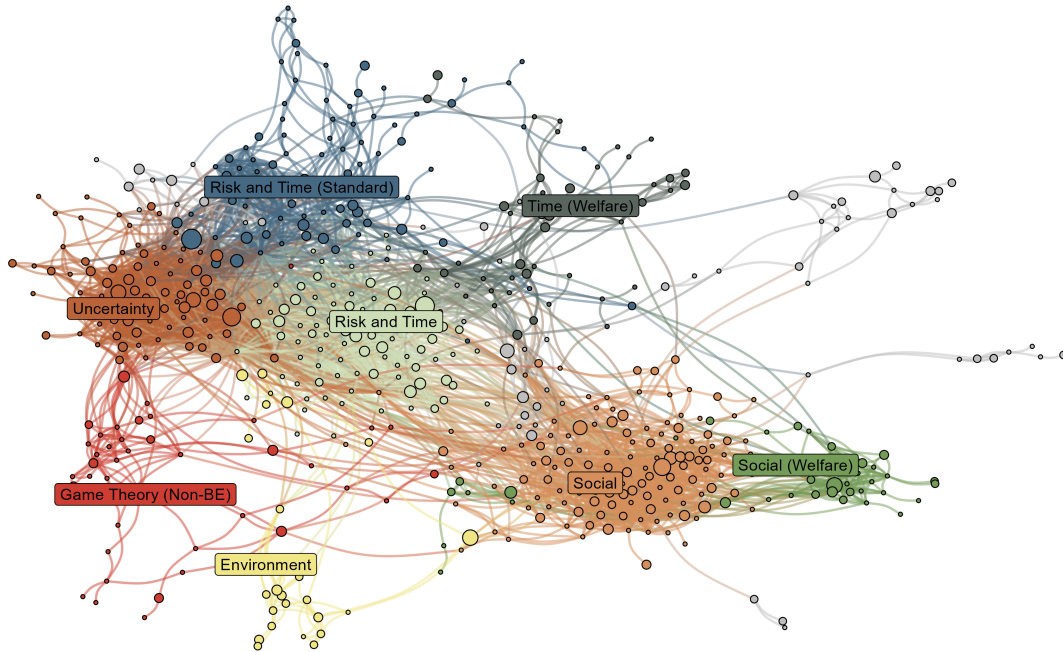


Figure 5: Bibliographic coupling of BE-XP-related publications from French economists (2010-2014). Nodes (articles) are color-coded according to their cluster. A connection between two nodes means that the corresponding articles have a significant number of references in common. The distance between nodes approximates the similarity of bibliographies.

across disciplinary frontiers in some cases (e.g., Henrich et al. (2004) with anthropology). Bénabou and Tirole’s work on social preferences is not aligned with these characteristics: it is exclusively theoretical (as was their work on time preferences in the previous section), Toulouse was not at the time a place known for research on social preferences and they do not co-author any of their papers of the period with scientists from other disciplines. It is also worth noting that one specificity of Bénabou and Tirole within the theoretical landscape of social preferences is that they are two theoreticians who do not conduct experiments, by contrast with economists who have authored the most cited theoretical models in BE-XP (i.e., Rabin, 1993; Fehr and Schmidt, 1999; Bolton and Ockenfels, 2000 in the case of social preferences).

The work of Bénabou and Tirole is clearly among the most influential of our corpus at the international level. For instance, their 2006 “Incentives and prosocial behavior” is the most cited paper of our corpus according to Web of Science. Its influence at the national level is also worth noting as it rapidly rises to being the third most cited reference by French economists working on social preferences in the 2014-2018 network. This paper does not even figure



2014-2018

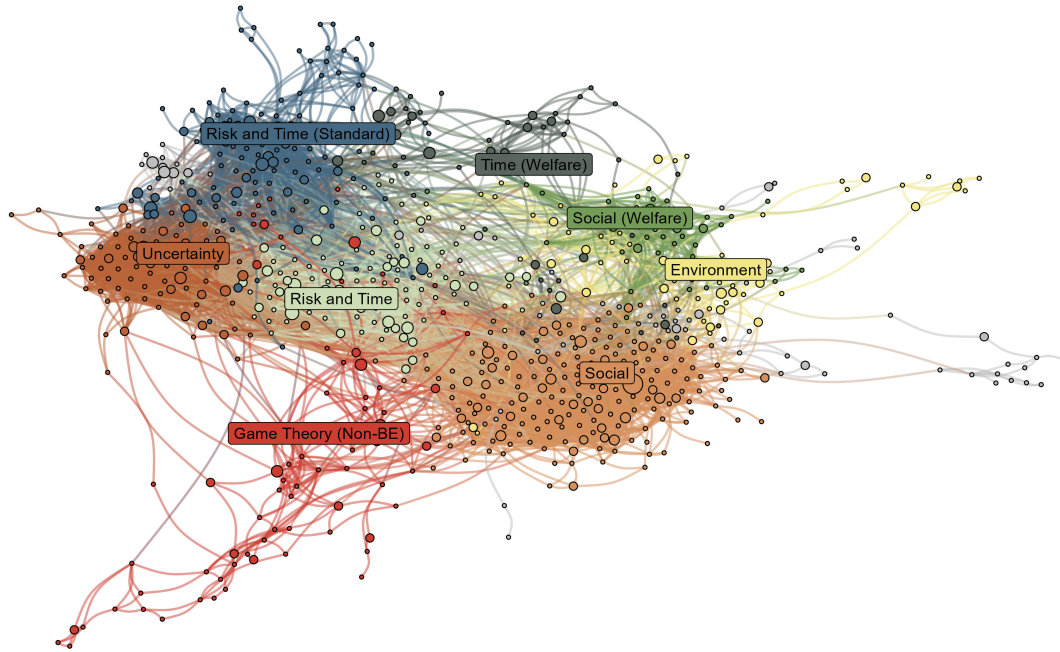


Figure 6: Bibliographic coupling of BE-XP-related publications from French economists (2014-2018). Nodes (articles) are color-coded according to their cluster. A connection between two nodes means that the corresponding articles have a significant number of references in common. The distance between nodes approximates the similarity of bibliographies.

among the five most cited papers within research on social preferences at an international level (see Truc, 2022a, p.426, Figure 13, Truc, 2022b, p.223, Table 1), which suggests that its influence at the national level is stronger than at the international level. Indeed, that paper is more cited in France than much earlier influential theoretical papers such as Rabin (1993) or Bolton and Ockenfels (2000). Concretely, that national influence is seen through several experimental works that explore aspects of social preferences that are close to Bénabou and Tirole's theoretical interests, such as status-seeking, lying, and cheating (Bekir et al., 2011; Clot et al., 2014; Maggian and Villeval, 2016). These observations on the work of Bénabou and Tirole corroborate the previously observed role of theoretical contributions in behavioral economics: despite most contributions to behavioral economics being empirical, the minority of theoretical ones concentrate the great majority of citations (Truc, 2022a, p.419).

Despite the influence of Bénabou and Tirole in terms of citations in France, they did not initiate a movement of theoretical work on social preferences in that country. While they influenced a part of the experimental work on social preferences in France, they did not influence the bulk of research in that domain which remains largely aligned with international

Behavioral Approach		Standard Approach	
Risk and Time	Social	Risk and Time (Standard)	Uncertainty
Paris (29%)	Paris (25%)	Paris (40%)	Paris (45%)
Montpellier (18%)	Lyon:Eculy (16%)	Toulousec (13%)	Paris:Cergy-Pontoise (9%)
Toulouse (7%)	Montpellier (12%)	Lille (8%)	Paris:Jouy-En-Josas (9%)
Paris:Fontainebleau (7%)	Toulouse (12%)	Marseille (6%)	Paris:Fontainebleau (8%)
Paris:Jouy-En-Josas (7%)	Lyon (11%)	Paris:Cergy-Pontoise (6%)	Toulouse (8%)
Grenoble (6%)	Rennes (8%)	Caen (4%)	Rennes (6%)

Table 6: Share of papers with at least one author affiliated to a particular city in the 2014-2018 network

Networks	BE-XP Risk-related clusters	BE-XP Social cluster
1996-2000	28 %	\
2001-2005	16 %	10 %
2005-2009	14 %	11 %
2010-2014	14 %	22 %
2014-2018	14 %	24 %

Table 7: Share of BE-XP risk-related and social clusters in networks

trends on at least three aspects. Firstly, contributions in the second half of the 2000s are very similar to the ones in the previous network (2001-2005). That is, they use well-known games such as the public good games (e.g., Masclet and Villeval, 2008) and the main applied contributions are to labor economics (e.g., Masclet et al., 2009). Secondly, in the 2010s, we see more and more contributions that are interested in exploring how aspects related to social preferences are connected with aspects related to risk or time preferences (Krawczyk and Le Lec, 2010; Teyssier, 2012; Bonein and Denant-Boèmont, 2015). Thirdly, other contributions are much more applied, especially to topics related to the environment (Willinger et al., 2014; Cecere et al., 2014; Clot et al., 2017) – it is worth noting here that *Ecological Economics* is the fourth main venue of publication for the *Social* cluster – or to gender issues (Datta Gupta et al., 2013; Kuhn and Villeval, 2015; Masclet et al., 2015; Breda and Ly, 2015; Culiberg and Elgaaied-Gambier, 2016).

One noticeable change in the networks of this period is that the *Time* cluster disappeared in 2008 and all BE-XP contributions on this theme are to be found in the *Risk and Time* cluster (Table 8). While this is aligned with the trend observed at the international level of a growing interest in investigating the links between risk and time preferences, most contributions in the *Risk and Time* cluster in the networks of this period are about risk preferences. Furthermore, the two types of contributions identified in the previous network (2001-2005) persist over this period. On the one hand, there is a considerable number of technical contributions focused on measuring non-standard risk preferences that seem distinctly French as we have noted since the first period of our story (Abdellaoui et al., 2008; L’Haridon, 2009; Bleichrodt et al., 2010; Abdellaoui et al., 2010b, 2011b,c). On the other hand, there are still some contributions more in line with the practice of BE-XP in the U.S. or in Germany, which seek to experimentally observe relatively new behavioral “anomalies”

Rank	Uncertainty	Risk and Time
1	Gilboa and Schmeidler (1989)	Tversky and Kahneman (1992)
2	Schmeidler (1989)	Kahneman and Tversky (1979)
3	Anscombe and Aumann (1963)	Abdellaoui (2000)
4	Ellsberg (1961)	Bleichrodt and Pinto (2000)
5	Yaari (1987)	Prelec (1998)

Table 8: Most cited references in two clusters related to risk and uncertainty (2005-2009)

(Etchart-Vincent, 2009; Etchart-Vincent and l’Haridon, 2011; Lévy-Garboua et al., 2012). There are comparatively fewer contributions investigating risk and time preferences jointly (e.g., Nielsen and Jaffray, 2006; Onay and Öncüler, 2007; Öncüler and Onay, 2009; Abdellaoui et al., 2011a, 2013a; Abdellaoui and Kemel, 2014; Toubia et al., 2013; Nebout, 2014; Nebout and Dubois, 2014), even though this represents a growing trend, and much fewer contributions investigating time preferences only (Sayman and Öncüler, 2009; Abdellaoui et al., 2010a, 2013b), a theme which seems to have never gained widespread momentum in France. A last point worth noting about intellectual production is that, as with the research on social preferences, we do find some applied research on risk and time preferences. While environmental and gender issues are treated here as well (e.g., Clot et al., 2014; Kuhn and Villeval, 2015), they do not predominate the field and coexist with several other topics such as insurance (Outreville, 2014) or education (Brodaty et al., 2014; Jung, 2015).

Aside from the intellectual production *per se* that constitutes the *Risk and Time* cluster, we observe an intriguing dynamic in it regarding the way Allais’ (1953) paper is cited. Consistently with that cluster in the previous (2001-2005) network, that paper is not very much cited in the second half of the 2000s: it ranks only as its 28th most cited reference. That absence of references to Allais in these periods within our corpus is particularly surprising given that, (Allais, 1953) was one of the most cited references for behavioral economists based in the U.S. (Truc, 2022a, p.406 and p.412). Allais’s absence from references within French publications changed quite drastically in the 2010s, as (Allais, 1953) became the fourth most cited reference in the 2014-2018 network. How can we explain this impressive renewal of popularity? We believe that one possibility is to be found in the global popularity (internationally and in all areas of economics) that behavioral economics came to acquire in the 2010s. Recall (from section 2) that Allais (1953) was historically used as a spearhead contribution for behavioral economists in the U.S. who reinterpreted Allais’ Paradox through their own lenses (Mongin, 2014). Even if this reinterpretation by behavioral economists misinterpreted some of Allais’ positions (*ibid*), it helped to promote a simple narrative: experimental anomalies have existed for a long time and Allais was one of the first to show that they mattered. In the early days of behavioral economics, this simple narrative was never really discussed, and much of the debates focused on specific theoretical and experimental questions. This was especially the case in France during the 1980s and 1990s where some French economists like Munier or Willinger cared about Allais’ legacy and never adhered to this simple narrative. Indeed, we saw that in the 1980s and 1990s, Allais’ (1953) paper was

not so central in the contributions to BE-XP by economists based in France. However, as economists based in France became increasingly influenced by the behavioral approach as a whole, including the simple narrative that involves Allais' (1953) paper, the latter became a central reference through its American reinterpretation (which is misleading according to Mongin, 2014; 2019).

Finally, we do find some market experiments in our networks, but they do not constitute a field of research as clearly as the other themes. Instead, they are always mixed with some other, seemingly unrelated, research. For instance, in the second half of the 2000s market (and auction) experiments (e.g., Noussair et al., 2002; Février et al., 2007; Neugebauer and Pezanis-Christou, 2007) are in the same *Consumers and Auctions (Experiments)* cluster as in the previous (2001-2005) network, but they are here with studies of consumer behavior that seem mostly concerned with food consumption (e.g., Noussair et al., 2002; Rozan, 2004) and/or with the methodological problems posed by elicitation of willingness to pay and willingness to accept (e.g., Rozan, 2004; Sayman and Öncüler, 2005). Furthermore, the work of Smith or Plott (i.e., pioneers of experimental markets) does not figure among the thirty most cited references in this cluster.

By the end of the 2010s, market experiments (e.g., Akiyama et al., 2014, 2017) are to be found in another cluster (*Game Theory (Non-BE)*), in which we can observe a surprising cohabitation of these experiments with research on behavioral game theory and gender issues. The only common point of most of this research seems to be the concept of learning. Interestingly enough, this heterogeneous set of articles starts as a very small cluster at the beginning of the 2010s (*cl\_145*), during which it co-exists with a bigger cluster that contains mostly rather standard work in game theory – *Game Theory (Non-BE)*. But over the 2010s that very small cluster disappeared and the type of research that was done within it now dominates the *Game Theory (Non-BE)* cluster. That cluster ends up being populated with economists who identify explicitly with the behavioral approach and the experimental markets approach as their most productive authors – such as Jeanne Hagenbach, Philippe Jehiel, and Nobuyuki Hanaki. It is worth noting that this cluster is one of the few in which the influence of Smith's work is important: Smith et al. (1988) is the third most cited reference of this cluster. Therefore, from our analyses, the existence of a research community of market experiments in France remains an open question.

To summarize, as we reach the end of the 2010s, the two principal distinctive features of French BE-XP, as previously outlined, remain consistent. (1) Technical contributions in utility measurement, once concentrated on risk, continue to be made by Abdellaoui and others, but now extend to behavior under risk and/or over time. (2) Theoretical contributions seeking the unification of behavioral phenomena across different disciplines persist with Bénabou and Tirole, but their focus has transitioned from time preferences to social preferences. Despite the fact that Bénabou and Tirole only made a handful of contributions on the topics, their contribution rapidly emerged as one of the most cited among experimental works in this area. In other words, despite not being identified as behavioral economists (see Heukelom (2007) on the topic), they exert an influence on BE-XP intellectual development. If this influence on the study of social preferences can be seen as one specificity of BE-XP

Article	Journal	Number of citations
Abdellaoui (2000)	Management Science	51
Bénabou and Tirole (2006)	American Economic Review	43
Masclet et al. (2003)	American Economic Review	30
Benabou and Tirole (2003)	Review Of Economic Studies	27
Abdellaoui et al. (2005)	Management Science	25

Table 9: Most cited articles from our corpus by our corpus

in France, the convergence with international trends on this research theme observed in the previous section is still at play here, with the continuing efforts of Villeval and others to participate in European institutions related to BE-XP and collaborations with economists from German-speaking countries.

Besides this continuity, we also find new trends. The work of Allais (1953) is finally among the most cited references within behavior under risk clusters. While Allais’ contributions set some path-dependency in French BE-XP, it was only after the 2010s that he *explicitly* appeared as an influential figure within French BE-XP. Two applied research topics in BE-XP in France are much more visible over this period than they were over the previous ones: environmental issues and gender issues. Whether there exists a specific research community on market experiments remains unclear as this type of work remains sparse and does not appear as a clear distinct specialty. However, we do find a new research direction that might be emerging with behavioral game theory. While it is too early to say whether this trend will persist, it also follows a trend that is observable at an earlier period at the international level (Truc, 2022a, p.423): a set of contributions related to interactive behavior but somewhat distinct from the ones on pro-social behavior (e.g., coordination, group decision, learning).

## 7 Conclusion

Allais’ (1953) work is often pictured as a seminal contribution to BE-XP. This work had indeed a rather strong influence in the 1980s, especially on Munier who was one of the main early promoters of BE-XP in France. Allais’ overall influence on the development of BE-XP in France is however limited. Rather than following a specifically French path proposed by Allais, the development of BE-XP in France is, by our account, aligned with international trends, albeit with some delays. Among the points of similarity, we find the early tripartition of research between risk, time and social preferences and the later entwinement among these domains; a growing tendency towards applied work; a quantitative prominence of empirical work in the lab compared to a few but very successful (in terms of citation) theoretical papers. Nevertheless, these resemblances with international trends at the general level hide some heterogeneity across the French territory.

In Grenoble, Lyon, Strasbourg, or Montpellier, BE-XP research structured itself around the creation of experimental economics laboratories and followed international trends. In Lyon, one of the driving forces behind this conformity with international trends is Ville-

val, who integrated the international institutional landscape of BE-XP rather early on and fostered several international collaborations.

While this conformity with international trends is also present in BE-XP produced in the Parisian region, we found one notable specificity there. Unlike the approaches focused on finding new behavioral anomalies, we found a rather different way of using BE-XP led by Abdellaoui which consists in developing technically advanced experimental means of measuring utility in the domain of decision under risk and uncertainty. Moreover, the Parisian region remains characterized throughout the emergence of BE-XP by a division of research between BE-XP and standard decision theory, something we find in no other places in France (and which could have participated to shape the particular approach focused on utility measurement of BE-XP that we identified). Another specificity with respect to international trends is in Toulouse. Bénabou and Tirole developed a theoretical approach to social preferences that seems indeed specific in terms of scientific practices and contributions. Most notably, they are not experimentalists unlike most authors of other leading models of social preferences in other countries.

Our study lays the basis for further work in at least two directions. Firstly, it would be interesting to situate BE-XP in France within the larger history of economics in that country and the overarching debates on rationality. There had been a research program called “psychologie économique” (e.g., Albou, 1962) with somewhat similar intellectual ambition to BE-XP but which, unlike BE-XP, never successfully entered the mainstream of the discipline. Moreover, BE-XP itself might have had ambiguous relationships with other more heterodox research programs such as the convention or regulation schools in the early 1990s. We could speculate that the existence of many different approaches in France keen on departing from the standard conception of individual rationality could be more related to the seminal work of Allais (1953) than what we observed here in the case of BE-XP. Secondly, we showed that, unsurprisingly, experimental laboratories are important in the development of BE-XP in France. It would be interesting to take a finer look at the organizational practices behind creating and running experimental laboratories in France. How do lab creations shape publication activities in BE-XP? What are the main institutional, financial, and technical obstacles? This would constitute an opportunity to look at actors that are invisibilized in publications such as lab managers, software engineers, and other technicians.

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