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Bioethics, Experimental Approaches

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Introduction

This entry summarizes an emerging subdiscipline of both empirical bioethics and experimental philosophy ("x-phi") which has variously been referred to as experimental philosophical bioethics, experimental bioethics, or simply "bioxphi" (Earp et al. 2020a, b; Lewis 2020; Mihailov et al. 2021a). Like empirical bioethics, bioxphi uses data-driven research methods to capture *what* various stakeholders think (feel, judge, etc.) about moral issues of relevance to bioethics. However, like its other parent discipline of x-phi, bioxphi tends to favor experiment-based designs drawn from the cognitive sciences (Knobe 2016) – including psychology, neuroscience, and behavioral economics – to tease out *why* and *how* stakeholders think as they do.

Using insights gleaned from these experiments, bioxphi aims to bridge the descriptive and normative programs of bioethical inquiry. Thus, it seeks not only to draw on, or respond to, ethical questions raised by bioethicists (e.g., for purposes of formulating empirical research questions), but also to advance substantive normative debates within the field. To this end, rather than relying on unrealistic, abstract thought experiments to identify the contours of what is morally at stake in some issue (e.g., Thomson's "violinist" analogy in arguments about abortion; for discussions, see Walsh 2011; McMillan 2018), bioxphi tends to deal with cases that are more directly inspired by real-world dilemmas and decisions. These might pertain, for example, to specific healthcare policy options or standards of clinical practice (Kingsbury and Hegarty 2022), to medical research and rules proposed to protect participants' rights (Dranseika et al. unpublished), to the understanding, use, or application of relevant legal concepts (Sommers 2020; Demaree-Cotton and Sommers 2022), to evaluation and regulation of cognitive enhancement or other emerging biotechnologies (Faber et al. 2016; Mihailov et al. 2021b), or (more generally) to human-technology and human-biosphere relations (for overviews, see Earp 2019; Earp et al. 2020a, 2021, 2022).

We begin by articulating some of the conceptual and methodological issues that have motivated a general interest in experimental approaches to bioethics with a view to detailing the ways in which research in bioxphi has responded to those issues. We also further situate this emerging subdiscipline in relation to both empirical bioethics and x-phi. In the second

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section, we outline some of the strategies that have been employed within bioxphi studies to enlist empirical findings (i.e., descriptive findings or models showing how and why people make certain ethical judgments and/or interpret or apply relevant concepts) in the service of bioethical arguments. Finally, we conclude with a brief reflection on the state of this burgeoning subdiscipline.

The Value and Methods of Bioxphi

McMillan (2018) and Machery (2017) have argued, in different contexts, that when it comes to people's ethical judgments or applications of relevant concepts (e.g., deciding whether someone is competent to refuse a doctor-recommended treatment), the basis for their decision is not always readily apparent. In the case of professional bioethicists, we do, typically, have some idea of how they have reached their normative conclusions regarding an issue, for example, when they explain their premises and reasoning in the context of an explicit argument in the academic literature. Similarly, we can learn how bioethicists apply certain concepts such as informed consent, competence, coercion, futility, equipoise, or medical necessity: Ideally, they will provide precise definitions of the concepts and explain how the concepts are being applied. Why, then, might we be motivated to go beyond the armchair and employ empirical methods to probe more deeply how individuals – both bioethicists and nonbioethicists – think about ethical issues and why they think as they do? Several answers suggest themselves.

First, even if we assume that professional bioethicists' explicit argumentation tells us all we need to know about their moral judgments and associated thought processes, professional bioethicists make up only a tiny fraction of those engaged in ethical reflection on healthcare, biomedical research, health policy, and related matters. Their intuitive moral responses to particular cases, on the basis of which they are likely to formulate their normative arguments (at least in part), may not be representative of those of a wider population. And yet, these responses are likely to be shaped, to some extent, by a bioethicist's own (relatively narrow or circumscribed) experiences, life circumstances, or even psychological dispositions. Thus, professional bioethicists may, in some cases, fail to "detect" morally relevant features of certain cases. This, in turn, may unduly restrict the scope or applicability of the arguments they develop (for a discussion, see Leget et al. 2009). Indeed, there is a vast array of different stakeholders making important moral judgments and applying ethical concepts on a routine basis, often in situations that have substantial real-life stakes and consequences. These diverse stakeholders may include medical practitioners and other healthcare providers, hospital managers, biomedical researchers, biobank personnel, policymakers, lawmakers, judges, patients, and their families. Such "on the ground" participants in practical ethical decision-making, faced with complex, morally charged situations, may have developed certain intuitive or morally relevant insights not available to the average armchair bioethicist. And although these insights may not always be easily articulated, they may nevertheless be revealed through the patterns of judgment these stakeholders generate in response to (experimentally controlled variations on) realistic cases.

Importantly, just like these other healthcare stakeholders, professional bioethicists may not always understand the underlying sources of their own intuitive responses to morally charged situations or the contextual factors that influence those responses. Depending on such background variables, including the cognitive processes that give rise to specific intuitions or shape them into concrete judgments (e.g., of right or wrong), there may be reasons to assign more or less weight to an intuition as a basis for moral judgment. This could be the case, for instance, if an intuitive moral reaction to a given scenario, or set of scenarios, is shown to emerge from a psychological process that is widely *normatively unreliable*, for example, a process distorted by racist or sexist assumptions or biases. Such biases are the result of psychological processes that are normatively unreliable in the sense that they are unlikely to

"track the truth" of the situation or help us arrive at a morally defensible conclusion (for discussions, see Wedgwood 2007; Sinnott-Armstrong 2008; Machery 2017).

Another reason to understand *why* or *how* a bioethical judgment applies to a given scenario is so that action-guiding considerations, principles, or protocols can be developed for relevantly similar cases. A crucial part of understanding whether the perceived moral (un)acceptability of a particular action generalizes to other situations involves identifying the factors that shape such perceptions in the first place and systematically exploring their scope (i.e., dimensions of variance across situations that elicit similar reactions or judgments). For these and other reasons, there is both theoretical and practical value in analyzing how and why people think about bioethical matters, and not just what they think (Lewis 2020).

However, such analysis cannot be conducted from the armchair. Reflection solely from the armchair rather than from the bedside, bench, or committee room, especially on abstract or idealized cases, may limit the real-world relevance of the intuitions, inferences, and judgments that make up such reflection. For instance, James Rachels (1975) appeals to intuitions about fictional cases unrelated to healthcare to attempt to call into question the moral difference between active and passive euthanasia. However, as McMillan (2018) notes, physicians have often objected that the distinction between active and passive euthanasia is morally relevant in real clinical cases, and that Rachels' fictional cases fail to generalize to actual end-of-life decisions. Relatedly, Rodríguez-Arias et al. (2020) have shown that, under realistic conditions, ordinary people draw the "killing" and "letting die" distinction very differently to the way endorsed by some bioethicists. For their research participants:

> the distinction between "ending" a patient's life and "allowing" it to end arises from morally motivated causal selection. That is, when a patient wishes to die, her illness is treated as the cause of death and the doctor is seen as merely allowing her life to end. In contrast, when a patient does not wish to die, the doctor's behaviour is treated as the cause of death and, consequently, the doctor is described as ending the patient's life. This effect emerged regardless of whether the doctor's behaviour was omissive (as in withholding treatment) or commissive (as in applying a lethal injection). (p. 509)

More generally, if the goal is to develop a normative position regarding a concrete bioethical issue, such as in the context of clinical care, it may be that the judgments of doctors or their patients, rather than (only) those of armchair bioethicists, will in some cases constitute more relevant data (Earp et al. 2021).

Empirical bioethicists will no doubt agree that the judgments of healthcare practitioners, policymakers, patients, their families, and so on should be considered when developing guidance and recommendations for dealing with complex ethical issues in the real world. What distinguishes bioxphi in terms of its relation to empirical bioethics is that, when it comes to either investigating the normative reliability of different stakeholder judgments or clarifying relevant bioethical concepts, such efforts involve *experimentally* testing the effects of different variables on those judgments and building explanatory models of how the latter come about (Earp et al. 2021). This feature is what bioxphi inherits from x-phi, which likewise draws on the methods of cognitive science and experimental moral psychology.

In principle, bioxphi studies could employ the full range of experimental methods used in the cognitive and psychosocial sciences, including the use of transcranial magnetic or direct-current brain stimulation devices to influence the cognitive processes involved in making moral judgments (e.g., Kuehne et al. 2015), or the administration of psychoactive substances to influence moral motivations (see Earp 2018). Indeed, as some have argued (O'Neill and Machery 2014; Mihailov et al. 2021a; Nado 2021; Alfano et al. 2022), experimental methods could also usefully be employed in combination with other empirical methods, such as interviews, qualitative surveys, linguistic corpus data analyses, anthropological work, and virtual reality simulations.

Nevertheless, the main method in x-phi from its inception, and hence of bioxphi more recently, has been the "contrastive vignette technique"

(CVT) (for an overview, see Reiner 2019). Broadly speaking, the CVT involves designing a pair of vignettes describing the exact same situation, but which differ from one another in a single, key respect. This difference constitutes the experimental manipulation, which is expected, on theoretical grounds, to influence participant responses, such as their normative judgments about the (im)permissibility of a given action or their application of a given bioethical concept. By systematically varying what is manipulated between conditions and measuring the outcome, a model can be built of the various factors that make a difference to participant responses. These models can then be used to infer the underlying cognitive processes involved. As a final step, bioxphi researchers can appeal to these empirical models, in combination with background theoretical commitments, including normative considerations, to advance a substantive argument about whether, when, or to what extent participants' moral judgments should be given *prescriptive* weight in reaching bioethical conclusions.

Bioxphi as a Normative Enterprise: Some Common Strategies

What are some of the most common strategies in bioxphi studies for reaching normative conclusions from premises that include empirical information about *how* and *why* people think as they do when making moral judgments, that is, empirical information about the underlying cognitive processes ("how") and eliciting factors ("why") that shape such judgments? Four broad approaches have recently been identified: *parsimony*, *debunking*, *triangulation*, and *pluralism* (Earp et al. 2021). Some of these approaches overlap with strategies adopted by empirical bioethicists (e.g., giving prima facie normative weight to the most consistent, common, and robust judgments within the studied population or adopting a method of reflective equilibrium) (see Leget et al. 2009; Davies et al. 2015). Of course, these are not the only strategies that could feasibly be employed in bioxphi studies. Rather, being among the most salient examples in the recent literature, they are used for illustration.

According to the *parsimony* strategy, widely shared, consistent, and robust moral judgments among a relevant group of stakeholders should carry *some* normative weight in bioethical argumentation (Earp et al. 2021, in press; see Beverley and Beebe 2018). Of course, simply identifying common and consistent moral responses and taking these for granted without additional normative consideration will typically not be sufficient for a convincing argument. These responses might, after all, reflect some misunderstanding, contradictory beliefs, inferential mistakes, bias, or prejudice. Thus, as DeGrazia and Millum (2021) have recently noted, by investigating the consistency of stakeholder judgments across different presentations of a case or providing evidence of the factors that bear on the normative reliability of judgment-forming processes, psychological experiments might be considered a new way of identifying Rawlsian "considered judgments" for the purposes of engaging in reflective equilibrium (see the "triangulation" strategy below).

The parsimony strategy, however, does not (and, indeed, should not) reduce bioethical conclusions and recommendations to a popularity contest (for a discussion, see Leget et al. 2009). The fact that a given moral judgment has been identified as being consistently held within a certain population – and has even survived experimental tests for normative reliability – does not mean that it is the "all-things-considered" most reasonable or most justifiable normative basis for action. For instance, the judgment may conflict with the equally or more reliable judgments of other stakeholders, such as experienced moral philosophers or bioethicists, or it may come into tension with other widely accepted normative factors (including moral and legal norms, principles, and theories). In such cases, a reasonable process of deliberation could well entail that the judgment should, despite its popularity, be overruled, discounted, or outweighed in arriving at some conclusion. All that the parsimony strategy entails is that the consistent, experimentally robust moral judgments of relevant stakeholders should be accorded some (defeasible) normative weight.

Effectively, it "puts the burden of proof on those who would argue that *no* normative weight should be assigned to the consistent judgments of relevant stakeholders about a given moral issue" (Earp et al. 2022, pp. 190–191).

As alluded to above, bioethical judgments sometimes rely on false information, prejudiced attitudes, epistemological distortions, morally irrelevant factors (e.g., framing effects), or faulty inferences (Greene et al. 2001; Singer 2005; Wedgwood 2007; Sinnott-Armstrong 2008; Berker 2009; Greene et al. 2009; Gino et al. 2010; Andow 2016; Machery 2017; May 2018; Sauer 2018; DeGrazia and Millum 2021; however, see Demaree-Cotton 2016; Demaree-Cotton and Kahane 2018, regarding framing effects). All else being equal, such factors should typically *weaken* the normative weight assigned to such judgments when reaching a bioethical conclusion (Wedgwood 2007; Machery 2017; Demaree-Cotton 2019). At the extreme, a given judgment might be entirely "debunked" – that is, shown to be entirely unreliable for ethical guidance. A key motivation of bioxphi studies is to provide evidence of factors that influence the normative reliability of stakeholders' moral responses (judgments, decisions, attitudes, intuitions, inferences, and so on).

The *debunking* strategy combines evidence against the normative reliability of a moral response with a type of argument inspired by work in x-phi (Mukerji 2019):

> (P1) Judgment *p* is the output of a psychological process that possesses the empirical property of being substantially influenced by factor F. (Empirical premise)
>
> (P2) If a judgment is the output of a psychological process that possesses the empirical property of being substantially influenced by factor F, then it is pro tanto unreliable. (Bridging normative premise)
>
> (C) Judgment *p* is pro tanto unreliable.

However, the scope of the debunking is necessarily conditional. After all, factor F in the argument schema above may itself be contested: Perhaps the bioxphi researcher views it as a morally irrelevant factor whereas someone else sees it as a legitimate moral consideration (see Königs 2020; DeGrazia and Millum 2021). Take the following judgment adapted from the findings of a bioxphi study conducted by Smith and Hegarty (2021): "Clitorectomies violate human rights more when performed on nonintersex female infants than on infants with intersex traits." Although Smith and Hegarty do not explicitly attempt to debunk this judgment, other work suggests that permissive attitudes toward intersex genital cutting are driven by such factors as participant endorsement of heteronormativity and the gender binary, and participants' own heterosexual identification (Kingsbury and Hegarty 2021). A politically progressive theorist who sees heteronormativity or belief in the gender binary as ethically misguided would thus likely regard such findings as supporting a debunking argument about the aforementioned judgment regarding intersex vs. non-intersex female human rights. A politically conservative theorist, by contrast, who sees both heteronormativity and the gender binary as being scientifically and ethically justified, would not regard such findings as debunking the judgment.

The issue of normative disagreement crops up in other ways. What happens, for example, when there is a divergence in two or more sets of pro tanto reliable judgments among a given population of relevant stakeholders (or between populations)? Indeed, how do ethical theories and principles, the judgments of professional bioethicists, and those of, say, patients, physicians, or the public relate to one another, and how can this information be integrated by bioxphi researchers to draw well-founded normative conclusions? In bioxphi research, one way of answering these questions involves adopting a *triangulation* strategy, one that is similar to reflective equilibrium (Earp et al. 2021). According to this strategy:

> Divergence among the judgments of various groups of experts and/or between expert and lay judgments requires the following: adjusting, pruning, or supplementing the normative conclusions derived from [one group's] judgments in order to accommodate: (1) the normative implications of the opposing views; and (2) normative considerations derived from, for example, ethical or legal principles, background theories, morally relevant facts, and/or the best arguments for a normative position

> in the relevant expert literature. (Earp et al. 2022, p. 189)

Of course, the mere fact that conflicting normative judgments exist does not immediately necessitate a triangulation strategy. As we have seen, one of the benefits of bioxphi is that it can employ experimental methodologies and argumentation strategies to investigate the pro tanto reliability of these conflicting judgments. Thus, if the psychological processes outputting one judgment are convincingly shown to be influenced by, for example, a morally irrelevant or normatively distorting factor, while the psychological processes outputting another judgment cannot be shown to be subject to such influence (despite comparable efforts), then one of the conflicting judgments might appropriately be discounted or discarded on that basis (i.e., debunking). Once conflicting moral judgments have survived various attempts at being shown to be pro tanto unreliable, they can be employed as initially credible (i.e., "considered") judgments for purposes of triangulation (or) in pursuit of reflective equilibrium. This will involve the execution of trade-offs among the respective considered judgments, or adjustment of weights, toward revising normative conclusions (or ethical theories, concepts, or principles) as coherence and mutual support seem to require (Earp et al. 2021; DeGrazia and Millum 2021).

Alternatively, faced with a divergence, bioxphi studies may indicate that a given bioethical concept or moral judgment is – even at the expert level – unclear, vague, or tends to generate confusion regarding one's obligations. The purpose of the triangulation strategy would then be to clarify a moral judgment or the concepts and inferences underlying that judgment. For example, the concepts of consent and autonomy have tended to be conflated at law, with statutory and common law applications of these concepts often running together the conditions for consent and the conditions for autonomy (Lewis 2021; Lewis and Holm 2022; for a series of bioxphi studies that provide evidence for this conceptual conflation, see Demaree-Cotton and Sommers 2022). One of the aims of the triangulation strategy could then be to resolve this confusion by making explicit the respective functions, uses, and/or values of these two concepts and thereby provide patients, physicians, legal professionals, and the public with some form of contextual reeducation.

In any case, it must be remembered that merely appealing to a divergence between sets of moral judgments will be inadequate to deliver an "all-things-considered" normative conclusion or recommendation. Although the triangulation approach is a useful starting point, adjusting, pruning, or supplementing opposing judgments will, in many cases, also require engagement with broader normative considerations, such as background theories, legal and moral principles, morally relevant facts, and the like (i.e., "wide reflective equilibrium") (DeGrazia and Millum 2021; Earp et al. 2021).

Finally, *pluralism* is an approach that that does not seek to find one single normative answer to an ethical question. Rather, it holds that in cases where various stakeholders have "conflicting, yet pro tanto reliable, judgments or where multiple and independent communities each reveal persistent disagreement between two or more conflicting, yet pro tanto reliable, judgments, these judgments may all have comparable normative weight" (Earp et al. 2021, pp. 106–107).

Conclusion

Relative to its parent disciplines – empirical bioethics and x-phi – bioxphi is an emerging field, one whose scope in terms of its methods, functions, and applications for practice and policy ends is yet to be established. This situation should be viewed positively. It affords those interested in adopting experimental approaches to bioethics a level of creativity and freedom to explore, test, and get to grips with what works and what does not. At the same time, there are challenges and unanswered questions facing this burgeoning subdiscipline: How and to what extent can the methods and strategies of bioxphi be integrated with others in empirical bioethics, philosophical bioethics, x-phi, cognitive science, and moral psychology? How do we, in practice, draw upon

experimental models of *how* and *why* people think about realistic bioethical issues in order to develop concrete recommendations for clinical practice and health policy? How do we, in practice, deal with the defeasible normative weight of seemingly reliable judgments in order to deliver "all-things-considered" judgments? Does bioxphi have a specific role to play in generating "all-things-considered" normative solutions and recommendations? Of course, the field of bioethics in general is still attempting to grapple with some, if not all, of these questions.

In this entry, our characterization of bioxphi has been deliberately modest. Situating the field in relation to empirical bioethics and x-phi, we have illustrated some of the ways in which bioxphi has brought empirical data into the service of reaching normative conclusions that are of significance to healthcare practice and policy, medical research, and emerging biotechnologies. We have also explained some ways in which bioxphi, at least at this stage of its development, differs in important ways from empirical bioethics and x-phi.

We have argued that there is value in understanding not only what people think about bioethical issues but also how and why they think as they do. In particular, the "hows" and "whys" will often have practical normative significance for a range of bioethical situations and problems. Bioxphi seeks to generate evidence and provide strategies for assessing such normative significance, allowing us to better navigate the views of different stakeholders across the relevant domains of medicine and healthcare.

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