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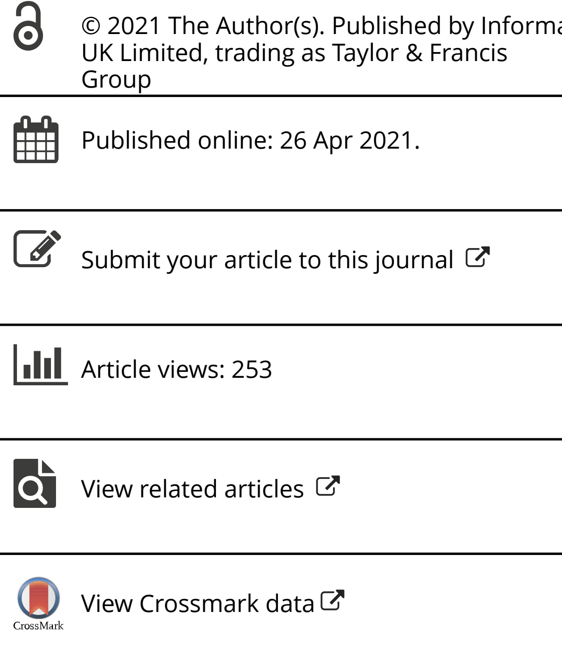

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Thought experiments and experimental ethics

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ABSTRACT
Experimental ethicists investigate traditional ethical questions with non-traditional means, namely with the methods of the empirical sciences. Studies in this area have made heavy use of philosophical thought experiments such as the well-known trolley cases. Yet, the specific function of these thought experiments within experimental ethics has received little consideration. In this paper we attempt to fill this gap. We begin by describing the function of ethical thought experiments, and show that these thought experiments should not only be classified according to their function but also according to their scope. On this basis we highlight several ways in which the use of thought experiments in experimental ethics can be philosophically relevant. We conclude by arguing that experimental philosophy currently only focuses on a small subcategory of ethical thought experiments and suggest a broadening of its research agenda.

KEYWORDS Thought experiments; experimental philosophy; experimental ethics; veil of ignorance; trolley cases

Introduction

Experimental philosophy is a relatively new approach to philosophy. Experimental philosophers investigate traditional philosophical questions with non-traditional means, namely with the methods of the empirical sciences (Knobe and Nichols 2008; 2014; 2017). Although most work in experimental philosophy has been done in the realm of theoretical philosophy, it has also been applied to ethics, broadly conceived (on experimental ethics see Appiah 2009; Mikhail 2011; Greene 2013; Christen et al. 2014; Lütge, Rusch, and Uhl 2014; Liao 2016; Pölzler 2018; Paulo and Bublitz 2020).

Experimental ethics, as we use this term, covers experimental approaches that intend to inform first-order moral questions. In addition,

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significant parts of experimental ethics are also devoted to issues in moral epistemology, primarily concerning the (un)reliability of moral intuitions (for an overview see Machery 2017, chap. 2). A number of studies have been claimed to suggest that moral intuitions may be sensitive to variations in the presentation of moral scenarios. For example, Lanteri, Chelini, and Rizzello (2008), Wiegmann, Okan, and Nagel (2012) and Liao et al. (2012) found a number of order effects, with moderate to large effect sizes, primarily for *trolley* scenarios. Responses to such scenarios have also been found to be influenced by the way in which information is framed (Petrinovich and O'Neill 1996) and by incidental emotions such as happiness (e.g. Valdesolo and DeSteno 2006; but see Ghelfi et al. 2020; Johnson, Cheung, and Donnellan 2014). In addition, sometimes moral intuitions seem to vary with demographic factors such as gender, age, culture, socio-economic status and personality as well (but see Knobe, forthcoming). For example, Petrinovich, O'Neill, and Jorgensen (1993) and Zamzow and Nichols (2009) report gender differences in response to *trolley* cases. Fumagalli et al. (2010) and Bartels and Pizarro (2011) found that men tend more towards 'characteristically' utilitarian intuitions, i.e. intuitions that are easier explained by reference to utilitarianism than by reference to alternative moral theories. Also, Ahlenius and Tännsjö (2012) report that Americans, Russians and Chinese test subjects respond systematically differently to variants of the *trolley* cases. Gold, Colman, and Pulford (2014) report similar effects for British as compared to Chinese test subjects.

As these examples illustrate, experimental ethics makes heavy use of traditional philosophical thought experiments such as the well-known *trolley* cases.[1] This is not exactly news. What is far less clear, though, is *how* experimental ethicists use these traditional philosophical thought experiments. The most influential responses to the so-called paradox of thought experiments – that they 'often have novel empirical import even though they are conducted entirely inside one's head' (Horowitz and Massey 1991, 1) – reconstruct thought experiments either as a priori insights into Platonist laws of nature (Brown 1991) or as mere arguments (Norton 1996). In contrast, experimental ethics is, by definition, *empirical* in nature. Two thematically pertinent papers – both titled

[1]There are different versions of the *trolley* cases. One version is *bystander*: A runaway trolley heads towards five workers. If nobody interferes it will kill them. Would it to be appropriate to divert the trolley onto a different set of tracks where there is only one worker? In the *footbridge* version, one can only save the five railroad workers by pushing a large man off a footbridge onto the tracks. (Foot 2003; Thomson 1976)

'Thought Experiments and Experimental Philosophy' (Horvath 2015; Ludwig 2017) – emphasise the fact that experimental philosophers make use of traditional philosophical thought experiments, but none discusses how they use them. In this paper our aim is to tackle this desideratum.

We will begin by describing the function of ethical thought experiments (Sec. 2), and show that these thought experiments should not only be classified according to their function but also according to their scope (Sec. 3). On this basis we will highlight several ways in which the use of thought experiments in experimental ethics can be philosophically relevant (Sec. 4). We conclude by arguing that experimental philosophy currently only focuses on a small subcategory of ethical thought experiments and suggest a significant broadening of its research agenda (Sec. 5).

Functions of ethical thought experiments

The use of thought experiments in ethics is partly similar to the use of thought experiments in the sciences. As in the sciences (Sorensen 1992, 191), an actual execution of thought experiments is often impossible in ethics – just think of far-fetched scenarios such as the *footbridge* version of the *trolley* cases or Thomson's *violinist*.[2] Other ethical thought experiments could well be carried out. This holds, for example, for *ticking-bomb*[3] or *plank-of-Carneades*[4] scenarios. But, of course, the execution of these thought experiments would often be morally questionable, to say the least.

That said, it is neither the (im)possibility to actually run thought experiments nor the research ethical problems of running them that motivates the use of thought experiments in ethics. Other than scientists, ethicists use thought experiments instead of actual experiments because the execution of the experiments wouldn't give them the philosophically

[2] *Violinist:* While you were asleep, and without any prior consent, your body has been hooked up to the body of a celebrity violinist with a particular medical condition. This condition requires her to be connected to your metabolic system for nine months; otherwise she will die. The question is whether it is morally permissible for you to demand to be separated from the violinist. (Thomson 1971)

[3] *Ticking bomb*: Imagine that the only way to save thousands of lives from the explosion of a ticking time bomb is to torture the suspected terrorist so that he reveals where the bomb is hidden. Would torture be permissible in such circumstances? (Shue 1978; Allhoff 2012)

[4] The *plank-of-Carneades* scenario goes back to Carneades of Cyrene (2nd century BC): Two shipwrecked sailors see a plank that can only carry one of them. One of them reaches the plank first; when the other sailor also reaches the plank, he is about to drown. He pushes the first sailor off the plank, thus causing him to drown. Is the surviving sailor to blame or did he merely act in self-defense? For a similar scenario see (Fuller 1949).

relevant information they seek when running the thought experiment. For example, how the different actions possible in *trolley* scenarios are to be judged morally simply wouldn't follow from how people actually act in these scenarios (at least not in any straightforward way). For example, even if a large majority of persons refrained from pushing the large man off the bridge it could still be the case that doing so was morally required. Just as in the sciences, thought experiments in ethics are meant to work through mere reflection (Häggqvist 1996; Gendler 2000). Other than in the sciences, however, the lack of actual execution of these experiments is not an epistemic deficit.

But if this is correct, what is the function of thought experiments in ethics, i.e. why do ethicists use thought experiments? Here we distinguish between three mains functions: (1) epistemic, (2) illustrative, and (3) heuristic. This distinction is somewhat artificial, and in some cases it will be difficult to draw the boundaries between the three functions. It must also be noted that one and the same thought experiment can be used in epistemic as well as illustrative and heuristic ways (see, e.g. *trolley*). Yet, it has still proven to be helpful to categorise the functions of thought experiments in this way, or in very similar ways (see, e.g. Brun 2017; Walsh 2011).

The epistemic function

The *epistemic* function describes the goal of changing or affirming beliefs. More specifically, the imagination of the execution of an epistemic thought experiment is expected to provide reasons for or against a moral statement, principle or theory. When used negatively, epistemic thought experiments are used as counter-examples or refuters (Sorensen 1992, 153; Gähde 2000). This use follows a rather 'scientific' understanding of how moral philosophy works, namely by falsifying natural law-like moral principles. The basic idea is that moral principles hold universally or necessarily. That is, whenever the principle applies to a situation, it dictates a certain moral judgment. Every successful counter-example is regarded as evidence against the validity of the principle. Thus, for example, if the *trolley* cases are successful counter-examples to the doctrine of double effect, this undermines the doctrine (see, e.g. Kung 2016, 229; Elster 2011, 242; Walsh 2011, 471).[5]

[5]Note that some philosophers and psychologists have argued that versions of the trolley cases (particularly *bystander* vs. *footbridge*) support (rather than undermine) the doctrine of double effect (e.g., Foot 1967; Mikhail 2011).

When epistemic thought experiments are used positively, the basic idea is that particular cases elicit moral intuitions, and that these intuitions provide defeasible reasons to believe in their content. Ethicists often seek to justify moral principles by reference to such intuitions about cases.[6] For example, thinking about Thomson's *violinist* can be supposed to yield reasons that abortion can be morally permissible even if the fetus is granted a right to life. Such intuitions about particular cases can then be used to theorise about morality. Proponents of Rawlsian *reflective equilibrium*, for example, search for moral principles that cohere with the content of intuitions about cases (Cath 2016); others largely disregard moral principles and theorise about morality through *moral consistency reasoning* on the level of cases (Campbell and Kumar 2012); still others work primarily with cases but also ultimately aim at moral principles (most prominently Kamm 1992, 6–11, 2011).

The illustrative function

Although the change or affirmation of beliefs is often regarded as the most important function of ethical thought experiments, the illustrative and heuristic functions are also very common. In ethics, *illustrative* thought experiments are supposed to make a statement, a principle or a theory more comprehensible, i.e. to facilitate our understanding of it. It is in this sense that Peter Singer, for example, developed his well-known *pond* thought experiment: It is obvious that everyone has a duty to rescue a child who is in danger of drowning in a pond if this is possible without considerable personal danger. This is in fact so obvious that Singer can contrast this duty to rescue with a less obvious duty, namely to help children in danger of starving to death in the developing word, even though this would cost part of the disposable income of the inhabitants of the developed world. This comparison of two scenarios is not itself intended to provide a reason to donate money. Rather, it is intended to illustrate Singer's utilitarianism, which in turn provides reasons for donating money (Singer 1972, 231).

The heuristic function

Unlike the epistemic and the illustrative, the *heuristic* function of ethical thought experiments is open-ended. When thought experiments are used

[6]Some philosophers claim that this picture of how philosophy works is wrong, e.g., Cappelen 2012; Deutsch 2015.

heuristically, they are not intended to provide reasons for or against a theory or to illustrate it. Rather, they are supposed to help to generate new hypotheses about, or to get a better understanding of, the implications or differences between moral statements, principles or theories. As any reader of Judith Thomson or Frances Kamm knows, the *trolley* cases, for example, have not only been used epistemically, but also to test certain formulations of principles or to encounter previously unnoticed factors that could prove morally relevant. For this purpose, countless variations of the cases have been created and intuitive reactions to them have been tested. Kamm, for example, often uses thought experiments to invite her readers to explore difficult moral matters with her. Along the way she urges the reader to remain open-minded, to not settle on certain responses to cases or on moral principles too easily. In other words, she asks the reader to follow the cases wherever they lead (Kamm 2007, 5).

It will sometimes be hard to find a clear-cut distinction between the heuristic and the epistemic use of thought experiments. In general, the main difference is that the former does not have a clear argumentative goal, whereas the latter does. Published philosophical writing rarely features the open-ended search for truth that is characteristic for the heuristic use of thought experiments. That is, we rarely read about how the authors actually came to hold their conclusions. Rather, philosophical papers and books are usually written with the goal of convincing the readers of a particular view. This might lead to an underestimation of the importance of the role of heuristic thought experiments in philosophical practice. When philosophers think about moral matters, when they discuss them in classrooms or at conferences, oftentimes they do not already have a clear argumentative goal. They simply want to explore the issues by pondering their intuitions about a variety of cases, or so we would argue. Of course, the heuristic use can lead to firm beliefs that are then effectively supported by epistemic thought experiments. These might be the very same thought experiments that, when used heuristically, ultimately convinced the philosopher of their moral beliefs.

Scope of ethical thought experiments

All ethical thought experiments mentioned so far aim at a *certain* statement, a *certain* principle or a *certain* theory and attempt to confirm or undermine, illustrate or increase our understanding of it (depending on their function). For example, Singer's *pond* thought experiment is intended to illustrate utilitarianism. It can hardly be used to motivate

other moral theories. Similarly, Thomson's *violinist* can hardly be used to support a position in the ethics of migration.

There is, however, a kind of ethical thought experiments, which, to our knowledge, has no equivalent in either the natural sciences or theoretical philosophy. These thought experiments can be used with regard to a *variety* of statements, principles or theories. Although they have the same functions as other ethical thought experiments – i.e. they can be used epistemically, illustratively and heuristically – their scope of application is much wider. Probably the best-known ethical thought experiment of this kind is the Rawlsian *veil of ignorance*.[7] Closely related to this is the idea of an *impartial spectator*[8], as it has been discussed in moral philosophy at least since David Hume and Adam Smith (see, e.g. Raphael 2007; Korsgaard 2008; Gordon 1995).

Thought experiments of this kind were originally developed against a certain theoretical background and thus had very specific functions within the theories defended by Rawls, Hume and Smith. This is why Brun, for example, does not assign the *veil* to any of the three functions mentioned earlier, but introduces a fourth (not further explained 'theory immanent') function (2017, 201; see also Cohnitz 2005, 146). However, instead of creating special functions for individual thought experiments, we suggest sticking to the three functions explained above and distinguishing this type of ethical thought experiment from other types by its wide scope of application.

One may doubt whether this works for our prime example, i.e. the *veil*. After all, John Rawls probably wanted to use this thought experiment for the specific purpose of illustrating his abstract arguments for certain principles of distributive justice (he characterised it as a 'device of representation', Rawls 2001, 17). But even if this interpretation of Rawls is correct this does not undermine our point that the *veil* is also used for other functions. What we refer to as the '*idea of the veil*' has long emancipated itself from Rawls' original use.[9] Today this *idea of the veil* is applied to all sorts of questions in ethics and political philosophy, almost always with epistemic aims (just see these examples from the ethics of migration

[7]The general idea of *veil* is this: One is asked to think about matters of justice and morality from a position in which one is veiled from knowledge about one's place in society, status, abilities etc.

[8]*Impartial spectator*: What is morally right depends on what an impartial, omniscient ideal observer would approve of.

[9]In Rawls' work, the *veil* is placed in the context of the *original position*, which adds requirements of rationality (see Harsanyi 1975; Gaus and Thrasher 2016). Also, often only a very 'thin' *veil* is used. That is, one is required to imagine not to know one's place in society (e.g., one's gender, abilities, ethnicity, wealth, etc.), whereas the *veil* is clearly "thicker" in Rawls' theory, where it also requires abstraction from certain societies.

and from health care ethics: Carens 1987, 257; Harris 1987; Singer et al. 1995). In the general literature on thought experiments the *veil* is thus typically ascribed an epistemic (Gähde 2000; Miščević 2017; Celikates 2012), and sometimes also a heuristic function (Gendler 2011, 132; Celikates 2012). This in fact supports our view that wide-scope thought experiments generally have the same functions as the ethical thought experiments that are aimed at a specific normative statement, principle or theory ('narrow' scope thought experiments). So, there is no need to assume a further distinct function.

What is special about the *veil*, the *impartial spectator*, and other thought experiments of this kind is, as we said, that they can be applied to a variety of issues. They can be used epistemically, illustratively or heuristically for moral matters on all levels of abstraction. They typically fulfil these functions by inviting the reader to take up a certain perspective. In particular, they are designed to help people to take what has been called the 'moral point of view' (Baier 1958). The *veil* and the *impartial spectator* do so by describing situations the conditions of which are intended to ensure impartiality (Paulo and Pölzler 2020; Jollimore 2018); other wide-scope thought experiments (such as Sidgwick's *point of view of the universe* or Habermas' *ideal discourse*) seem to approximate the moral point of view by other means. In any case, from the moral point of view, all possible statements, principles and theories can be explored epistemically, illustratively or heuristically. One can use wide-scope thought experiments such as the *veil* to underpin principles of distributive justice; but one can also use them to undermine or motivate certain positions in migration ethics and health care ethics (see references above); or about animal ethics (Liberto 2017; Rowlands 2009), abortion (Berry 2016; Dreier 2017; Williams 2015), global justice (Beitz 1999; Brock 2005; Pogge 1988), intergenerational justice (Reiman 2007; Wolf and Dron 2015), and the basic social minimum (Copp 1998; Waldron 1986). It is in this sense that thought experiments of this kind have a wider scope than other ethical thought experiments.

One might object that narrow scope thought experiments such as *trolley* or *violinist* do, in fact, apply more broadly than we claim. This objection appears particularly pressing with regard to trolley-style moral dilemmas. For example, these dilemmas have been used to pit deontology against consequentialism, to illuminate or criticise the doctrine of double effect, the difference between act and omission, etc. They can also involve self-driving cars, hijacked planes, etc. instead of trolleys.

However, this description is misleading. First, deontology/consequentialism, act/omission, and the correctness of the doctrine of double effect are, in fact, largely intertwined problems. A consequentialist response to the trolley problem will most likely not be explained by distinguishing between act and omission or between intending and merely foreseeing, but a deontological response likely will be explained in such a way. In other words, the different headlines might give way to the assumption that they address distinct problems, when, in fact, the problems are closely related.

Second, the different subject matters of *trolley* cases – trains, cars, planes, etc. – might be taken to suggest that *trolley* cases apply to a wide range of different philosophical problems. This, again, is a misunderstanding. The different forms really are just different masks for the same structure, which is recognised in labels such as 'Trolleyology' (Sauer 2018, chap. 6) or 'moral emergencies' (Appiah 2009, 96). They are scenarios that feature forced life and death choices with fixed outcomes. The number of philosophical problems that can be captured by such a structure is limited. 'Trolleyological' or 'moral emergency' thought experiments can be used to make the same points in different philosophical debates (be it self-driving cars or terrorist attacks). But these points are always about forced life and death choices with fixed outcomes, meant to highlight the complex of intertwined problems just mentioned: deontology/consequentialism, act/omission, and the doctrine of double effect.

It is true that *trolley* cases have somewhat wider scope of application than *violinist*, *pond* and other traditional ethical thought experiments. Trolleyology can be used to test certain distinctions in a variety of moral principles that postulate morally relevant differences between certain kinds of acts. However, again, these tests will always be limited to the considerations mentioned above: deontology/consequentialism, act/omission, and the doctrine of double effect. In that sense, *trolley* cases are narrow-scope thought experiments. They cannot be used to understand or illuminate many other issues in ethics, especially in applied ethics and in political philosophy. For example, trolleyology doesn't apply to most aspects of animal ethics; neither does it apply to questions of political equality.

To sum up, there are at least two types of ethical thought experiments: those with a narrow scope (such as *trolley* or *violinist*) and those with a wide scope (such as *veil* or *impartial spectator*). These thought experiments can have the same three functions, i.e. they can be used epistemically, illustratively or heuristically. With this understanding in mind, let us now return to the question of how experimental philosophy relates to

ethical thought experiments. In the next section, we will explain how experimental ethicists have actually used ethical thought experiments. Then we will provide some suggestions for future research.

Thought experiments in experimental ethics

Some empirical investigations of ethical thought experiments have focused on how participants actually *behave* or *decide* in response to these thought experiments. For example, moral psychologists have used virtual reality technologies to investigate how test subjects react in the *trolley* cases (Skulmowski et al. 2014; Sütfeld et al. 2017; Francis et al. 2016, 2017). Such studies are highly interesting, and sometimes even normatively relevant (Paulo and Pölzler 2020). However, many of them do not fall within the scope of experimental ethics, as it is understood here, because they are not primarily intended to contributing to answer philosophical questions (recall that on our understanding experimental ethics requires such a philosophical intention).

Most experimental ethics research so far has not focused on how participants *behave* or *decide* in response to thought experiments; it has rather explored their moral *intuitions*, i.e. the 'strong immediate moral beliefs' (Sinnott-Armstrong 2008, 47) that are prompted by considering cases like *trolley*, *violinist*, etc. Studies have in particular been conducted on three aspects of these intuitions (mirroring research in experimental philosophy in general; see Knobe and Nichols 2017): (1) the intuitions' content, (2) their sensitivity to irrelevant factors, and (3) their diversity.

Content-focused investigations

Philosophers often refer directly to their moral intuitions. They do so under the assumption that these intuitions are shared by most people or a certain subset of people (e.g. Jackson 1998; Kauppinen 2007); or at least by most philosophers or a certain subset of philosophers. For example, when Thomson or Kamm report their intuitions on *trolley* cases they seem to assume that it is not just them who have these intuitions but at least some of their readers as well. This is not to ignore that philosophers sometimes state that they only intend to explore their *own* intuitions.[10] Take Kamm, for instance, who says that 'that much more is

[10]We thank a reviewer for this journal for pressing us on this point.

accomplished when one person considers her judgments and then tries to analyse and justify their grounds than if we do mere surveys.' (Kamm 2007, 5) However, in a footnote she explains that certain case intuitions are 'a natural source of data from which we can isolate the reasons and principles underlying their responses.' That is,

> the responses come from and reveal some underlying psychologically real structure, a structure that was always (unconsciously) part of the thought processes of some people. Such people embody the reasoning and principles […] that generates these responses. The point is to make the reasons and principles explicit. […] If the same 'deep structure' is present in all persons—and there is growing psychological evidence that this is true […]—this would be another reason why considering the intuitive judgements of one person would be sufficient, for each person would give the same response. (Kamm 2007, 8, note 4; for more details see her 1992, 6–11)

So, Kamm thinks that it suffices to engage with one's own intuitions *if and only if* one is among the 'few people […] able to respond to a complex case with a firm response.' (Kamm 1992, 9) For these people are the 'natural source of data' and, after careful thinking, have converging intuitions. Moreover, the whole method of cases seems to presuppose that the author assumes that her intuitions are widely shared. If these philosophers did not think that their intuitions are at least somewhat similar to those of others, then why would they write books and articles that are grounded in them? Why would they expect anybody to be interested in reading these books and articles? Hence, one function of experimental ethics has been to test whether philosophers' assumptions about the moral intuitions of (some) people or (some) philosophers are correct.

Testing ethicists' assumptions about the representativeness of their intuitions about thought experiments is a philosophically important task. For example, if it turned out that most or certain subsets of ordinary speakers or philosophers did not share Thomson's and Kamm's intuitions this would, at least under certain circumstances, weaken these intuitions' evidentiary force. It is accordingly no wonder that experimental ethicists regularly investigate the content of people's intuitions about thought experiments, such as the content of their intuitions about *trolley* cases (see, e.g. Greene et al. 2001; Liao et al. 2012). Yet, most often they don't leave it at that. In addition, and in fact primarily, experimental ethicists have also explored the sensitivity and diversity of participants' moral intuitions.

Sensitivity-focused investigations

The lion's share of research in experimental ethics has so far targeted the factors that people's intuitions about ethical thought experiments are sensitive to. Do these intuitions respond to features that can plausibly be deemed morally relevant? Or are they (also) caused by (purportedly) irrelevant factors?

In the introduction to this paper we already provided a number of examples for sensitivity-focused studies (see Machery 2017, chap. 2, for a helpful overview; and Knobe forthcoming for a recent defense of the stability of philosophical intuitions). For example, several studies have been claimed to suggest that participants' intuitions are influenced by the way in which information is framed (e.g. as *saving* four persons versus *killing* one person in *trolley* cases, e.g. Petrinovich and O'Neill 1996), by the order in which scenarios are presented (e.g. if the *bystander* version of *trolley* dilemmas is presented prior to the *footbridge* version, rather than subsequently, participants tend to respond differently, e.g. Lanteri, Chelini, and Rizzello 2008; Wiegmann, Okan, and Nagel 2012 and Liao et al. 2012) or by incidental emotions such as anger, happiness, mirth and elevation (participants who were primed with these emotions tended to make different judgments than participants who were not primed in this way; see e.g. Seidel and Prinz 2013; Strohminger, Lewis, and Meyer 2011; Valdesolo and DeSteno 2006).[11]

By attempting to establish such sensitivities to irrelevant factors most experimental ethicists have attempted to undermine particular moral statements, principles or theories (and hence to support their alternatives). The most famous example is arguably provided by Joshua Greene. Greene et al. (2001) used fMRI to investigate participants' brain activity while they were thinking about *trolley* cases. In his interpretation this study showed that '[t]here are good reasons to think that our distinctively deontological moral intuitions … reflect the influence of morally irrelevant factors and are therefore unlikely to track the moral truth' (Greene 2008, 69 f.). Therefore, as deontology is debunked, we ought to

[11]Note that studies on incidental emotions were not designed to directly answer philosophical questions but as investigations into classical moral psychology. Moreover, most of the extant research in this area has focused on the emotion of disgust (e.g., Schnall et al. 2008; Schnall, Benton, and Harvey 2008). Some of these disgust-focused studies did not replicate (e.g., Ghelfi et al. 2020; Johnson, Cheung, and Donnellan 2014), and meta-analyses suggest that disgust either does not have any or only a very small effect on moral judgements (e.g., Landy and Goodwin 2015). In fact, even the effect of other incidental emotions on moral judgments has typically been small and many studies have also been subject to methodological worries (Pölzler 2018).

go with consequentialism (on this argument see Paulo 2018; for critique see Berker 2009; Kahane 2015).

However, sensitivity-focused research may be employed for broader methodological purposes as well. In line with what has been called the 'negative program' of experimental philosophy[12], it may be argued that moral intuitions are so easily distorted by irrelevant factors that ethicists should give up the practice of relying on these intuitions at all. On this view, *all* intuition-based arguments – whether they attempt to support deontology or consequentialism, or any other moral statement, principle of theory – must be dismissed (e.g. Paulo 2020; Peter Singer 2005).[13]

Diversity-focused investigations

Some empirical research on morality has also focused on variations in people's intuitions regarding thought experiments, such as variations with culture, gender, age, socio-economic status or personality (see again Machery 2017, chap. 2, for a helpful overview; and Knobe forthcoming for a recent defense of the stability of philosophical intuitions). Again, representative studies have already been mentioned in the introduction, suggesting that responses to *trolley* cases vary both with gender (Bartels and Pizarro 2011; Fumagalli et al. 2010; Petrinovich, O'Neill, and Jorgensen 1993; Zamzow and Nichols 2009) and culture (Ahlenius and Tännsjö 2012; Gold, Colman, and Pulford 2014).[14]

Some studies have also involved alternative ethical thought experiments. For example, a study by Abarbanell and Hauser (2010) suggests that in contrast to Westerners, rural Mayans do not judge harmful actions (e.g. saving five lives at the expense of one by asking a man to cross the road in front of an oncoming truck) to be more wrong than equally harmful omissions (e.g. saving the five lives by not warning a man who is about to cross the road)[15]; and in their famous 'Moral Machine' study Awad et al. (2018) asked participants from all around the world to respond to thought experiments

[12]According to a common distinction, experimental philosophy studies are conducted to either support substantive philosophical theses (this is its 'positive program') and to undermine traditional philosophical methods, especially appeals to intuitions ('negative program') (Knobe and Nichols 2017).

[13]In response to sensitivity-based arguments some critics of experimental philosophy have claimed that only the intuitions of philosophers, and not of lay people, matter for ethics and philosophy. This claim will be discussed in Section 5.

[14]Note that some of the studies that reported gender differences in people's intuitions about trolley cases did not replicate, see Adleberg, Thompson and Nahmias 2015.

[15]One set of Abarbanell and Hauser's thought experiments involved five men on a road. The lives of these men are saved from an oncoming truck by sacrificing the life of one man. In the first version of the vignette this is achieved by asking the man to cross the road (ACTION). In the second version, in contrast, the man is not warned of the oncoming truck (OMISSION). Abarbanell and

that involve deadly accidents with self-driving cars, reporting significant differences between (1) North America and many European countries, (2) Eastern Countries, and (3) Latin America and countries with French influence.[16]

Sometimes diversity-focused investigations on ethical thought experiments have been motivated by (partly) non-philosophical reasons (as may be the case with regard to both Abarbanell and Hauser 2010; Awad et al. 2018). Recently, however, their philosophical relevance has been considered in more detail as well. One potential implication of moral intuitions' variation across populations is again that either particular moral intuitions or these intuitions in general fail to be reliable guides to the moral truth – as has been argued with regard to other philosophical concepts, such as knowledge (Weinberg, Nichols, and Stich 2001; but see Machery et al. 2017) or reference (Machery et al. 2004). Moreover, some experimental ethicists have appealed to this variation in metaphysical and semantic arguments, arguing that it supports a particular (relativistic) interpretation of moral truth (e.g. Doris and Plakias 2008; Fraser and Hauser 2010).

Suggestions for future research

In the last section, we explained three main ways in which thought experiments have so far been used in experimental ethics: (1) content-focused, (2) sensitivity-focused and (3) diversity-focused. Investigations of these kinds can shed light on which moral intuitions about particular thought experiments particular people have, and why. In order for these results to bear on moral statements, principles or theories, however, additional philosophical arguments are required. For example, why believe that emotions are unreliable in bringing about moral judgements or that a certain amount of diversity undermines our moral intuitions?

In what follows we will abstract from these more fundamental philosophical issues (see, e.g. Berker 2009; Heinzelmann 2018; Kauppinen 2007; Nadelhoffer and Nahmias 2007); our focus will rather be on the ways in

Hauser report that rural Mayan subjects did not judge the actions they were presented with to be less permissible than their corresponding omissions.

[16]The most important differences across these clusters concern the weight that subjects attributed to moral preferences. First, subjects from the Eastern cluster attributed much less weight to sparing younger than older people than subjects from the other clusters. Second subjects from the Eastern cluster also attributed much less weight to sparing high status people. And third, subjects from the Southern cluster attributed much less weight to sparing humans rather than pets, and much more weight to sparing women and fit persons.

which experimental ethicists have used thought experiments. In particular, we attempt to advance this area of research by suggesting that it should incorporate five additional kinds of investigations (that have so far received less attention): investigations into (1) illustrative and heuristic thought experiments, (2) wide-scope thought experiments, (3) de-biasing strategies, (4) atypical thought experiments, and (5) philosophers' intuitions about thought experiments.

Illustrative and heuristic thought experiments

So far experimental ethics has focused almost exclusively on the epistemic function of ethical thought experiments. This is again most obvious in the case of Greene's attempts to justify consequentialism (Greene 2008); but it is also true of all the other studies in experimental ethics mentioned above (e.g. Liao et al. 2012; Wiegmann, Okan, and Nagel 2012).[17] Irrespectively of whether these studies have focused on the content, the sensitivity or the diversity of test persons' intuitions, their underlying philosophical aim has always been to support or undermine our justification for holding certain ethical statements, principles or theories.

However, experimental ethics could also provide valuable insights into the appropriateness of illustrative and heuristic usages of thought experiments, by testing whether these thought experiments really fulfil the function that they have been claimed to fulfil. There are many ways in which this might be done. As an example, consider Singer's *pond*. This thought experiment is assumed to be a good illustration of utilitarian arguments about our obligations to the global poor. If this assumption is correct then a group of participants who are presented with *pond* and a group of participants who are presented with these abstract utilitarian arguments should mostly end up endorsing the same moral statements about our obligations to the global poor (in the absence of any plausible alternative explanations for divergence). The thought experiment could only be considered illustratively effective in case of this result; otherwise it would be ineffective.

As was pointed out in Section 2, ethical thought experiments are quite often used for illustrative or heuristic purposes. We therefore suggest that

[17]To further clarify, even though some *philosophers* have used *trolley* in heuristic ways and *pond* in illustrative ways (Sec. 2), empirical studies have so far exclusively tested these thought experiments' epistemic function.

future research in experimental ethics accounts for this fact, and also puts these alternative functions to the test.

Wide-scope thought experiments

So far experimental ethics has also almost exclusively been oriented towards thought experiments with a narrow field of application. For example, as we have seen, there are numerous studies on *trolley* (which pits deontology against consequentialism; e.g. Greene et al. 2001; Huang, Greene, and Bazerman 2019; Liao et al. 2012; Valdesolo and DeSteno 2006) and similar scenarios (which were used to investigate intuitions about the ethics of self-driving cars, the moral significance of the action/omission distinction and other specific statements, principles or theories, e.g. Abarbanell and Hauser 2010; Awad et al. 2018). This focus falls short of representing the full range of thought experiments in ethics. Above we argued that some of the thought experiments that are most often used by ethicists (such as the *veil* or the *impartial spectator*) rather have a wide scope, i.e. they can be applied to a variety of different ethical statements, principles or theories.

Experimental ethics could provide helpful information about the kinds of moral statements, principles and theories that people endorse in the face of wide-scope thought experiments. For example, situated behind the 'veil of ignorance', would people really prefer Rawls' principles of justice over utilitarianism (see Bruner 2018; Frohlich, Oppenheimer, and Eavey 1987; Frohlich and Oppenheimer 1993 for investigations from the perspective of experimental economics)? Even more importantly, empirical studies on wide-scope thought experiments could also illuminate the appropriateness of these thought experiments (e.g. Paulo and Pölzler 2020). They could investigate how effective wide-scope thought experiments are in achieving their aim (i.e. in leading people to adopt the 'moral point of view' for purposes of justification, illustration or heuristics); they could investigate how sensitive these thought experiments are to irrelevant factors such as the order or framing of certain information; and they could investigate to what extent the thought experiments' effectiveness and results differ across different populations.[18]

[18]There have already been some studies on wide-scope thought experiments' appropriateness. For example, Aguiar, Becker, and Miller (2013) compared the *veil*'s effectiveness to the effectiveness of other wide-scope thought experiments; and Bond and Park (1991) and Chan (2005) conducted cross-cultural research on the *veil*. However, in Paulo and Pölzler (2020) we show that such studies —even though they are fascinating—typically do not yield the kind of data that would be necessary to form reliable judgments about wide-scope thought experiments' appropriateness.

Elsewhere (Paulo and Pölzler 2020) we have made concrete suggestions for how to test the appropriateness of the *veil*. For example, the thought experiment's epistemic function may be investigated by a study that involves the following two conditions: (non-veiled) a condition in which participants arrive at a moral judgment in an ordinary way; (veiled) a condition in which participants are first asked to disregard their gender, race, income, etc. People are generally rather partial in making moral judgments (see, e.g. Bocian and Wojciszke 2014; DeScioli et al. 2014). Thus, if it turned out that judgments in the veiled condition do not statistically significantly differ from judgments in the non-veiled condition, or that judgments in the veiled condition do not show lower correlations to participants' gender, race, income, etc., this would suggest that the *veil* is ineffective as a method of justification. It would likely fail to lead people towards a more impartial point of view.

De-biasing strategies

In the last section, we saw that much research in experimental ethics has tested our moral intuitions' sensitivity to irrelevant factors such as order, framing or incidental emotions. This information has typically been used in arguments that purport to undermine (particular) moral statements, principles or theories (e.g. Greene 2008). However, experimental ethicists could also take a more constructive, forward-looking approach and investigate to what extent and how ordinary people or philosophers may be 'de-biased' in their responses to ethical thought experiments, i.e. enabled to overcome their moral intuitions' sensitivity to irrelevant factors.

Strategies that might mitigate the influence of irrelevant factors on people's reasoning have been explored in some non-moral contexts. Preliminary evidence from these other areas of inquiry suggests that certain strategies can indeed significantly reduce biases in several respects (Dasgupta and Asgari 2004; Larrick 2008; Morewedge et al. 2015). From these findings, as well as other psychological and philosophical considerations, experimental ethicists may derive hypotheses about how to 'de-bias' responses to ethical thought experiments. For example, they might want to test how increasing awareness through mindfulness meditation affects participants' ability to become aware of and counteract the influence of incidental emotions on their moral judgments; or whether exercises meant to increase cognitive reflection ability or explanations of the nature and effects of biases have any such effect (for some initial

theoretical considerations and suggestions on moral de-biasing see Herman 2020).

Atypical thought experiments

Many thought experiments in ethics share a set of distinct features. For example, according to Machery (2017), they are unusual (e.g. people rarely find themselves in circumstances where they can save five lives at the expense of one by pulling a switch or pushing a large man off a bridge); they pull apart properties that are usually strongly associated (e.g. by using violence we usually do more harm than good, instead of *vice versa*); and they involve philosophically irrelevant information (e.g. it might be claimed that the size of the man on the footbridge is irrelevant or distracting).

Some researchers have suggested that such common features of ethical thought experiments explain why people's intuitions about them are prone to being influenced by irrelevant factors (Bauman et al. 2014; Machery 2017). The features may also be blamed for (some) people not having determinate or meaningful intuitions about particular thought experiments at all (see, e.g. MacIntyre 1981 and Sandel 1998 on the *veil*). We acknowledge that these explanations are controversial and do not endorse them here (for responses see, e.g. Greene 2014; Schindler and Saint-Germier 2020). However, suppose for the sake of argument that they turn out to be correct. This would mean that, where possible, philosophers better switch to 'atypical' thought experiments: thought experiments that, for example, are usual, don't pull strongly associated properties apart, and don't involve philosophically irrelevant information. As an example of such a thought experiment, consider the following vignette from (Schnall et al. 2008, 1107): 'James is going to work and considers whether to walk the 1½ miles or to drive in. He is feeling lazy and decides to drive in. How moral or immoral do you, personally, find James's decision to be?'[19]

Experimental ethics has so far mostly investigated typical thought experiments like *trolley* (e.g. again Greene et al. 2001; Liao et al. 2012; Valdesolo and DeSteno 2006). Hence, another suggestion for future research is to test to what extent and in what ways these thought experiments are

[19]We realise that in testing certain kinds of hypotheses it will be difficult or impossible to come up with fully typical thought experiments like the one provided above. Yet, typicality admits of degrees, and it will often be possible to design thought experiments in a somewhat more typical way (e.g., simply by removing philosophically irrelevant information).

indeed disturbing. This may be achieved by presenting participants with atypical as well as typical thought experiments (for initial evidence see Schindler and Saint-Germier 2020), measuring imaginative resistance (Kim, Kneer, and Stuart 2018), requesting verbal explanations of answer choices, and other measures (for theoretical discussions of realistic vs. fanciful cases see Stoner and Swartwood 2017; Shue 2006).

Philosophers' intuitions

Some readers may doubt that our last two suggestions are helpful or well-grounded. Why attempt to limit irrelevant influences on thought experiments (by using atypical versions or de-biasing people) when there is a sub-population that is not prone to these influences in the first place, namely (moral) philosophers? In fact, isn't there a case to be made that, given their greater expertise (as well as other facts about them and their inquiries), only philosophers' responses to thought experiments matter for ethics and philosophy more generally, i.e. that direct scientific investigations of the intuitions of lay people are simply philosophically irrelevant? (Kauppinen 2007; 2018; Williamson 2008)

This argument reflects what has come to be known as the 'expertise objection' against experimental philosophy (for discussion see, e.g. Horvath 2010; Nado 2014; Egler and Ross 2018). It is unclear to what extent this objection succeeds. Initial evidence from non-moral contexts suggests that philosophers may in fact be similarly susceptible to order effects, framing effects, etc. as lay people (e.g. Machery 2017; Schwitzgebel and Cushman 2012; Tobia, Buckwalter, and Stich 2013). These findings have been mostly substantiated by a recent large-scale study on moral intuitions in particular (Horvath and Wiegmann 2021). Finally, it may also be doubted that there are good philosophical reasons for regarding only philosophers' intuition as relevant (e.g. Nadelhoffer and Nahmias 2007; Pölzler 2018; Sytsma and Livengood 2015).

Nonetheless, outside of experimental philosophy the expertise objection is still often held. We thus suggest that to further account for this objection – as well as for the fact that some ethicists only mean their moral intuitions to be representative of those of other philosophers, see Section 4 – future research in experimental ethics should follow in the footsteps of other experimental philosophy research (see, e.g. the above references regarding philosophers' expertise). It should not only test the intuitions of lay people but also of philosophers (for some experimental ethics studies whose samples have already included philosophers

see Löhr 2019; Schwitzgebel and Rust 2013; for a helpful overview see Wiegmann, Horvath, and Meyer 2020).

Conclusion

Experimental ethicists investigate traditional ethical questions with non-traditional means, namely with the methods of the empirical sciences. Studies in this area have made heavy use of philosophical thought experiments such as the well-known *trolley* cases. Yet, for some reason, the specific function of these thought experiments within experimental ethics has received little consideration. In this paper we attempted to fill this gap. First, we described the function of ethical thought experiments, distinguishing between an epistemic, an illustrative and a heuristic function. We also showed that ethical thought experiments should not only be classified according to their function but also according to their scope. Some ethical thought experiments (such as the *veil*) can be applied to a variety of moral issues. On the basis of this understanding of thought experiments we highlighted several ways in which the use of thought experiments in experimental ethics can be philosophically relevant. Such studies can in particular inform us about the content of the intuitions that people have about ethical thought experiments, these intuitions' sensitivity to irrelevant factors, and their diversity. Finally, we suggested that experimental ethics broadens its research agenda to include investigations into illustrative and heuristic thought experiments, wide-scope thought experiments, de-biasing strategies, atypical thought experiments, and philosophers' intuitions about thought experiments. In any case, since experimental ethics heavily relies on thought experiments, an increased theoretical engagement with their function and implications is likely to benefit the field. It is our hope that this paper contributes to promoting such an engagement.

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