Abstract

The ‘no-difference problem’ challenges us to explain in which way the occurrence of an aggregate effect gives us reason to act in a specific way, although our individual actions make no difference to the effect’s occurrence. When discussing this problem, philosophers usually distinguish between so-called ‘triggering cases’, where the aggregate effect in question is brought about upon reaching a precise threshold, and ‘non-triggering cases’, in which no such precise threshold exists. However, despite their relevant differences, it is widely assumed not only that both categories of cases confront us with the same moral problem, but also that this problem should be solved in the same way no matter which category we are considering. In this paper, I argue that this assumption is mistaken by showing that non-triggering cases pose very different moral problems than triggering cases unless very specific and, arguably, unlikely assumptions in neighbouring debates about causation and decision-making under indeterminacy hold.

Keywords

Collective harms · Causal overdetermination · Vagueness · Indeterminacy · Making no difference · Non-triggering cases

1 Introduction

Assume that you plan to gather together some friends to play football in a park. Assume further that many other people have followed through on the same idea over the last few months, such that the park is now showing considerable signs of damage. At the same time, it is clear that playing one game less will not make a difference to the grass’s condition; rather, the damage caused can be reversed only if most people
stop playing there. If so, do you have a reason to call off your game although doing so makes no difference to the park’s recovery?

This collective action case is one example of a scenario which gives rise to what we can call the ‘no-difference problem’, and thus the challenge of explaining how the occurrence of an aggregate effect gives us reason to act in a specific way even though our individual actions make no difference to this effect’s occurrence.¹ The no-difference problem has been widely discussed in recent years, with discussion usually distinguishing between so-called ‘triggering cases’, where the aggregate effect in question is brought about upon reaching a precise threshold, and ‘non-triggering cases’, in which no such precise threshold exists.² This distinction is thought to be relevant for two reasons. Firstly, it is supposed to capture the correct causal analysis of the aggregate effects in question. For instance, whereas election wins are clear examples of triggering phenomena, in that victory is generally secured upon reaching the precise threshold of 50% of the votes plus one, no such precise threshold appears to exist in relation to air pollution, water contamination or the damaged grass in the park. Secondly, the distinction is used, at least implicitly, in assessing suggested solutions to the no-difference problem. More precisely, it is generally demanded that solutions apply to triggering and non-triggering cases alike, with minus points being awarded accordingly if a suggestion can cover one category of collective action cases but not the other.³ Hence, despite their relevant differences, it is not only widely assumed that both triggering and non-triggering cases confront us with the same moral problem, but also that this problem should ideally be solved in the same way no matter which category of cases we are considering.

In this paper, I will argue that this assumption is mistaken. More precisely, I will show that non-triggering cases not only pose different moral problems than triggering cases, but also problems which are much harder to solve unless non-trivial assumptions in debates about causation and decision-making under indeterminacy hold. Hence, given the many vexed and still underexplored issues that non-triggering cases raise, those who defend their existence have their work cut out for them.

Importantly, my objective in this paper will be to draw attention to the many problems posed by non-triggering cases, not to solve them. To do so, I will choose global

¹ The no-difference problem can also be formulated in terms of partial moral responsibility ascriptions, such that it requires us to explain how we can hold individual agents morally responsible for aggregate effects to which their actions make no difference. My arguments in this paper are neutral towards the reasons-based and the responsibility-based readings of the no-difference problem. For simplicity’s sake, I will adopt its reasons-based formulation here. While no-difference considerations can also be raised in relation to phenomena which do not amount to aggregate effects (e.g. see Parfit’s (1984) case of the two assassins), I will limit my focus exclusively to no-difference making in relation to aggregate or collective phenomena.

² For instance, see Sinnott-Armstrong (2005), Jamieson (2007), Parfit (1984, 2011), Hiller (2011), Kagan (2011), Nefsky (2012a, 2012b, 2017), Braham/van Hees (2012), Kingston/Sinnott-Armstrong (2018) and Albertzart (2019).

³ Arguably, this comes into view most clearly in relation to Kagan’s (2011) suggestion to solve the no-difference problem on grounds of expected utility considerations. Being aware that his suggestion applies only to triggering scenarios, Kagan himself seeks to defuse worries about his proposal’s inapplicability to non-triggering cases by establishing that there are no genuine non-triggering cases in the first place. At the same time, this does not stop others (such as Nefsky 2012a, 2012b) from criticising Kagan’s proposal exactly because of (inter alia) its failure to cover non-triggering cases.
warming as my example. Other examples—such as overgrazing, oceans’ plastic pollution or contagious levels of virus-laden aerosols in closed rooms—would have done just as well. In what follows, I will thus assume not only that global warming amounts to a non-triggering case, but also that genuine non-triggering cases do in fact exist. Both assumptions are controversial. However, in what follows, I shall do nothing to dispel these controversies, but instead grant that there are genuine non-triggering cases without thereby committing myself to their existence. As such, this paper should be understood as investigating what would follow morally if there were such cases. If there were none, so much the better for moral philosophy—or so we will find.

In order to arrive at this conclusion, it will be most helpful to start in Sect. 2 with a short analysis of the no-difference problem in relation to triggering cases, which can then be used as a counterfoil for our subsequent examination of the moral challenges posed by non-triggering phenomena. How we should understand such non-triggering cases will be clarified in Sect. 3, while Sects. 4–6 will set out what this understanding implies for the many challenges raised by these cases. A brief conclusion will sum up my results in Sect. 7.

## 2 Triggering cases and the no-difference problem

Let us start with a quick look at the no-difference problem in relation to triggering cases. Sticking with our example of an election victory, consider Fig. 1, in which the boxes signify the share of votes won by one candidate:

Since election victory is triggered at one exact point, namely 50% of the votes plus one, the spectrum of vote shares splits into exactly two distinct categories: one in which the election has been won—comprising those boxes that are covered by the line—and one in which the election has not been won—containing the boxes not covered by any line.

When do triggering cases give rise to the no-difference problem? We have specified that this problem concerns scenarios in which individual actions make no difference to the aggregate effect in question. Applied to our example of the election win, this will be the case only if the candidate would have won no matter whether a specific individual voted for her, voted against her or abstained. And this will hold only if more people voted for the candidate than would have been necessary to secure her victory: at the very least, the candidate will have needed to win at least 50% of the votes plus two.⁴

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⁴ These thoughts can also be adapted so as to apply to the candidate’s causally overdetermined election loss.
Put in more general terms, we can thus see that in triggering contexts, the no-difference problem occurs only if an aggregate effect is *causally overdetermined*, in that the effect has more partial causes than would have been required to bring this effect about. Given as much, let us specify the particular challenge posed by the no-difference problem as follows:

*Challenge 1*: We must be able to show that individual agents have a reason to act in a specific way in view of a *causally overdetermined* morally relevant aggregate effect $E$, even though their actions, while being *partial causes* of $E$, make *no difference* to $E$.

Does this challenge also arise in relation to non-triggering cases, as the debate about no-difference making generally assumes? Before we can answer this question, we first need to attain a better grasp of what non-triggering cases involve.

### 3 Non-triggering cases, vagueness and metaphysical indeterminacy

Non-triggering cases, we have said, differ from triggering cases in that there is no precise threshold which, once reached, would trigger the aggregate effect in question. Since I have said that I will grant that global warming falls into this non-triggering category, I will also assume that there is no precise amount of exactly $n$ grams of emitted greenhouse gases which would trigger (further) $6$ degrees of global warming. Rather, while it is clear that *some* amount of greenhouse gases is sufficient for global warming, its harmfulness are genuine non-triggering phenomena, I will assume that just as it is metaphysically indeterminate which precise amount of CO$_2$ emissions is sufficient to cause further degrees in global warming and the corresponding harms this induces. Hence, I will take individual actions to make a difference neither to the occurrence of harmful global warming more generally, nor additional temperature rises and corresponding aggravations of harms more specifically. Since my arguments apply both to the general and the specific case, Fig. 2 below will neglect these complexities for the sake of simplicity by representing global warming as a flat line rather than one that is rising. Moreover, it might be pointed out that there is further uncertainty—or possibly even vagueness—about which extreme weather events and harms have been caused by global warming and which are unrelated to this effect. This further question adds an additional layer of complexity to the arguments I make here, but does not change their thrust or core substance. Consequently, I will ignore these further elements of complexity for the sake of simplicity. Compare also footnote 11 on thoughts about the relation between individual actions and harms along the lines of ‘share of the total’ views. I thank an anonymous reviewer for asking me to render these assumptions more explicit and to distinguish between global warming and the harms it causes more clearly.

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5 Why ‘morally relevant’? Of course, casting one’s vote makes a difference to the overall number of votes cast, just as releasing one gram of CO$_2$ makes a difference to the overall amount of CO$_2$ emitted. However, the no-difference debate’s interest does not lie with any kind of measurable aggregate effect but with morally relevant outcomes, such as election wins, the harms induced by global warming, harmful levels of virus-laden aerosols, etc. It is these morally relevant effects to which individual actions are presumed to make no difference even if they do make a difference to the number of votes cast, the amount of CO$_2$ emitted or the quantity of virus-laden aerosols released.

6 I mention further degrees of global warming here because global warming and its harmfulness are not binary on/off phenomena. Rather, further increases in CO$_2$ emissions will lead to further rises in global mean temperature which, in turn, will lead to greater harm. In keeping with the assumption that global warming and its harmfulness are genuine non-triggering phenomena, I will assume that just as it is metaphysically indeterminate which precise amount of CO$_2$ emissions is sufficient to bring harmful global warming about, it is also metaphysically indeterminate which precise amount of CO$_2$ emissions is sufficient to cause further degrees in global warming and the corresponding harms this induces. Hence, I will take individual actions to make a difference neither to the occurrence of harmful global warming more generally, nor additional temperature rises and corresponding aggravations of harms more specifically. Since my arguments apply both to the general and the specific case, Fig. 2 below will neglect these complexities for the sake of simplicity by representing global warming as a flat line rather than one that is rising. Moreover, it might be pointed out that there is further uncertainty—or possibly even vagueness—about which extreme weather events and harms have been caused by global warming and which are unrelated to this effect. This further question adds an additional layer of complexity to the arguments I make here, but does not change their thrust or core substance. Consequently, I will ignore these further elements of complexity for the sake of simplicity. Compare also footnote 11 on thoughts about the relation between individual actions and harms along the lines of ‘share of the total’ views. I thank an anonymous reviewer for asking me to render these assumptions more explicit and to distinguish between global warming and the harms it causes more clearly.
warming to occur, which exact amount this is will be taken to be vague. In addition, I will grant that there is no precise rise in global mean temperature $\Delta t$ which would trigger global warming’s harmfulness, such that global warming would be harmful given $\Delta t$, but not harmful given $\Delta t$ minus 0.001 °C, say. Rather, while it is clear that some rise in global mean temperature is sufficient to cause deaths and pain through global warming-induced extreme weather events, when exactly global warming becomes harmful will once more be assumed to be vague. Combining both instances of vagueness, I will thus presume that while some amount of greenhouse gases is sufficient for global warming to be harmful, which exact amount this is remains vague. Since it is harmful global warming, rather than global warming as such, that constitutes a morally relevant aggregate effect, all references to global warming in this paper will relate to harmful global warming.

How is vagueness to be understood in this context? It is clear that if we are to buy into the idea of genuine non-triggering cases, vagueness cannot be related to epistemic indeterminacy. That is, the claim at stake cannot be that although there is a precise triggering threshold of global warming, for principled reasons we cannot know where this threshold lies. Alternatively, we could try to relate vagueness to semantic indeterminacy by arguing that words such as ‘harmful’ lack determinate extensions, such that they would need to be precisified in order to remove any indeterminacy about what does and what does not qualify as harmful global warming. However, the kind of vagueness in which I will be interested here will be one which relates vagueness to metaphysical indeterminacy. More precisely, I will assume that non-triggering cases’ vagueness does not pertain to our limited knowledge of existing facts, nor the imprecision of our linguistic expressions, but to there simply being no fact of the matter as to which precise amount of greenhouse gases would be minimally sufficient to bring the collective harm of global warming about.\(^7\)

One way to analyse this assumption is visualised in Fig. 2:

Here, the boxes stand for the overall amount of CO$\textsubscript{2}$ molecules that have been emitted at any one time, while the numbers within these boxes specify how many grams of CO$\textsubscript{2}$ these sets contain.\(^8\) Note, therefore, that it is not indeterminate how many grams of CO$\textsubscript{2}$ have been emitted, and thus how many such grams each of these boxes comprises. Rather, what is metaphysically indeterminate is when these increasing amounts of CO$\textsubscript{2}$ molecules become sufficient to cause harmful global warm-

\(^7\) Compare Nefsky (2012b: 50) for reading non-triggering cases as involving metaphysical indeterminacy. I thank an anonymous referee for Philosophical Studies for pressing the point that we might also be able to sustain ‘no fact of the matter’ talk on grounds of semantic indeterminacy.

\(^8\) These numbers are used solely for illustration purposes and are not to be read as empirical hypotheses about the causal process leading to global warming.
ing. In contrast to our analysis of triggering cases, the spectrum of CO₂ emissions depicted in Fig. 2 thus splits into three areas, not two: We find a ‘white’ area, which comprises sets of CO₂ emissions of which it is determinately true that they are insufficient to cause harmful global warming. These are the boxes not covered by any line in Fig. 2 above. We also have a ‘black’ area, which includes amounts of CO₂ molecules of which it is determinately true that they suffice to cause this collective harm. These are the boxes covered by the solid line. Finally, we find the ‘grey’ area of metaphysical indeterminacy—highlighted here by the dotted line—which contains amounts of CO₂ emissions for which the world simply does not fix whether these sets are or are not sufficient to cause harmful global warming.

This, I have briefly indicated, is one way to model metaphysical indeterminacy; later, I will also introduce a second. For now, though, let us stick to the analysis visualised in Fig. 2 to determine which specific challenges non-triggering cases pose. Since the white area is not relevant for this purpose—after all, no aggregate effect is brought about in this area that gives rise to moral concerns—we can safely ignore it here to focus fully on the scenarios picked out by the black and grey areas respectively. I look at these in turn.

4 First scenario: the black area of non-triggering cases

Let us start with the seemingly easy case of the black area and thus situations in which it is determinately true that the emitted amount of CO₂ is sufficient for global warming to occur and be harmful. For argument’s sake, assume that we find ourselves within a scenario in which 5 \times 10^{15} g of greenhouse gases have been released. How is this scenario to be analysed?

One intuition may be that if we are dealing with a scenario in which it is determinately true that the emitted amount of CO₂ suffices to bring harmful global warming about, it is very likely that more grams of CO₂ have been released than would have been required to cause this effect. In this vein, compare Julia Nefsky’s (2012a: 378) remarks:

Presumably, if you have enough hairs to count as not bald, then you have more than enough hairs: taking one away won’t make you bald (nor will it make you partially bald or ‘balding’). … Similarly, in the nontriggering Harmless Torturers case, for example, if enough people have turned the dial for the victim to be in a certain amount of pain, then more than enough have.

Analogously, we can add that in the non-triggering case of harmful global warming, if enough CO₂ has been emitted to cause this collective harm, then more than enough has been emitted: Even if we had not released 5 \times 10^{15} g of greenhouse gases but 5 \times 10^{15} g minus one, harmful global warming would still have occurred.⁹

⁹ Since there is no fact of the matter as to how many grams of CO₂ would be minimally sufficient to cause global warming, there also is no fact of the matter as to when global warming becomes causally overdetermined. I will ignore this complication here.
Given our analysis of triggering cases, this should sound familiar. For, if Nefsky is on the right track, this would mean that whenever we are dealing with a non-triggering scenario in which the amount of CO$_2$ emitted is clearly sufficient to bring harmful global warming about, we are dealing with a case of causal overdetermination: that is, if $5 \times 10^{15}$ g of greenhouse gases amount to more than enough CO$_2$ molecules to cause harmful global warming, then this effect must be causally overdetermined. This, in turn, seems to be good news for anyone who believes that triggering and non-triggering cases confront us with the same no-difference problem. After all, if the no-difference problem arises in relation to triggering cases only in contexts of causal overdetermination, and if the black area of non-triggering cases also ranges over instances of causal overdetermination, it appears that both categories of cases generate the same moral Challenge 1, namely:

**Challenge 1:** We must be able to show that individual agents have a reason to act in a specific way in view of a causally overdetermined morally relevant aggregate effect $E$, even though their actions, while being partial causes of $E$, make no difference to $E$.

However, appearances are deceiving: even in relation to the black area of non-triggering cases, things are far from straightforward. The reason why lies, maybe surprisingly, in Challenge 1’s reference to individual actions being partial causes of $E$.

To elaborate, theories of causation generally conceive causes as being some kind of difference-makers. In this vein, Lewis (1986: 167) famously states that “[w]e think of a cause as something that makes a difference, and the difference it makes must be a difference from what would have happened without it.” Sartorio (2005: 75) further enforces this thought by arguing that the idea of causes being difference-makers is “a constraint on theories of causation: a condition that the true analysis of causation … would have to meet.” As such (and simplifying greatly), simple counterfactual theories of causation classify $C$ as a (partial) cause of $E$ iff $C$ makes a difference to $E$ such that $E$ would not occur if $C$ did not occur. INUS or NESS tests require that for $C$ to be a partial cause of $E$, $C$ must make a difference to the sufficiency of a condition for bringing $E$ about, in that it must at least be a necessary element of a condition that is minimally sufficient to produce $E$. On manipulation or interventionist approaches to causation, $C$ is a (partial) cause of $E$ iff $C$ makes a difference to $E$ such that by manipulating $C$, we can manipulate $E$. According to probability views, $C$ is a (partial) cause of $E$ iff $C$ makes a difference to the probability of $E$’s occurrence. And so on. Hence, for $C$ to qualify as a (partial) cause of $E$, $C$ must make some difference to $E$, be it in relation to $E$’s occurrence, the probability of its occurrence, $E$’s specific features, and the like.

Conceiving of (partial) causes as difference-makers poses no problem in relation to triggering contexts. Of course, it is true that individual actions fail to make a difference to the occurrence of triggering phenomena if these phenomena are causally overdetermined, as we observed above. Accordingly, it is also true that simple

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10 See Lewis (1986) for a classic formulation of the counterfactual theory, Mackie (1965) for the INUS theory, and Hitchcock (2001) for an interventionist theory.
counterfactual theories of causation will not do in order to qualify these individual actions as partial causes of aggregate trigger-effects. Still, it is not difficult to see how individual actions can, in principle, be difference-makers in triggering contexts: just think of an election victory that is not causally overdetermined, but secured by winning exactly 50% of the votes plus one. Accordingly, as long as we modify our theory of causation in a way that caters for causal overdetermination, conceiving of causes as difference-makers is perfectly compatible with holding individual actions to be partial causes of aggregate trigger-effects even if no individual action makes a difference to the occurrence of these effects.\footnote{Some deny that causal overdeterminers are causes (Hausman, 1998: 263). As this appears to be a minority view, I will ignore it here and assume that causal overdeterminers qualify as partial causes. Note also that being a partial cause of an aggregate effect need not be equated with causing part of this effect. For instance, imagine that three men join forces to push a car off a cliff, which results in the death of its three passengers. Then observing that the actions of these three men are partial causes of the three deaths does not commit us to claiming that each of the three men is causally responsible for one of the three deaths. Kingston/Sinnott-Armstrong (2018: § 5) appear to assess and dismiss such a “share of the total” view (Lawford-Smith & Tuckwell: 2020) when discussing partial causation. When I speak of partial causes, or of some $x$ being part of a cause, I do not seek to imply such a ‘share of the total’ view but am interested only in whether or not $x$ is causally involved in bringing some effect about.} 

However, in contrast to triggering cases, there are no non-triggering contexts in which individual actions make a difference to the morally relevant outcome. Rather, individual grams of emitted CO$_2$ can never make a difference in such contexts.\footnote{It goes without saying that this is not to deny that sets of CO$_2$ emissions as featured in Fig. 2 make a difference. However, what is at stake here is the causal status and difference-making of individual CO$_2$ molecules, not that of bigger molecule sets.} Here is Nefsky (2012a: 378) again:

Instead, the boundaries between one morally relevant outcome and another are vague, and so the difference between $n$-1 and $n$ acts of the relevant type can never, no matter what $n$ is, make the difference between one morally relevant outcome and another. After all, what defines non-triggering cases is exactly that there is no precise threshold such that the performance of one more action would make a difference to the morally relevant outcome by turning a determinate non-harm into a determinate harm. Rather, individual actions necessarily fail, by definition, to make a determinate difference to the morally relevant non-triggering effect in question. Hence, no-difference making runs much deeper in non-triggering cases than in triggering cases. In triggering cases, no-difference making is simply rooted in the contingent phenomenon of causal overdetermination. In non-triggering cases, there can be no determinate difference-making exactly because of these cases’ metaphysical indeterminacy. As such, the occurrence of harmful global warming does not counterfactually depend on the release of one more CO$_2$ molecule, nor is any CO$_2$ molecule ever a necessary element of a set of CO$_2$ emissions that would be minimally sufficient to bring this collective harm about. By emitting one more CO$_2$ molecule, we cannot manipulate harmful global warming, nor can we raise the probability of its occurrence, given that “there is no chance that my act will make a morally relevant difference—not even a
small chance” (Kagan, 2011: 129). Hence, if causes are difference-makers, and if individual actions fail—by definition—to make determinate differences to morally relevant non-triggering phenomena, difference-based causal theories will misfire in non-triggering cases because they will fail to qualify individual actions as partial causes of morally relevant non-triggering effects.14

Given as much, non-triggering cases do not straightforwardly engender Challenge 1, as it appeared at first sight. First and foremost, they confront us with a different and more fundamental challenge, namely:

Challenge 2: We must be able to present a theory of causation which allows us to classify individual actions as partial causes of a morally relevant aggregate effect E, although no individual action can ever make a determinate difference to E.15

13 Could we argue, with Lewis (2000), that although individual actions make no determinate difference to whether harmful global warming occurs, they do make a determinate difference to how or when this collective harm comes about? Put differently, could a move from coarse-grained events to fine-grained alterations of events help us in this context? Apart from questions about the general plausibility of Lewis’ account, this move would need to deal with several thorny issues. Some examples: Firstly, while Lewis seeks to remain neutral on whether the alteration of an event E amounts to a different event E*, neutrality about the individuation of alterations cannot be maintained in the no-difference debate, since certain individuation criteria will entail that individual actions necessarily make a difference to an occurring event. Secondly, it is not clear in which way we could meaningfully speak of an alteration of harmful global warming, if the only difference between harmful global warming E and its equally harmful alteration E* were that E is brought about by everyone but me emitting CO₂ whereas E* is brought about by everyone and me emitting CO₂. Thirdly, it is unclear how focus on how E comes about can help us in cases where we find metaphysical indeterminacy about whether E occurs. Finally, we can ask why making a difference to how an outcome comes about should matter for moral reasons and responsibility, if the way in which this outcome comes about neither changes the outcome’s occurrence as such nor its moral status and harmfulness. I am not too hopeful that convincing answers to questions such as these are forthcoming. At least, it seems clear that moving to event alterations will not deliver an easy way out of the problems raised here. I thank an anonymous reviewer for this journal for pressing me on Lewis’ proposal.

14 To guard against misunderstanding, the question raised by metaphysical indeterminacy here is not whether or not ‘causation’ is a vague notion. Rather, the question is how to classify individual actions as partial causes of an effect E if these actions can never make a determinate difference to E. At the same time, the ‘misfiring’ of causal theories could be interpreted in one of two ways, depending on how we understand non-triggering cases. If we hold that individual actions fail to be difference-makers in such cases, theories of causation will entail that these individual actions fail to be partial causes. This option is covered by Challenge 3. If, in turn, we hold that it is indeterminate whether or not individual actions are difference-makers in non-triggering contexts, theories of causation would be consistent with holding that it is indeterminate whether or not individual actions are partial causes. This option is covered by Challenge 5, albeit in a different context. I thank an anonymous referee for drawing my attention to these different interpretations.

15 You may have noticed that the list of causal theories provided above did not contain so-called process theories of causation, according to which there is a causal connection between C and E iff C is part of a process which transfers a conserved quantity (such as mass-energy or momentum) from C to E (Dowe 2000). Process views differ from the approaches listed above in that they do not tie causality to difference-making counterfactually understood (Dowe 2012: 218–219), but interpret ‘difference’ in terms of the application of a conservation law (Dowe 2004: 929), such that for C to (partially) cause E, C must affect E’s mass-energy or momentum, say. Given as much, could process theories offer a straightforward solution to Challenge 2? If moving to process theories were successful, it would certainly not be straightforward. One worry that such a move would need to assuage concerns process theories’ inapplicability to many of the morally relevant phenomena in which we are generally interested (for instance, it is unclear in which
Challenge 2 does not concern some minor, peripheral issue. Rather, it concerns one of the no-difference debate’s central premises, as Nefsky (2012b: 71–72) makes admirably clear:

The problem in Collective Harm Cases is not that no individual act seems to be part of the cause. On the contrary, it is a starting point—a point from which the problem gets going in the first place—that if the morally relevant outcome occurs, then individual acts of the type in question will have been part of what caused it. … So our challenge is not one of showing that individual acts of the relevant type can be causally involved, even if they make no difference. That is something we can—and really, must—take for granted. We must take it for granted to set up the Problem of Collective Harm to begin with.

Although it is perfectly fine to take for granted that individual actions are partial causes of an aggregate effect in triggering scenarios, we have just seen that doing so in non-triggering contexts is exactly what we cannot do, given widespread views on the link between causation and determinate difference-making. Consequently, nor can we take for granted that non-triggering cases confront us with the same Challenge 1 as triggering cases. Rather, if we want to argue that non-triggering cases also raise Challenge 1, we must show, rather than presume, that individual actions are partial causes of an aggregate non-triggering effect despite never making a determinate difference to it. Put differently, before we can turn to Challenge 1, we must meet Challenge 2.

What would follow morally if Challenge 2 could not be met? Our failure to do so will significantly change the moral challenge raised by non-triggering cases. For, these cases would now no longer engender the challenge of explaining which reasons apply in cases where actions are partial causes of a collective effect despite making no difference to it. Instead, they would confront us with a very different moral challenge, namely:

**Challenge 3**: We must be able to show that individual agents have a reason to act in a specific way in view of a morally relevant aggregate effect \( E \), even though their actions make no difference to \( E \) and are no partial causes of \( E \).
Given that Challenge 3 no longer assumes that individual actions are partial causes of some effect \( E \), it importantly departs from central presuppositions of the no-difference debate. Yet, tackling Challenge 3 also has more far-reaching implications that extend beyond this debate. More precisely, according to the mainstream view, moral responsibility presupposes causal responsibility, in that we can be held morally responsible for \( E \) only if our actions are (partial) causes of \( E \). Similarly, debate about the no-difference problem implicitly assumes that the occurrence of some effect \( E \) can give us reason to act in specific ways only if there is some causal relation between our actions and \( E \)—this, I take it, is exactly what Nefsky is driving at when insisting that we must take causal involvement for granted in order to set up the no-difference problem in the first place. Challenge 3 forces us to break with this mainstream view by severing causal responsibility from moral responsibility and reasons.

What could such a break involve? More radically, it could comprise severing the link between causal responsibility, moral responsibility and moral reasons altogether by denying that the former is necessary for the latter.\(^\text{16}\) If we chose to pursue this path, we would have to explain on which grounds moral responsibility and reasons for action can be attributed in light of some effect \( E \) if individual actions stand in no causal relationship to \( E \). Less radically, we could seek to modify the mainstream view about causal responsibility, moral responsibility and moral reasons by suggesting that moral responsibility and reason ascriptions presuppose some link between our actions and an effect’s cause, without demanding that this link entail or require that our actions themselves be partial causes of this effect. If we chose this avenue, we would have to spell out how exactly this link between our actions and an effect’s cause is to be understood and why this link suffices to render us eligible candidates for moral responsibility and reason ascriptions.\(^\text{17}\) None of these tasks is trivial.

Where does this leave us in relation to our analysis of non-triggering cases vis-à-vis that of triggering cases? As these considerations show, before we even know which moral problem non-triggering cases generate, we need to tackle Challenge 2 by examining whether or not—rather than taking for granted that—individual actions are partial causes of harmful global warming despite never making a determinate difference to it. Only if we manage to meet this challenge, will the black area of non-triggering cases confront us with Challenge 1, and thus the moral problem that generally lies at the heart of the no-difference debate and causally overdetermined triggering cases. If, in turn, we fall short of meeting Challenge 2, we will face Chal-

\(^\text{16}\) See Sartorio (2004) for an argument to this effect. At the same time, see Sartorio (2005: § 6) for the suggestion that not classifying individual actions as causes in certain situations might give us exactly the right results regarding assessments of moral responsibility and moral luck.

\(^\text{17}\) What could this link look like? For instance, we might try to explain that although individual \( \text{CO}_2 \) emissions are not partial causes of global warming, they are non-constitutive parts of the causal process leading to global warming. See Loew (2017) for distinctions such as causing an outcome vs. helping determine how an outcome happens, constitutive vs. non-constitutive parts of causal processes, etc. In this context, also compare Lewis’ (2000) thoughts on alterations of events and Sartorio (2005) for ways of difference-making. Alternatively, we could argue that although individual molecules do not partially cause global warming, they are part of a \( \text{CO}_2 \) cloud which possesses the property of harmfulness as an emergent property (Kingston & Sinnott-Armstrong, 2018). I return to this idea in Sect. 6. Needless to say, I float these approaches merely as examples; I should not be understood as claiming that these approaches are guaranteed to succeed in meeting Challenge 3.
lende 3, and with it all the controversial issues about causal responsibility, moral responsibility and moral reasons that follow in its wake.

### 5 Second scenario: the grey area of non-triggering cases

While the black area of non-triggering cases comprises sets of CO$_2$ emissions of which it is determinately true that they bring about harmful global warming, its grey area concerns cases in which the world does not fix whether or not the emitted amounts of CO$_2$ are sufficient to cause this collective harm. Given as much, we might think that this grey area is not one in which the no-difference debate would or should be interested. That is, it might be argued that as long as it is not determinately true that a set comprising $3 \times 10^{15}$ g of CO$_2$, say, causes any harm, releasing some of these $3 \times 10^{15}$ g need not give us reason for concern. However, whilst this might be the endpoint of our enquiries into non-triggering cases’ grey area, it cannot be its starting point. After all, since in this area, it also fails to be determinately true that a set comprising $3 \times 10^{15}$ g of CO$_2$ does not cause harmful global warming, we could just as well argue that we need to investigate the grey area exactly because there is no fact of the matter as to whether or not the number of emitted molecules is harmful.

I believe that this second reaction is on the right track. Hence, at the very least, the grey area of non-triggering phenomena forces us to consider which reasons for action may apply to us if there is no fact of the matter as to whether or not some collective harm obtains. But if so, we are confronted with yet another moral challenge, namely:

**Challenge 4:** We must be able to show that individual agents have a reason to act in a specific way in view of a morally relevant aggregate effect $E$, even though there is no fact of the matter as to whether or not $E$ obtains.

Does Challenge 4 amount to a genuinely distinct moral challenge, or could we also find related moral challenges in triggering contexts? It might be tempting to tend towards thinking the latter, as triggering cases certainly allow room for Challenge 4*:

**Challenge 4*:** We must be able to show that individual agents have a reason to act in a specific way in view of a morally relevant aggregate effect $E$, even though it is uncertain whether or not $E$ (will) obtain(s).

Meeting variants of Challenge 4* is the aim of approaches that seek to solve the no-difference problem in triggering contexts on the basis of rational choice considerations. For instance, Kagan (2011) and others argue that even if we are uncertain whether or not some aggregate effect $E$ will obtain—more precisely still, even if we are uncertain whether or not our own actions will make a difference to $E$’s occurrence—expectations about the consequences of our actions may still give us reason to act in specific ways if acting in this way would maximise expected utility.

Yet, although Challenge 4 and Challenge 4* may appear similar, it is clear that at least *prima facie*, they concern very different phenomena. More specifically, Challenge 4* pertains to decision-making under uncertainty, and thus decision-making...
that is subject to epistemic limitations, in that we do not know for certain which state of the world does or will obtain. Yet, as we have specified above, non-triggering cases should not be understood as concerning epistemic limitations, but metaphysical matters. Hence, the problem posed by non-triggering cases is not that we are uncertain whether or not \( E \) holds, but that the world does not settle whether or not \( E \) obtains. Put differently, the problem concerns decision-making under indeterminacy, not uncertainty. At least at first sight, Challenge 4 thus seems to present a different problem than Challenge 4*.

However, there might still be a way to show that Challenge 4 does, after all, collapse into Challenge 4*, namely by demonstrating that decision-making under indeterminacy reduces to decision-making under uncertainty. More precisely, it could be argued that whenever we find ourselves in a situation where it is metaphysically indeterminate whether or not a set of released \( \text{CO}_2 \) molecules is harmful, we should understand this situation as one in which we are uncertain whether or not this set causes harm. This, of course, would not exempt us from having to explain how such epistemic uncertainty affects the reasons we have for acting in one way or another. Still, at least we could now discharge this task by tapping into the extensive pool of theories that have specifically been developed to deal with decision-making under uncertainty. Hence, if decision-making under indeterminacy were reducible to decision-making under uncertainty, the grey area of non-triggering cases would not confront us with a genuinely new moral problem, but with the familiar challenge of explaining which moral reasons apply to decisions made under uncertainty. So, is decision-making under indeterminacy reducible in such a way?

How to approach decision-making under indeterminacy is a novel and still very much underexplored field of research.\(^{18}\) Still, we might venture a first, albeit rather tentative assessment here. For, as Robbie Williams (2017: 652) observes, reducing the puzzle of indeterminacy to one of uncertainty seems, at least prima facie, rather peculiar:

> When one is (in the ordinary sense) uncertain whether \( p \), one can wonder whether \( p \), gather evidence for or against \( p \), hope or fear that \( p \) will turn out to be the case. But in the case of indeterminacy, one could simply know that there’s no fact of the matter whether \( p \), and hoping, wondering, evidence gathering, and the other accompaniments of ordinary uncertainty seem prima facie out of place when one knows already that there is no fact out there to be hoped for or wondered about.

Assume that this strong appearance of peculiarity could be further substantiated. Then it would not be the case that decision-making under indeterminacy can be reduced to decision-making under uncertainty. Nor would it be the case that the grey zone of non-triggering cases can be analysed through well-known theories of decision-making under uncertainty that we might want to employ in triggering contexts. Rather,

\[^{18}\text{For discussions of indeterminacy and different kinds of vagueness in the moral domain, see Williams (2014, 2017), Bernstein (2016), Constantinescu (2014), Dougherty (2013), Schoenfield (2016), Sud (2019) and Elson’s (2016) Special Issue on ‘Indeterminacy in Ethics’.}\]
instead of collapsing into more familiar problems along the lines of Challenge 4*, Challenge 4 would present a new and genuinely distinct moral problem posed by the grey area of non-triggering cases which would call for its own distinctive solution by explaining which reasons apply to us when faced with metaphysical indeterminacy.

Again, as was the case in relation to Challenges 2 and 3, providing such an explanation is no trivial task. Yet, as I have indicated above, my aim in this paper is to explicate the many problems posed by non-triggering cases, not to solve them. Hence, let us record that unless decision-making under indeterminacy can be reduced to decision-making under uncertainty, the grey area of non-triggering cases once more confronts us with a very different and arguably much trickier problem than the one raised by triggering cases.

6 Third scenario: ontic indeterminacy

I have indicated earlier that the analysis presented in Fig. 2 is one way to model metaphysical indeterminacy, which then directed us to our investigations of non-triggering cases’ black and grey areas respectively. Yet, there is also a second way of understanding metaphysical indeterminacy. This, in turn, gives rise to a third scenario that requires our attention.

To lead into this second way of modelling metaphysical indeterminacy, let us follow Kingston/Sinnott-Armstrong (2018: 176) in assuming that the harmful effect which a set or group of CO$_2$ molecules may cause does not just depend on the number of molecules emitted, but also on their arrangement:

When the molecules are arranged properly in the atmosphere, the group as a whole causes climate change..., but the same molecules would not cause climate change … if they were re-arranged into a thin sheet only one molecule thick far from the earth’s surface. In this case, any photon absorbed and re-emitted by a particular molecule would most likely be released at one of the many angles that would see it miss the earth, rather than back towards it as typically happens when the molecules are arranged thickly nearer the earth.

This, Kingston/Sinnott-Armstrong (2018: 175) explain further, suggests that the harmfulness of CO$_2$ molecules in relation to global warming is an ‘emergent’ rather than an ‘aggregative’ property. An aggregative property or effect is one which “is made up of effects of the parts, no matter how small the parts are” (Kingston & Sinnott-Armstrong, 2018: 175). For instance, if I mix 120 g of water with 80 g of juice, the mass of my resulting drink will amount to 200 g. Emergent properties, in turn, are those which emerge “out of parts that lack that property”, such that emergent “properties of the whole are not properties of the parts” (Kingston & Sinnott-Armstrong, 2018: 175). Kingston/Sinnott-Armstrong’s own example of an emergent property is the sliminess of oil. A single molecule of oil, they explain, is not slimy at all. Yet, if we look at an ounce of oil which is made up of numerous such molecules, this ounce of oil does possess the property of sliminess although its constituent parts do not. As such, sliminess is an emergent and not an aggregative property.
According to Kingston/Sinnott-Armstrong (2018: 175), the harmfulness of greenhouse gases is also emergent in this way:

Just as individual molecules of oil do not cause parts of sensations of sliminess..., so individual molecules of greenhouse gas do not cause parts of dangerous climate impacts. Instead, as with the sliminess and color of oil, what increases the dangerous impacts of climate change is larger groups of molecules of greenhouse gases, [where] the effects of these groups do not depend simply on the number of molecules, but also on their arrangement, structure, or organization.

Clearly, this analysis of greenhouse gases’ harmfulness amounts to a hypothesis, not a truism. Still, it appears sufficiently plausible to consider how it could affect our understanding of non-triggering cases, going beyond that of Fig. 2.

Let us stick, then, with Kingston/Sinnott-Armstrong’s picture of a layer or cloud of CO$_2$ molecules that results from our CO$_2$ emissions. To bracket complexities and make matters as clear and simple as possible, let us assume further that there is only one such cloud. How could metaphysical indeterminacy feature in this scenario?

On the one hand and in line with our understanding of non-triggering cases, it could be metaphysically indeterminate how many molecules this cloud must contain in order for the property of harmfulness to emerge. Yet, since this would merely be a variant of non-triggering cases’ black and grey areas that we investigated earlier, we need not consider such an interpretation here. On the other hand, metaphysical indeterminacy could be understood along the lines of ontic indeterminacy. More precisely, we could argue that the cloud itself is an ontically indeterminate object, such that there is simply no fact of the matter as to which molecules are part of it.

To elaborate, take a look at Fig. 3, which seeks to depict a cloud of CO$_2$ molecules which, let us assume, is determinately harmful:

In this scenario, it is not indeterminate how many grams of CO$_2$ have been released. Nor is it indeterminate whether or not the cloud that has formed as a result of these emissions is harmful—assume that it is. Rather, what is indeterminate is whether or not the molecules found in the shaded areas of Fig. 3 are part of the cloud.

This scenario confronts us with a new combination of elements that we have previously found in the black and grey areas of non-triggering cases respectively. As was the case in the black area, we now grant that is determinately true that this cloud causes harm. However, as was the case in the grey area, we are also confronted with decision-making under indeterminacy, as it is metaphysically indeterminate whether or not certain CO$_2$ molecules are part of this cloud and thus part of the cause of global warming. Moreover, bear in mind that we are following Kingston/Sinnott-Armstrong

![CO$_2$ cloud](image)
in assuming that as long as individual molecules are not part of this cloud, they are not harmful—only the cloud possesses the emergent property of harmfulness. Accordingly, even if we blank out cases in which we find indeterminacy about the existence of a collective harm, and even if we bracket concerns about the causal status of individual actions which can never be determinate difference-makers in non-triggering contexts, analysing non-triggering cases in terms of ontic indeterminacy impresses yet another moral challenge on us, namely:

**Challenge 5**: We must be able to show that individual agents have a reason to act in a specific way in view of a morally relevant aggregate effect \( E \), even though their actions make no difference to \( E \) and there is no fact of the matter as to whether or not their actions are partial causes of \( E \).

Challenge 5 refers us back to our discussion about decision-making under indeterminacy that we encountered in the previous section. It also re-directs us to our discussion about the link between causal and moral responsibility that we considered in relation to Challenge 3, given that Challenge 5 requires us to explain how the observation that it is indeterminate whether or not our actions are part of a collective harm’s cause impacts on moral responsibility and reasons that arise in relation to this harm.\(^{19}\)

However, we now face a further complication. For, even though it is metaphysically indeterminate whether or not the molecules located in the shaded areas belong to the cloud depicted in Fig. 3 above, it is not indeterminate that those in its centre are part of the cloud. Yet, at the moment of releasing \( \text{CO}_2 \) molecules, we do not know where these molecules will end up: Will they remain totally detached from the cloud, such that they have nothing to do with the cause of harmful global warming? Will they find themselves in the cloud’s centre, such that they determinately belong to the cause of this collective harm? Or will they end up in the shaded areas, such that there is no fact of the matter as to whether or not the molecules we release are part of the harmful cloud, and thus part of the cause of the collective harm? Given as much, we are now dealing with a situation in which decision-making under indeterminacy and decision-making under uncertainty combine, as is captured in Challenge 6:

**Challenge 6**: We must be able to show that individual agents have a reason to act in a specific way in view of a morally relevant aggregate effect \( E \), even though their actions make no difference to \( E \) and they are uncertain whether or not there is a fact of the matter as to whether or not their actions are partial causes of \( E \).

No doubt, Challenge 6 deals with a very particular case, presupposing very specific conditions. At the same time, these conditions do not appear too far-fetched when considering the most widely discussed phenomenon in the no-difference debate, namely harmful global warming. Hence, if Kingston/Sinnott-Armstrong’s under-

\(^{19}\) For further thoughts on the link between causal and moral indeterminacy, see Bernstein (2016).
standing of global warming is on the right track, Challenge 6 must be taken seriously. Once more, meeting this challenge will be a far from trivial undertaking.

7 Conclusions

We have seen that non-triggering cases do not pose one problem, but many. Additionally, I have argued that contrary to mainstream assumptions of the no-difference debate, these problems neither arise in triggering contexts, nor can be expected to receive the same solutions as those posed by triggering cases, unless very specific and, we might want to add, unlikely assumptions in neighbouring debates about causation and decision-making under indeterminacy hold. Hence, given the many vexed and still underexplored issues that non-triggering cases raise—about causation and metaphysical indeterminacy, causal and moral responsibility, decision-making under indeterminacy, as well as combinations of decision-making under indeterminacy and decision-making under uncertainty—those who defend their existence certainly have their work cut out for them. At the same time, I have made clear that this paper should be seen as an investigation of what would follow morally if there were non-triggering cases without being committed to their existence. In light of the challenges that have been explicated here, I hope that none exist.

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