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Introduction

Eugen Fischer and Mark Curtis

Experimental philosophy is undergoing exciting transformations. Until recently, the discipline has prominently been associated with the questionnaire-based study of philosophically relevant intuitions (Alexander 2012, Fischer and Collins 2015, Mallon 2016). However, experimental philosophy – conceived, quite broadly, as the practice of systematically collecting and analysing empirical data to address philosophical questions or problems (Sytsma and Livengood 2016, *cf.* Knobe and Nichols 2017) – adapts a wide range of empirical methods for a variety of new uses in philosophy, in the study of intuitions and beyond (*cf.* Nado 2016). To some extent, the recruitment of methods ‘beyond the questionnaire’ has been part of experimental philosophy since the inception of the movement (e.g., Greene et al. 2001). Currently however, the uptake of further methods is gathering momentum: this might mark a step change in the larger enterprise of making philosophical questions and problems more empirically and scientifically tractable.

Experimental philosophy’s new methods include sophisticated paradigms for behavioural experiments from across the social sciences – ranging from psycholinguistics to experimental economics – as well as computational methods from the digital humanities that can process large bodies of text and data. This volume offers a conspectus of these cutting-edge empirical methods and explores how they can complement questionnaire-based approaches in a variety of philosophical pursuits, across several key areas. The studies reported or discussed herein demonstrate – in some cases pioneer – the use of their chosen methods in experimental philosophy. The areas of philosophy covered include epistemology and metaphysics, the philosophies of mind and language, the philosophies of science and mathematics, moral philosophy and psychology, as well as the history of ideas.

The questionnaire-based surveys and experiments that have so far been the standard tools of experimental philosophy are convenient, can demonstrably be used to address a very wide range of philosophically relevant questions (see Alexander 2012 and Knobe & Nichols 2017 for reviews), and have generally led to replicable findings (Cova et al. 2018). This volume will make the case for complementing these familiar and useful approaches not by belabouring their limitations and shortcomings (which the following chapters will broach, where relevant), but by positively demonstrating what the alternative methods allow us to do, and the philosophical uses to which their findings can profitably be put.

The first part of the volume focuses on experimental methods drawn from different social sciences. The second part examines computational methods from the digital humanities. In each part, the first chapters discuss how further empirical methods can be put to the service of (natural extensions of) philosophical projects that have been prominently associated with experimental philosophy and rely on or respond to intuition-driven methodologies. In line with the broad conception of experimental philosophy, subsequent chapters then explain how further methods can be recruited for philosophical projects that have not seen much reliance on intuitions. All the methods discussed can be profitably put to more philosophical uses than are presented here, including uses in other areas of philosophy. We therefore encourage readers to also consider chapters which address philosophical topics outside their own immediate areas of interest.

Each chapter combines presentation, demonstration, and discussion of a chosen method or set of methods with an explanation and assessment of how the methods’ application can contribute to traditional philosophical concerns, to ongoing philosophical debates, or to opening up new philosophical research questions. Usually, the demonstration and discussion of the philosophical application will include the report of a new (previously unpublished) empirical study. Contributions provide accessible explanations of the methods used. They do not assume prior familiarity with the methods presented, but convey the methods’ potential, workings, strengths, and limitations. The chapters thus address experimental philosophers who would like to expand their methodological repertoire as well as further philosophers at different levels of the profession – including advanced undergraduates – who are curious about how a new range of empirical methods can be put to the service of philosophical projects. Each chapter is preceded by an abstract and keywords indicating the empirical methods covered and the philosophical applications trialled. Each chapter is appended with some suggested readings on the introduced methodology (which precede the bibliographies).

# Chapter Outlines

The empirically informed conceptions of intuitions that are prevalent in experimental philosophy conceptualise them, in slightly different ways, as judgments generated by largely automatic cognitive processes (Gopnik and Schwitzgebel 1998, Fischer and Collins 2015, *cf.* De Cruz 2015). Already an early ‘Experimental Philosophy Manifesto’ therefore advocated examining the evidentiary value of philosophically relevant intuitions by studying their internal sources (Knobe and Nichols 2008, 8), i.e. the automatic cognitive processes that generate them. A proper understanding of their workings might help us develop ‘epistemological profiles’ for such cognitive processes, which tell us when and why we may (or may not) trust their outputs (Weinberg 2015). It is then natural to extend the scope of the inquiry: to ask how automatic cognition shapes philosophical thought, more generally, for better or worse, and to investigate through what representations and processes automatic cognition shapes inferences, judgments, decisions, and arguments in thought that is relevant either as the medium or the topic of philosophical reflection. The first five chapters explore how new empirical methods can be recruited for these purposes.

In *chapter 1*, Shaun Nichols uses a *statistical learning* approach employed in different branches of cognitive science, to examine how children acquire concepts and distinctions which continue to shape automatic cognition – as manifest in judgment and reasoning under cognitive load – in adults. The studies discussed provide evidence for a surprisingly demanding, infallibilist, concept of knowledge and for surprisingly complex rules which conform to the principle of double effect and inform adults’ distinctions between moral and immoral actions. This approach allows us to understand, for example, why an infallibilist concept of knowledge might inform some sceptical arguments. However, unlike familiar debunking accounts, the statistical learning paradigm also allows us to understand why it is perfectly rational for learners to initially acquire the philosophically troublesome concepts and rules.

In *chapter 2*, Eugen Fischer and Paul Engelhardt introduce several *experimental methods from psycholinguistics* and explain how they can be used to examine automatic inferences and assess intuitions and arguments. One recent and one new eye-tracking study pioneer the use of *pupillometry* and *reading-time measurements*, respectively, in experimental philosophy. They examine automatic inferences that constantly occur in language comprehension – such as when we hear or read verbal case descriptions or premises of arguments. They serve to study how stereotypes (implicit knowledge structures built up subconsciously through sustained interaction with the physical and discourse environment) are deployed in understanding and can have thinkers leap to conclusions from verbal case descriptions. The studies contribute to an epistemological profile of the key comprehension process of stereotypical enrichment, provide evidence of a cognitive bias besetting it, and deploy results to expose seductive fallacies in a philosophical paradox about perception.

In *chapter 3*, Jennifer Cole Wright and colleagues use different *eye-tracking methods*, which work with visual scenes (rather than text), to examine how people form and deploy their moral judgments. Two new studies elicit moral judgments through a text-based task and then present visual scenes in which people get helped or harmed by the actions previously judged right or wrong. By measuring gaze-fixation frequency, gaze duration, and scan path on these visual scenes, the studies examine whether participants attend more to ‘beneficiaries’ or ‘victims’ of their judgments. Findings support the hypothesis that people reinforce their moral judgments through subsequent patterns of sensory processing and suggest that we subconsciously employ approach-and-avoidance strategies that have developed to maintain optimal mental health and wellbeing – but which need not help us correct errors or make good judgments.

In *chapter 4*, Rodrigo Díaz discusses the use of *fMRI neuroimaging* techniques in two philosophical projects: (i) to explain and assess moral intuitions and (ii) to assess the empirical adequacy of extant mental (viz. emotion) categories. The first project seeks to show that non-utilitarian judgments derive from emotional distortions in rational thought. It uses fMRI to identify mental processes (emotions) involved in a moral judgment task. This move relies on ‘reverse inference’ from observed brain activation during an experimental task to the conclusion that the task involves a mental process previously found associated with such brain activity. The second project involves ontology testing which deploys the logic ‘same pattern of brain activity equals same mental processes’ in meta-analysis of fMRI studies. The chapter assesses these two inference strategies, finds the first problematic, and promotes the second.

In *chapter 5*, Adrian Alsmith and Matthew Longo review the use of *Virtual Reality (VR) technology* to study people’s use of the self-concept. Their topic is the flexibility of people’s self-conception: to what extent people can be induced to apply the self-concept to different kinds of things (“I am a physical body” vs. “I am a non-physical soul”) and to credit themselves with properties attributable to distinct entities in similar contexts (“I will die one day” vs “I am immortal”) – a topic of conflicting philosophical intuitions. The chapter reviews studies that have employed VR technology to study participants’ sense of self-location, ownership, and agency over virtual entities (avatars) which are increasingly less similar to them, and discuss methodological challenges involved in building on such studies to examine the flexibility of our self-conception.

In *chapter 6*, Hannah Rubin, Cailin O’Connor and Justin Bruner use paradigms from *experimental economics* that involve *induced valuation*: They have participants make choices in strategic situations where choices have real (financial, for example) consequences that the participants care about. The chapter presents extant and new studies which employ these methods to study the emergence of communication and language – e.g. whether similarity structures facilitate communication, and categories of what width people form to describe a complex world with a limited stock of signals. The experimental paradigms demonstrated allow them to test predictions from game theory and evolutionary game theory. These methods can be usefully employed wherever philosophers have turned to these formal frameworks to study strategic interactions – communication, coordination, altruism, cooperation, social dilemmas, social norms, resource distribution, etc. – in areas ranging from political philosophy to social epistemology.

These latter chapters may also help experimental philosophers address another important challenge: People don’t always do as they say. For example, the decisions about moral dilemmas that people make when immersed in VR simulations (Francis et al. 2017) or when real-life consequences attach to decisions (Gold et al. 2015) are out of line with their moral judgments about hypothetical cases. The moment we are interested in people’s decisions and actions, we need to go beyond eliciting, explaining, and assessing judgments or decisions about hypothetical cases, and methods involving VR techniques or induced valuation become instrumental.

In another, currently central and potentially transformative, methodological development, experimental philosophers are beginning to recruit computational methods. Computational modelling has always been an integral part of cognitive science – to which many experimental philosophers take themselves to belong (*cf.* Knobe 2016). But experimental philosophers are now deriving inspiration also from the digital humanities and are beginning to recruit several methods of corpus analysis, data mining, and text mining, to take advantage of the ready availability of large amounts of text and other data through the internet and of software to process and analyse them. The rapidly increasing importance of these methods is aptly illustrated by the fact that half of the studies in the first part of the volume, though focusing on other methods, build on corpus analyses (chapters 1 and 2) or employ an automated database using text-mining techniques (the Neurosynth database of fMRI studies, chapter 4). The second part of the volume is devoted to computational methods and seeks to build a bridge between experimental philosophy and the digital humanities.

In *chapter 7*, Justin Sytsma and colleagues introduce qualitative and quantitative methods of *corpus analysis* and deploy them in a new study of causal attributions (‘A causes B’). The authors hypothesise that these attributions are not purely descriptive but are similar to attributions of responsibility in that they express normative evaluations – which are more frequently made when outcomes are negative. Using a general-purpose corpus, they investigate which nouns most frequently follow ‘caused the’, its thesaurus-recognised synonyms, and ‘responsible for the’, and which verbs most frequently accompany the nouns identified (‘death’, ‘accident’, etc.). The computational methods of *Latent Semantic Analysis* and *Distributional Semantic Analysis* help follow up first findings. To extract information about semantic similarities, these methods look at the distribution of words across a corpus and consider, for example, the extent to which words co-occur with the same other words, in the same proportion. Comparisons between a general-purpose and a philosophy corpus reveals that philosophers use causal language differently from ordinary folk.

In *chapter 8*, Pablo Mejia Ramos and colleagues explain further aspects of *corpus linguistics* and examine occurrence frequencies in mathematics, physics, and general-purpose corpora, in a study that addresses a central issue from the philosophy of mathematics, considered as applied philosophy of science: How central to mathematical practice is explanation – even though standard (causal or statistical) accounts of scientific explanation do not seem to apply there? They examine absolute and relative occurrence frequencies of ‘explain’-words and related expressions identified through concordance searches across the three corpora, and replicate findings across different parts of the corpora. Results suggest that explanation occurs in mathematical practice but does so (even) less frequently than in physics. Where mathematicians do give explanations, they explain more often how to do something in mathematics rather than why certain mathematical facts obtain.

In *chapter 9*, Mark Alfano and Andrew Higgins offer a crash course in *semantic network analysis* for experimental philosophers, with illustrations drawn from research that applies data-mining techniques to an obituary corpus, to extract and visualise information about the values, virtues, and constituents of well-being recognised by a community. The chapter explains how these methods can be put to the service of a familiar philosophical project whose implementation has not been feasible previously. David Lewis developed the idea of devising implicit definitions of folk-theoretical terms (such as virtue or mental terms) by constructing Ramsay sentences that collect all the accepted platitudes in which the terms (‘belief’, ‘desire’, etc.) occur, replace these terms by variables, and quantify over them. The chapter explains how a modified form of this method of Ramsification can be implemented with semantic networks.

In *chapter 10*, Arianna Betti and colleagues introduce the nascent field of *computational history of ideas*. Their latest study examines the origin, development, and spread of the notion of ‘conceptual scheme’, much used in the philosophy of science and in several social sciences. Betti and colleagues apply a mixed-methods approach to a large interdisciplinary corpus of research articles from the 1880s to the 1950s. Automated search in a digital corpus facilitates expert annotations of occurrences of the term of interest, in their immediate textual context, guided by a simple model of the concept of interest that represents it as a relational structure with stable/determinate and variable/determinable elements. Quantitative analysis then also takes into account institutional affiliations and author career information. The approach permits to advance beyond analysis of a small number of canonical texts and to develop and assess hypotheses about how key concepts were used and disseminated in larger research communities and across disciplines.

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