Risks and Limited Aggregation

By Alec Walen*

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I. Introduction

Life is risky. Morality should give agents guidance when they are confronted with choices that involve imposing risks of harm on some to achieve benefits (often uncertain benefits) for others (even if they might be among the others). A peculiar feature of theoretical debate about how that guidance should work is that the participants seem generally to want to shoehorn all cases of risk into one of two models; it’s still one-size-fits-all. I argue here that that is a mistake. It takes both types, and a particular kind of hybrid, to handle all the cases.

The two basic models are the ex ante model and the ex post model. The ex ante model holds that claims not to suffer some harm, H, should be discounted to reflect the probability that each claimant will suffer H, where that probability is to be assessed from the point of view of the agent, A, given what she knows and can reasonably be expected to come to know by the time she should act.1 The ex post model is more complex. It breaks risk down into two parts: what is the probability that someone will suffer H, and how broadly distributed is that risk.

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across a group of people. The ex ante model rolls the uncertainty regarding whether anyone will suffer harm, and if so who, into one combined form of risk that each claimant faces. The ex post model says that if A is certain that someone will suffer H, then she should credit that person, whoever he turns out to be, with a full, non-discounted claim not to suffer H. In other words, the ex post model looks past risk regarding who will suffer H, and finds risk only to the extent that it is unclear if anyone will suffer H. In that regard, the ex post model borrows from the ex ante model: insofar as A is uncertain that anyone will suffer H, she should discount the claim not to suffer H to that degree.

I will argue here that for cases in which the choice to perform a risky action can be modeled on an act being done to and for the sake of one person, the ex ante model is appropriate. For cases in which the choice involves different groups of people, whose interests are known to conflict, the ex post model is appropriate. But when scaling up to consider social policy choices involving the second kind of case repeated on a regular basis, a kind of hybrid model should be used: ex post at the base, but ex ante on the whole.

To make sense of the last position, and many of the arguments that will occur throughout the paper, one needs to accept a position know as limited aggregation. Limited aggregation is the view that when one person has a claim not to suffer a grave harm, such as death, no number of claims not to suffer a much smaller harm, such as not getting a headache,

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3 A note regarding pronoun use: to avoid the awkward singular “they” and to ease the use of pronoun reference, I treat the generic agent as female, and the generic patient—a person affected by an agent’s choice—as male.
could morally outweigh it. These weaker claims are held not to be “relevant” to the stronger claim. Limited aggregation is an intermediate position between an extreme anti-aggregationist position, adopted by proponents of Scanlonian contractualism, according to which the number of claims never adds up to provide more moral weight than the strongest claim among them (though tie-breaking, when competing claims are otherwise balanced, is allowed), and unlimited aggregation as adopted by classical utilitarians. According to limited aggregation, if claims are close enough in strength, then they can be aggregated to produce a net stronger claim in favor of an agent performing a particular act, but if they are too disparate in strength, then no number of weaker claims can outweigh a stronger claim. To complete the example started above, while no number of claims to avoid a headache would morally outweigh a claim not to be allowed to die, a sufficient number of claims to be saved from quadriplegia would outweigh a claim not to be allowed to die.

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4 For a good list of limited aggregators, see Alex Voorhoeve, “How Should We Aggregate Competing Claims?” *Ethics* 125 (2014): 64-87, p. 65 n. 2. The list should be extended to include Voorhoeve himself.

5 The term “relevant” seems to have been coined by T.M. Scanlon, *What We Owe to Each Other* (Cambridge, Mass: Harvard University Press, 1998), p. 239. To be clear, the comparison is between competing patient-claims on an agent. An agent’s claim that she did not want to suffer a headache herself would be relevant to deciding whether to save a patient from death. It would presumably be outweighed, but if she might suffer a great number of headaches, that might be sufficient reason not to save the life of a stranger—it is another matter when dealing with people who have special claims on the agent.

6 See T.M. Scanlon, *What We Owe to Each Other*, pp. 229-41; Rahul Kumar, “Risking and Wronging,” *Philosophy and Public Affairs* 43 (2015): 27-51. Frick, in “Contractualism and Social Risk,” writes as though he takes the same position, but he insists in personal communication that it was solely for the purpose of testing the limits of Scanlonian contractualism and its commitment to weighing only individual complaints.
Limited aggregation is an intuitively attractive position, and I think it is true. It is not, however, without its problems. One question that immediately arises: in virtue of what would the gap between competing interests be so big that the smaller ones cease to be relevant? Another question: how should we handle the seeming intransitivities that arise? For example, suppose that the claims of 100 people suffering H2 outweigh the claim of one person suffering H1, and that the claims of 100 people suffering H3 outweigh the claim of one person suffering harm H2. It could be that H3 is irrelevant to H1, and thus that 10,000 claims not to suffer H3 would not outweigh one claim not to suffer H1. People take different positions regarding whether this is a problem. And Patrick Tomlin has raised a further problem by noting that the groups who an agent might have to choose between need not be homogenous; they might have a mix of people such that some have claims that are relevant to others in their group or competing groups, but not to others. He constructs cases that show that it is hard to make

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7 It is beyond the scope of this paper for me to argue against Scanlonian contractualism or consequentialism. I argue against both in *Defending Against Threats: A Case Study in Rights Theory* (Oxford University Press, forthcoming). My argument against Scanlonian contractualism is in Chapter 2, § 5.2.3, where I argue that Scanlon was mistaken to think that the separateness of persons is incompatible with aggregation. My argument against consequentialism is implicit in the scheme of rights I develop and defend, i.e. in the whole book.

8 Voorhoeve suggests a test that we can use to understand where to draw the line: if A would be required to take on harm H1 for the sake of others, to whom she owes no special duties, to prevent them from suffering H2, then H1 is not relevant to H2. “How Should We Aggregate Competing Claims?” p. 72. Victor Tadros, “Localised Restricted Aggregation,” (unpublished ms on file with author) convincingly argues that this test is unsound, and suggests instead that the location of the line is a “basic” moral fact.

sense of limited aggregation without running afoul of some other principles that seem true, such as that “merely adding a claim to a group of claims cannot lessen that group’s choiceworthiness, compared with a fixed alternative.” I will assume that all of these problems and concerns can be adequately addressed.

I will, however, address myself to one argument against limited aggregation. Joe Horton argues that both the ex ante and the ex post attempts to spell out claims not to be exposed to risk of harm fail when applied to contexts in which it would seem that limited aggregation should apply. He concludes that we should accept that claims in situations involving risk should be weighed according to the ex ante model, using unlimited aggregation. But his argument against using the ex ante model and limited aggregation uses cases that should be handled with the ex post model, and his argument against using the ex post model and limited aggregation uses cases that should be handled with the ex ante model. If we get clear about how to handle the different kinds of cases, his argument collapses.

I proceed as follows. First, I discuss Johann Frick’s argument that risky choices should be handled using an ex ante model. I argue that it works for some of the cases he discusses, those that can be modeled on single-person gambles. Second, I argue that Frick is mistaken to try to extend the ex ante model to cover cases that involve known competition between two

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groups—I will call these known conflict cases.\textsuperscript{12} Third, I argue in favor of the ex post model in known conflict cases. Finally, I argue for the return of the ex ante model in social policy choices.

II. Cases for Which an Ex Ante Approach to Risk Fits

Frick plausibly explains the difference between the following two cases by appeal to the fact that in the first, but not the second, we can model the choice for many on the choice for one:

\textit{Mass Vaccination (Unknown Victims):} One million young children are threatened by a terrible virus, which is certain to kill all of them if we do nothing. We must choose between mass producing one of two vaccines (capacity constraints prevent us from producing both):

- Vaccine 1 is certain to save every child’s life. However, the vaccine will not provide complete protection against the virus. If a child receives Vaccine 1, the virus is certain to paralyze one of the child’s legs, so that he or she will walk on crutches for the rest of his or her life.

- Vaccine 2 is risky. It gives every child a 999/1000 chance of surviving the virus completely unharmed. However, for every child there is a 1/1000 chance that Vaccine 2 will be completely ineffective and that the child will be killed by the virus. (Assume that the outcomes for different children are probabilistically independent.) Call the children who end up dying the \textit{luckless} children.\textsuperscript{13}

\textsuperscript{12} The argument should extend to cases involving competition between more than two groups.
\textsuperscript{13} “Contractualism and Social Risk,” pp. 181-182.
Contrast that case with:

*Mass Vaccination (Known Victims)*: The threat situation is as in Mass Vaccination (Unknown Victims) above. This time, we must choose between mass producing one of the following two vaccines:

- Vaccine 1, as above, is sure to save every child’s life, at the cost of paralyzing one of their legs.
- Vaccine 3 is sure to allow 999,000 children to survive the virus completely unharmed. However, because of a known particularity in their genotype, Vaccine 3 is certain to be completely ineffective for 1,000 identified children. These *doomed* children are sure be killed by the virus if we choose Vaccine 3.

We can model *Mass Vaccination (Unknown Victims)* on the decision of a single-person deciding what to do when faced with a risky choice. The model is a guardian for a child who faced the choice of (a) doing nothing and letting the child die, (b) giving the child Vaccine 1 so that he survives with one leg paralyzed for life, or (c) giving the child Vaccine 2 so that he has a 99.9% chance of surviving unharmed and a 0.1% chance of dying. Option (a) is clearly off the table. But a child’s guardian could reasonably choose the risky option (c): giving that child Vaccine 2. Indeed, it would arguably be overly risk averse to choose option (b): giving the child Vaccine 1. Given that all the children are in the same predicament, at least in terms of what anyone involved knows or could reasonably come to know, it would make sense for an agent charged with making the choice for the group of children to develop Vaccine 2. Even if the

\[\text{14 Id, p. 183.}\]
children and their guardians did not give their actual consent, she can operate as if they have done so, as a matter of hypothetical consent.\textsuperscript{15}

By contrast, in \textit{Mass Vaccination (Known Victims)} the children are not all in the same position. Rather, it is a known conflict case involving no risk at all. Almost all would rather have Vaccine 3, as it would cause them to recover fully from the infection, without paralysis. But 1,000 children would rather have Vaccine 1, as it would save their lives, even at the cost of having a paralyzed leg. Each child in the second group has a stronger claim than each child in the first group, because the claim not to be allowed to die is stronger than the claim not to be allowed to suffer paralysis of one leg. If we think that claims not to suffer paralysis of one leg are too weak to be relevant to claims not to be allowed to die (at least among children who would otherwise have a long life yet to lead), then we should choose to save the doomed children. This contrasts starkly with the outcome called for in \textit{Mass Vaccination (Unknown Victims)}.

Admittedly, many who accept the idea of limited aggregation would think that the claim not to suffer a paralyzed leg is close enough in strength to the claim not to suffer death to be relevant, thus licensing aggregation. And if one engages in aggregation in this case, it might seem that the doomed children should lose.\textsuperscript{16} But we can change the case to fix that problem. Imagine that the harm from Vaccine 1 is merely one year with a paralyzed leg, and then full

\textsuperscript{15} If it is a close case, then she might want to seek to determine whether most guardians would choose Vaccine 1 or Vaccine 2. I assume we can invoke hypothetical consent unproblematically in a case in which all or almost all guardians would choose one option over the other.

\textsuperscript{16} This issue does not arise for Frick, who assumes, at least for the sake of argument, that aggregation is always wrong, at least inside the contractualist normative space; though he embraces a pluralism that allows for non-contractualist, aggregationist, welfarist reasons to matter too. I explain why I reject this pluralist framework in section III.
recovery. It would be easier for one sympathetic with limited aggregation to believe that no number of claims not to suffer a year with a paralyzed leg would outweigh the claim of a child not to lose the rest of his life. Thus, with that option set, the only moral choice in Mass Vaccination (Known Victims) would be to Vaccine 1 (everyone lives and suffers a year with a paralyzed leg).

One might worry that the same outcome would be picked in Mass Vaccination (Unknown Victims). What reasonable guardian would accept a 1 in a 1,000 chance of a child dying to avoid one year with a paralyzed leg. But we can change the odds to make that choice more reasonable too. Suppose the chance of death for those who get Vaccine 1 is only 1 in 100,000. Then it might be reasonable to choose Vaccine 1 in Mass Vaccination (Unknown Victims). But given that limited aggregation applies, it would still be unreasonable to choose Vaccine 1 in Mass Vaccination (Known Victims).

One might also worry that I’ve not put my finger on what is doing the work in these cases. It might seem that a substantial part of what makes it plausible that we should choose Vaccine 2 in Mass Vaccination (Unknown Victims) is the assumption that the outcomes for different children are probabilistically independent. To test that, suppose we change the case so that the reason some children would die if Vaccine 2 were shipped out and delivered to the children is that 10 doses of Vaccine 2 got contaminated with something that neutralizes the effectiveness of the drug, and that, unfortunately, there is no time to screen for those doses; we must either deliver Vaccine 2 to the children, or deliver Vaccine 1 and leave them all suffering a year with paralysis of a leg. It might be tempting to say that this case is different, because we know that there will be 10 dead children if we deliver Vaccine 2, and the only
question is which 10 will it be. We do not know that 10 children will die if the risk to each is independent.

I think this considerations should, in fact, be given little to no weight. We can know with equal certainty that some children, approximately 10, will die even if the outcomes for each child are probabilistically independent. Of course, if the mutation that would make Vaccine 2 ineffective strikes randomly in 1 out of every 100,000 people in the population, there is some miniscule chance that none of the million children has it. But we can assume that there is an equally small chance that the impurity that got into 10 doses of Vaccine 2 in the other version of the case is inert. So from an ex ante, decision making point of view, the cases are equivalent except for one detail: there is a substantial chance that 9 or 11 (or even smaller or larger numbers of) children will die if Vaccine 2 is used if the problem is a random mutation. But it is hard to see how uncertainty on that point could be morally significant. What really seems to matter is that, whatever explains the risk of using Vaccine 2, it is shared, as far as anyone involved knows, among all the children. And a guardian would have equal reason to approve the use of Vaccine 2, no matter the source of the risk, no matter whether the fate of the children is interdependent or independent.\footnote{The fact that the children in Mass Vaccination (Unknown Victims) would all hypothetically consent also negates any worry about whether it is already determined, in some sense, who would die if Vaccine 2 is developed. This is a point that Frick defends at length in “Contractualism and Social Risk,” pp. 197-201.}
III. Cases for Which an Ex Ante Approach to Risk Does Not Fit

Frick takes himself to have given a general defense of the thought that we should approach the problem of moral choices under risk using the ex ante model. He acknowledges that when the cases involve known conflict “a different defense of ex ante contractualism” is required. But he does not offer an argument parallel to the one just given, that it makes sense for all involved to approve of the agent using the ex ante model. Instead, with regard to these cases, he relies on his arguments against the ex post model, and claims that the ex ante model, at least when properly supplemented by non-contractualist considerations, gives a good account of known conflict cases too.

In this section, I argue that Frick is mistaken to extend the ex ante model to known conflict cases. I first offer two cases that the ex ante model intuitively gets wrong. I then discuss the larger, moral theoretical problem that one has to take on if one approaches the shortcoming of the ex ante model, as applied to known conflict cases, by supplementing it, as Frick does, with a fundamentally consequentialist appeal to the overall welfare.

A. Cases that Come out Wrong Using the Ex Ante Model

Consider first a simple variation on a trolley switch case.

Trolley Roulette: Suppose that a trolley is heading down a hill, out of control, such that it will hit and kill A, but you could turn it onto a track where it will hit and kill someone else, B. Both A and B are innocent bystanders who have done nothing to waive or forfeit their claims not to be hit. But the identity of B is unknowable; he is one of 10 people

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who is each in a slot on a human-scaled roulette wheel spinning at the bottom of the side track. Your choice is: allow A to die, or turn the trolley not knowing which one of the 10 will be facing up the track if and when the trolley comes hurling down, i.e., not knowing which of the 10 will be B.

The standard assumption in trolley literature is that a person’s claim not to be killed is stronger than another’s claim to be saved, all else equal, and that you therefore may not turn a trolley onto one person merely to save one other person. Intuitively, being unsure which person on the roulette wheel would be the one to die if you turned the trolley makes no difference. It is just as clear that you may not turn the trolley, even though, ex ante, each person has only a 10% chance of being killed. Moreover, it does not seem to matter how many people there are. As long as each slot is filled with a person, you are still killing one person to save one person, and that seems wrong. This conflicts with the ex ante model, applied without aggregation, which implies that once each person’s ex ante claim is weaker than A’s claim to be saved by the same ratio as implied by the number of people in A’s position required to justify turning the trolley onto B—the traditional ratio is five to one—then you should be permitted to turn the trolley.

Joe Horton offered a similar objection to Frick’s view, using the following case:

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19 What if some of the slots are empty? Then it is uncertain that anyone will die. Their claims should be discounted to the extent such uncertainty applies.
Villain 1: A villain has kidnapped C1 and 1000 other children. He will either (1) break three of C1’s fingers or (2) randomly select one of the other children and break four of his fingers. You must choose which.20

Horton takes it “that you are morally required to choose (1).”21 I agree. But again, the ex ante view would suggest something different. The ex ante claims of the 1000, that push you not to pick option (2), are the rather weak claim not to be exposed to a 0.1% chance of having four fingers broken. If these claims were all aggregated, that might explain why you should choose option (1). But if limited aggregation is true, then if these claims are sufficiently weak, they would not be relevant to, and therefore not to aggregate against, the claim of C1 not to suffer three broken fingers. You should then choose option (2). And if the claims of the other children are strong enough to be relevant, then change the example; add more children until their claims are so weak that they would cease to be relevant. In the end, whether one rejects aggregation, or designs the case so that the principle of limited aggregation blocks aggregation, one cannot use the ex ante model and get the case right. Either way, you should choose option (2). But intuitively, no matter how many children there are, you know that one of them will suffer a worse harm than C1, and that seems to be the determinative fact; it is in virtue of that fact that you should choose option (1).22

20 I take this case from “Aggregation, Complaints, and Risk,” p. 59. I change the number from Villain 3 to Villain 1 because I do not need his prior cases. I also change the number of children the villain kidnaps to be less fantastical, as lowering the number might forestall objections about our ability to handle large numbers in our moral imagination.

21 Id.

22 For Horton, the ex post claim of the one who would suffer four broken fingers is not determinative; he thinks that what matters is the aggregation of all the other children’s ex ante claims not to have four fingers broken. Id, p. 80. But the example can be used by either ex post theorists or unlimited ex ante aggregationists.
B. Frick’s Response and the Reasons I Reject it

Frick acknowledges the moral significance of something beyond ex ante risks, namely a moral concern with overall well-being. He thinks this has to be balanced against a concern with “equity,” the term he uses to capture the significance of showing each person equal respect inside Scanlonian contractualism. He would try to explain away the problem in Villain 1 by saying that there is an equity based reason to choose option (2), while also admitting that there is a welfare-based reason to choose option (1). One problem with this answer, as Horton points out, is that if we change option (2) so that the villain will “randomly select one of the other children and break three (rather than four) of his fingers,” ... it seems “that you have equal moral reason to choose each option.” In other words, the equity dimension seems to carry no moral weight. And the same point is implied by my example of Trolley Roulette.

But I do not want to rest my objection to Frick simply on intuitions about such cases. I want to explain why I think Frick’s approach is deeply problematic. To do so, I will explain how Frick thinks the ex ante model can handle cases of known competition, why he thinks it is only part of the moral story about how to handle such cases, and why I think his appeal to pluralism, involving a combination of contractualism and consequentialism, is the wrong move to make.

Let us start with Frick’s example of a case in which different groups have competing interests:

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24 He has said this to me in personal communication.
25 “Aggregation, Complaints and Risk,” p. 60.
Miners (1 vs. 100): Gareth, a miner, is trapped in a collapsed shaft. If we do not save him, he is virtually certain to die within days. However, a rescue will be costly. Suppose we must choose between the following two options:

- **Rescue:** Spend all our available funds to rescue Gareth.
- **Prevention:** Spend our available funds [over the next year] to improve safety at this mine, reducing future accidents. If we choose this option, the risk of death for each of the other 100 people working at this mine of dying in a future accident will be reduced from 3 percent to 1 percent [for the year]. We expect that this will save two lives (though we cannot know whose). However, Gareth will die.26

Unlike Mass Vaccination (Unknown Victims), this is a known conflict, but unlike Mass Vaccination (Known Victims), it is a known conflict case involving risk. Given that it seems that we would save an extra life (net) if we choose Prevention over Rescue, the question is: Is there any reason to prefer Rescue? One might think so. As Frick points out, “[h]uman beings have a well-documented psychological propensity to consider rescuing identified individuals in imminent peril more important than preventing the loss of “statistical lives.”27 But is there a normative case to be made to support this propensity?28

Frick suggests that his use of the ex ante model provides that normative case. As Frick notes, “Gareth has a much stronger claim to our assistance than” any other miner.29 This is

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27 Id.
28 As Frick notes, “many philosophers economists, and lawyers have greeted this notion with skepticism.” Id. Count me among the skeptics.
29 Id, p. 215.
because each other miner starts with a much lower chance of death, and also because we can reduce each other miner’s chance of death by much less.\footnote{Id.} Clearly, if the choice were to save Gareth or take preventive action that would reduce the risk of death one other miner from 3% risk to 1%, we should choose to save Gareth. So the question is why it should be different with 100 miners competing against Gareth. If one rejects aggregation altogether, as a Scanlonian contractualist would, then it should make no difference how many other miners there are. And even if one allows limited aggregation, it is plausible that the claims of the other miners are not even relevant to Gareth’s claim. And if they are relevant, the case could again be changed by increasing the number of other miners and proportionally reducing the good done to each miner by adopting Prevention. For example, we could increase the number of miners by a factor of 10, and reduce the risk reduction achieved by Prevention to a 0.2% drop in the likelihood of death. By using this method we would eventually find a case in which, though we would expect to save two lives by adopting Prevention, we should choose to rescue Gareth instead. This much follows at least if we follow Frick in using the ex ante model, and embrace limited aggregation.

But what if we increase the number of other miners and do not decrease the good done by Prevention. Consider Miners (1 vs. 1000). In that variation, we can expect that 20 people will die over the relevant time period. Frick concedes that it would be “implausible” to take the Scanlonian framework he has been exploring to give us the all things considered conclusion that we should still rescue Gareth.\footnote{Id, p. 219.} Frick’s suggestion, on behalf of Scanlonian contractualism, is to
rein in its ambitions. He believes that “Scanlon ought to accept that ... reasonable rejectability in the contractualist sense is not the only relevant consideration in determining whether an action is right or wrong, all things considered.”

Rather, he suggests adopting a pluralistic framework, one in which Scanlonian contractualism is balanced against a fundamentally consequentialist concern with well-being. In that balance, the moral weight of preventing 20 deaths outweighs the moral weight of the fact that Gareth’s claim beats all the other individual claims.

My problem with this account is that complementing a contractualist concern with the strongest claim with a consequentialist concern with well-being gives rise to a fundamentally incoherent form of pluralism. In essence, it says: respect for the individual matters but so does an aggregative notion of welfare, and those two sorts of mattering simply have to be balanced off against each other. While many people think this sort of pluralism is inevitable in moral theory, I think it is to be avoided as fundamentally unprincipled, making the balancing act fundamentally morally opaque. We should try to formulate a coherent way of incorporating respect for both welfare and the individual, one that does not imply that insofar as we take aggregative welfare considerations into account we thereby offend against the dignity of the individual.

Elsewhere I detail how the normative space of rights can be understood to reflect a commitment to three fundamental moral principles:33

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32 Id, p. 220.
33 Defending Against Threats. I list these three principles in chapter 2, § 5.2.
1. The *Autonomy Principle*: we all have our own lives to lead; we are not to be treated as or directed by morality to think of ourselves as mere cogs in some larger scheme.

2. The *Equality Principle*: we are all fundamentally equal as members or “citizens” of the space of rights.

3. The *Welfare Principle*: our welfare matters and that value affects the rights we have.

In the conception of rights based on these principles, a concern with welfare supports limited aggregation,\(^{34}\) but a concern with autonomy protects the individual, and they are both protected in a single, coherent, normative space. Aggregation in the space of rights respects the rights of the individual; it does not come in from the outside as some sort of alien normative pressure that is inconsistent with the respect individuals are due.

This problem for Frick, I argue, is one prong of a trilemma that arises for those who embrace the sort of pluralism that Frick embraces.\(^{35}\) The pluralism I discuss in my book on rights is a similarly unprincipled attempt to balance respect for individual rights against a consequentialist concern with lesser-evil justifications that supposedly justifies permissibly “infringing” rights. I argue that one who embraces that sort of pluralism either has no satisfying account of why the balance is ever struck one way or another, or reduces all moral notions to the common coin of consequentialist value and then has to confront the “paradox of deontology,” or has to reject aggregation as Scanlon does, but then cannot account for many of

\(^{34}\) In the book, I note only in passing that the aggregation should be limited.

\(^{35}\) I present this trilemma in *Defending Against Threats*, chapter 3, § 5.2.
our strong moral convictions. I say that the way to avoid that trilemma is with principled, limited aggregation of claims within the space of rights.

This criticism of Frick’s pluralist answer to the problem raised by Miners (1 vs. 1000), leaves us with the choice to accept the ex ante model and bite the bullet on the fact that so many miners would die, or accept the ex post model for this case, and the other cases I’ve raised in this section. Clearly, the latter approach accords with our intuitions better. It straightforwardly explains why you should not turn the trolley if someone (even if you can’t know who) will die in Trolley Roulette; it explains why you should choose option 1 (the villain breaks three of C1’s fingers) in Villain 1; and it explains why you should engage in Prevention with the expectation of saving 2 or 20 miners in Miners (1 vs. 100) and Miners (1 vs. 1000), respectively.36 The question is: Is there some deep problem with the ex post model that should steer us away from it? I argue next that neither Frick nor anyone else has given us any reason to accept that such a problem exists.

IV. In Defense of the Ex Post Model in Known Conflict Cases

The argument in favor of using the ex post model for known conflict cases is two-fold. First, as just noted, it fits our intuitions regarding the known conflict cases we have just examined. Second, it reflects the basic moral idea that we should care about individuals who

36 Again, one might not think this is a virtue in Miners (1 vs 100). But nothing I say in this paper stands in the way of discounting the value of statistical lives, in known conflict cases where the mechanism putting people at risk applies to each independently of the others, as in the Miners cases. My point is only that some other reason for discounting those ex post claims needs to be given; Frick’s appeal to the ex ante model does not provide it.
will suffer harm to the extent that we are sure that such individuals exist.\textsuperscript{37} If we are uncertain that anyone will be harmed, then we should discount the concern with causing harm to that extent. But insofar as we are sure that someone (or more than one) will suffer harm, then not knowing who it will be is irrelevant. It is no different than not knowing their names. Knowing that they exist and will be harmed is reason enough to credit their claims not to be harmed.\textsuperscript{38}

One might worry that an unknown person who might suffer a harm is not like an unnamed person; one might think that all we can have in mind is a sort of abstract or fictional stand-in for a real person. And one might then say that abstract people have no claims. Michael Otsuka helpfully raises and responds to this worry.\textsuperscript{39} His response is that the unknown person is not fictional or abstract; he is simply unknown. “[T]he indeterminacy of the person is simply the lack of determinacy as to which of the [scenarios that might lead to harm plays out and leads to harm to] an actual flesh-and-blood [person] with a particular Social Security number, a specific, fully filled-in life history, and so on.”\textsuperscript{40}

The basic appeal of the ex post model, therefore, seems clear. I turn now to two sets of arguments against it. The first are raised by Frick, the second by Horton.

\textsuperscript{37} I remain agnostic about what to say about the non-identity problem: the problem of making sense of the claims not to be harmed of those who do not yet exist, when the choice made at one time will affect who comes into existence at another time.  
\textsuperscript{38} This is similar to the argument given by Sophia Reibetanz Moreau, “Contractualism and Aggregation,” \textit{Ethics} 108 (1998): 296-311, p. 304 (she went by Reibetanz at the time this article was published).  
\textsuperscript{39} “Risking Life and Limb,” pp. 84-86.  
\textsuperscript{40} Id, p. 86. Horton finds this answer obscure. “Aggregation, Complaints, and Risk, p. 65. It seems straightforward to me.
A. Rejecting Frick’s Reasons to Reject the Ex Post Model

Frick offers four reasons to think that ex post theorists about risk are mistaken. The first is the argument from the single-person case. Frick suggests that the significance of the single-person gamble is lost by those who focus on the fact that someone is statistically certain to lose in the end. This is a fair complaint if one thinks that all cases of moral choice in the face of risk have to use the same model. But if one thinks that cases like Mass Vaccination (Unknown Victims), cases that can be modeled on single-person gambles, should use the ex ante model, and that cases that involve known conflict should use the ex post model, then this argument gets no grip.

Second, he claims that ex post theorists would say that we show an inappropriate lack of concern with the eventual losers if we focus only on the ex ante risks. Frick responds that this “expresses a preoccupation with the overall shape of the outcome...” and adds that “contractualism's exclusive focus on personal reasons does not allow us to appeal to such impersonal principles.” But again, he is arguing with Mass Vaccination (Unknown Victims) as his reference point. He thinks that the individual focus of the reasonable gamble is all that matters, which is correct in that case but not in known conflict cases. Moreover, in the latter cases we don’t have to be particularly committed to aggregation to see the problem with the ex ante model—consider again Trolley Roulette. Not that there is any problem with limited

42 Frick speculates that ex post theorists might be “suspiciously” appealing to “a new form of interpersonal aggregation: the combination of complaints by different individuals at different possible worlds, depending on who happens to be unlucky at that possible world.” Id, p. 196. I see no reason to accept this.
43 Id. p. 197.
aggregation, and not that Frick, given his ultimate pluralism, can claim to be avoiding an appeal to “the overall shape of the outcome.”

Third, he engages with the challenge that ex ante odds are, if determinism is true, merely epistemic. The challenge is based on the thought that it is already an established fact who the losers will be, so we should assume that they have the same sort of claims that they would have if all we did not know is their names. His response again appeals to single-person gambles, arguing that one should not care whether the gamble is objectively or merely epistemically chancy. I agree; the agent should use the best information she has at the time, and that will leave her taking a gamble. But the argument for the ex post model is not that the facts are already determined. Indeed, as I introduced the model, it allows for an ex ante dimension, discounting the claim of whoever is going to suffer harm by the uncertainty that anyone will. So this argument fails because all it does is reject an argument the ex post theorist should not rely on.

Fourth, and most significantly, Frick appeals to the value of equity or fairness to capture what is morally important about the ex ante framework. This at least arguably applies even in known conflict cases like Trolley Roulette and Villain 1. It is the basis for his position that even in those cases the ex ante model should have some weight. To see how this value is supposed to work, consider Villain 1. If you choose option (1), you concentrate 100% certainty of suffering three broken fingers on C1, while all the other children have no chance of any harm at V’s hands; but if you choose option (2), you disperse the risk widely so that all 1000 have only a

\[44\] Id. pp. 197-200.

\[45\] Id. p. 221.
0.1% chance of suffering four broken fingers, while C1 has no chance of any harm at V’s hands. The dispersion of risk brings the ex ante odds closer to equal, and thus is, to that extent, fairer. That seems to weigh in favor of option (2).

But this is a misguided appeal to fairness. The problem is, as John Broome points out, that lotteries have a very limited role in normative theory. They should be used to decide between people who “have roughly equal claims to [a] good [or harm] that is to be distributed.”⁴⁶ They are not to be used as a way of establishing equality in claims when claims are not already equal. Broome’s discussion of an example inspired by John Taurek illustrates the point well:

A volcanic island is about to explode. People are waiting to be rescued, some at the North end and some at the South. There are more of them at the North. You have the only boat near enough to help but your boat is too small to pick up even everybody at the South. You are now at sea approaching the island. You have to decide whether to go to the North or the South. When you arrive at either end time will be so short that the people you rescue will have to be selected by lot. Everyone, assume, as an equal claim to be rescued. ... Is there any moral merit in going to the North?⁴⁷

If there were something in Frick’s equity argument in favor of running a lottery in Villain 1, there would be a reason to go to the North. After all, by doing so, you would come closer to giving all parties an equal chance of being rescued. The odds of rescue in the North, having a larger population, would be closer to 0, which is the odds in the South if you go to the North.

⁴⁷ Id. p. 630.
The odds of rescue in the South, if you went to the South, would be closer 1, thus creating more disparity in the odds. But as Broome says: “I cannot persuade myself that it makes any moral difference which end you go to.” Me neither.

B. Rejecting Horton’s Argument Against the Ex Post Model

Horton offers a very different argument against the ex post model. And his argument has a different significance. He uses cases like Villain 1 to argue against the ex ante model combined with limited aggregation. He uses his argument against the ex post model and limited aggregation to rule out the ex post account of Villain 1. This leaves, he thinks, only one option: the ex ante model using unlimited aggregation. I argue here that his argument fails because it illicitly uses the wrong model for the case he introduces to make the argument.

Horton presses his argument against ex post reasoning by way of considering another Villain case:

Villain 2: A villain has kidnapped one billion children. For each child, the villain will either (1) cut off one of this child’s hands or (2) give this child a ticket for a lottery with one billion unique tickets. You must choose between these options for each child in turn. You know that, after you have chosen for all of the children, the villain will randomly select one of the billion lottery tickets and then kill any child who has the corresponding ticket.

Horton claims

48 Id.
49 “Aggregation, Complaints, and Risk,” p. 69. For Horton, this was Villain 8.
1. That, “[f]or each child it is certain that choosing (1) will generate an ex post complaint based on losing a hand.”

2. That, for each child, “there is a one-in-a-billion chance that choosing (2) will generate an ex post complaint based on death.”

3. That if the two previous claims are true, then, on the ex post approach to risk, you must choose that the villain impose on each child the one-in-a-billion chance of dying. This is because the risk of dying is so small that it should be preferred to certainly losing a hand.

This leads him to conclude

4. That the ex post position is that you must choose option (2).

The problem, he claims, is that this conflicts with the fact that, on the ex post view, if the choice in Villain 3 were to be made once, and for all, then it is at least plausible that the right choice would be option (1), the option in which the villain cuts one hand off of each of the billion children. The reason is that the ex post claim not to die is substantially stronger than the claim not to lose a hand, and if aggregation is impermissible when the gap in harm is that large, then the stronger ex post claim beats the billion claims not to lose a hand. This conflict shows, he thinks, that the ex post, limited aggregation approach to risk “violates the following principle of consistency: if a moral view condemns act X, it should condemn any series of acts that is in all morally relevant respects equivalent to X.”

50 Id.
51 Id.
52 Id, p. 70. Tadros, “Localised Restricted Aggregation,” offers a set of abstract reasons why Horton’s principle of consistency is not as compelling as he thinks. I offer a more specific, concrete reason to reject his argument.
The problem with Horton’s argument is that he fails to notice that he has switched into the realm of cases that should be modeled on single-person gambles, and that the ex post model should not apply there. In Villain 2, whether you must choose for each child in turn or for all children at once, you are facing a group of people who all share the same interest at the time of your choice: they would rather keep their hand and run a 1 in a billion choice of dying than lose their hand and avoid a 1 in a billion chance of dying. In the end, if you choose to have a billion lottery tickets given out, one person will die. But this is not a known conflict case. Given that they all share the same concern, it is like Mass Vaccination (Unknown Victims). You should choose what to do, when choosing once and for all, by using the ex ante model. Thus, Horton has given us no argument to reject the ex post model in general. He has given us an argument to reject it only in cases that can be modeled on a single-person gamble. But we knew that.

V. Two Scales of Risk, and the Return of the Ex Ante Model

Horton raised an interesting problem with Villain 2: What difference might be made by taking the same choice and repeating it over and over? I argued that in Villain 2 no difference results. The same should be true of the Miners cases. If every mining company were to face a choice like Miners (1 vs 100) or Miners (1 vs 1000) or some variation on that theme, and were to decide what to do using the ex post model that I recommended, no problem would result. The social impact of repeating that choice would be just what we want: we would rescue people when appropriate, and prevent future deaths when appropriate. But there are other cases in which things seem to take a different turn, and it might look like the implication is
radical: that much of what is done in modern societies for the convenience of its members is morally indefensible.

Consider convenience driving.\textsuperscript{53} Most of us think that driving for convenience, including driving to make it more convenient to enjoy some recreational activities like seeing a movie or going out to dinner, is permissible, as long as one drives with sufficient care. We think that because the odds of harming another if one drives carefully are very small. This isn’t merely a point about mutual imposition of risk. Careful convenience-driving is permissible even when it imposes risks on people who do not drive. Nor is it a point about the necessity of driving, in many locations, to keep the economy working well for the benefit of all. I am talking about driving for \textit{mere} convenience. With regard to that sort of driving, we, as a society, have to make a choice: Do we ban and thereby seek to deprive drivers of certain meaningful experiences that are available at reasonable cost to them only if they drive, or do we allow them to impose very small risks of serious harms on others?

To be fair, the idea of “mere” convenience driving is not straightforward. Banning convenience driving could have an impact on the economy as well as on the enjoyment of individual lives. Driving to restaurants, theatres, parks and friend’s houses has collateral benefits: employment for restaurant and cinema workers, the physical wellbeing of people who

\textsuperscript{53} Scanlon discusses a similar example, construction work on transmission lines for electrical power. But that example has too many confounding features to be a good case study. We have to worry that not providing electrical power will cost lives as productive industry will be hampered and life-saving technologies could not be deployed. In addition, workers are not conscripted into dangerous work like that—not in advanced democracies, at any rate. They volunteer for that work, which might be taken to waive their claim not to be seriously injured. They would still have a claim not to be put at unnecessary risk, but that too would be a complicated matter, to be sorted out by paying attention to the costs and benefits of requiring different levels of worker safety.
drive to gyms and parks; the psychological wellbeing of people who might slip into depression, even suicidal depression, if they are forced to be more socially isolated; the political health of society as social networks are built and reinforced. On the other hand, if convenience driving were banned, more people might move into denser neighborhoods, where public transportation is a more viable option, and that might improve social connectedness, access to parks, etc. I will assume, for the sake of the argument that follows that the ban would be tolerable overall, that it would reshape society in some ways, that it would frustrate the desires of car owners (some of whom would cheat and engage in convenience driving anyway), and that, most importantly, it would make the world safer by cutting down the number of fatalities caused by convenience drivers.

My claim is that if the risk to bystanders is small enough, it is reasonable that their claims not to be exposed to the risk of being hit by a car driven by a convenience driver should lose out to the claims of convenience-drivers. But this is puzzling, because convenience driving is a case of known conflict: the claim of the driver to enjoy the fruits of convenience driving versus the ex post claims of the pedestrians, cyclists, those sitting at outdoor cafes, and all others who die from convenience driving. Given that people do actually die from convenience driving, and that the claims to engage in convenience driving are very weak compared to the claim not to die, limited aggregation and the ex post model seem to imply that convenience driving should be banned.
It is possible to ground this claim in real data. In 2015, over 5000 pedestrians were killed by drivers in the United States alone.\textsuperscript{54} We can assume that that is a representative year. We can also conservatively assume that the vast majority of those deaths were caused by non-convenience drivers. Still, if we assume that only about 10\% were caused by convenience drivers, that means that about 500 pedestrians can expect to be killed each year by convenience drivers. Let us assume that the vast majority of those victims engage in convenience driving themselves, and thus have no standing to complain if accidentally killed by a careful convenience driver. If we assume that 10\% do not engage in convenience driving (or perhaps do so occasionally, but much less than average, then we are still left with about 50 deaths imposed by convenience drivers on people who do not impose similar risks on anyone else. Suppose we assume again that the vast majority of those deaths result from people who are not driving as carefully as they should. Even if only 10\% result from careful convenience driving, we are still left with approximately five deaths imposed by careful convenience drivers on people who do not impose similar risks on anyone else. Moreover, we should not let the numbers go that low. It is an inevitable result of permitting convenience driving that many people will do it without sufficient care, thus a result of permitting careful convenience driving is that there will be deaths from insufficiently careful convenience drivers. Let us assume that a campaign to educate drivers about the risks could have only marginal impact on the reckless drivers out there, so let us take the number back up to, 40. Now suppose I’m off by an order of magnitude. We should still expect at least four deaths of pedestrians to result every year, in the

\textsuperscript{54} In 2015, 5,376 pedestrians were killed in traffic accidents in the United States. See https://www.cdc.gov/motorvehiclesafety/pedestrian_safety/index.html.
United States, if we continue to permit convenience driving. Thus, we must count at least a few ex post claims not to be killed, each year, as sitting in the balance against the claims of mere convenience drivers.

Again, if that is right, and the ex post model is the right model to use, then it seems that we must ban convenience driving. For the claims of convenience drivers are surely not relevant to the claims of pedestrians not to be killed. Even if we add up all the losses entailed by not being allowed to engage in convenience driving over a lifetime, noting the significant impoverishment it would impose on the quality of life enjoyed by many people who live far from good public transportation, their claims to be entitled to engage in convenience driving should still fall short of being relevant to the ex post claims of at least a few pedestrians who we should expect to die every year from convenience driving.

But I think the conclusion that we should ban convenience driving is mistaken. The mistake was thinking that we should use the ex post model when we scale up to setting social policy. The right way to proceed when thinking about social policy is by iterating on the claim that a choice to impose risks on some is justified by the claim of someone else to a benefit. As long as nothing changes in the proportion of benefit to risk when moving to the social scale, then the social policy should embrace the iteration of the choice. This is what seemed obviously right in the Miners cases, and I think it is right with regard to convenience driving as well.

This raises the question, what is the relevant small unit of choice for iterating? Is it each second in which one continues to drive and impose risks on others? Is it each occasion of convenience driving? Is it a person’s freedom to choose to engage in a lifetime of convenience driving? Or is it something in between, like the annual risk imposed on others by engaging in
convenience driving? I can see reasons in favor of at least the per instance of convenience 
driving and the lifetime option of convenience driving, so let us look at both of those.

Start with a single instance of convenience driving. We need to know what the ex post 
risk is for that. That is, supposing that someone has a claim not to killed, how much should it be 
discounted by the risk involved. To come up with a rough answer, I will make some ball-park 
plausible assumptions, to carry forward the ballpark calculation from above. Again, I will use 
conservative numbers, that make the case for convenience driving as difficult as it is reasonable 
to make it. So, let us assume that the average driver engages in convenience driving 200 times 
per year—based on 100 round trips. And let us assume that in the United States there are 200 
million people who engage in convenience driving—I count the passengers as their interests 
often are decisive in choosing to take the trip. That means that the total number of 
convenience driving trips per year in the United States is something like 40 billion. And let us 
assume that 10 deaths to pedestrians who themselves do not engage in convenience driving 
result from of those trips. The odds of killing a pedestrian who does not engage in similar 
threatening behavior is then 1 in 4 billion per trip. In other words, we should discount the ex 
post claim not to be killed by a factor of about 4 billion, and then weigh that against the driver’s 
(and her passenger’s) claim to be free to engage in that instance of convenience driving. When 
put that way, it is plausible enough that the driver should be permitted to take the trip. The 
claim not to be killed is much greater than the claim to be free to enjoy something like a movie. 
But 4 billion times greater?

How are we to think about that tradeoff? I think most of us would be willing to take a 1 
in a billion risk of accidental death to enjoy a good night out. We do that sort of thing all the
time. Of course, that is a matter of imposing risks on ourselves. We cannot justifiably impose similar risk on others for our own sake. But at the same time, if the question is, what is it permissible to do to others for the sake of some, when those others are not being used as a means, but simply seek to exercise a veto based on their interest in not getting harmed, the multiplier does not seem to be that great. Here I come back to trolleys. As noted above, the standard assumption is that it is not permissible to kill one as a side effect of saving one. But the original trolley problem was framed with a ratio of five to one because that seems intuitively sufficient to justify turning a trolley away from some even knowing it will cause harm to another. There is no science to this, only a more or less shared judgment about this kind of tradeoff. But I suggest that is fundamentally the same sort of tradeoff we make when considering odds. We should then discount the claim of the agent who seeks to do something for her own interest by a factor of five against the claims of others who seek not to be harmed for her interest. If the odds of killing a non-convenience driving pedestrian are 4 billion to 1, and we discount that by a factor of five, then we get odds of 800 million to 1. Again, I think most of us would choose to accept such risk for the sake of a good night out. Indeed, I think a “reasonable person” would accept such risk for the sake of a good night out. Since we are considering whether to accord the ex post claim not to be killed sufficient weight to block the claim to be free to engage in convenience driving, the “reasonable person” standard is the right one. We want an objective weighing of the claims, not a weighing as would be done by someone who is either excessively risk averse or excessive risk inclined. Thus, the ex post claim of non-convenience driving pedestrians not to be killed should lose to the driver’s claim to enjoy careful convenience driving.
Suppose we switch now to the option to engage in a lifetime of convenience driving as the relevant baseline. How many trips would that be? If we suppose that passenger interest counts like driver interest, and we give people 80 years of being a driver or passenger, and 200 trips per year, we have to increase the odds of causing death to a non-convenience driving pedestrian by a factor of 16 thousand. That gives us an ex post claim not to be killed of reduced by a factor of 50,000. So again, we should ask the question: Would a reasonable person accept a 1 in 50,000 chance of dying to engage in a lifetime of opportunities to enjoy the benefits of convenience driving? And again, I think the answer would be yes.

In other words, however we frame the basic choice that justifies imposing risk on non-convenience driving pedestrians—whether as the option to engage in a particular instance of convenience driving, or the freedom to engage in a lifetime of convenience driving—the act of careful convenience driving seems justified, despite the ex post risk of killing non-convenience driving pedestrians.

The problem arises only when we start multiplying the risk by the 200 million drivers and passengers. But continuing to use the ex post model there is unwarranted. Now we are combining the interests of multiple people in having some good, and combining the risks that harm will result. Obviously, the risks will grow and grow, until the ex post likelihood of serious harm or death becomes great. And obviously, if the interest each person has in having some good is small enough, then limited aggregation will imply that it will not aggregate, unlike the risk. But that is an artificial result. The fundamental unit of justification for imposing a risk on others has to be the interest of a particular person. If the act of risk imposition is justified, given the ex post claims of others, discounted to reflect the likelihood of harm, then iterating on that
choice should continue to be justified unless some new, emergent social problem arises. Just as iterating on the choice of saving miners should be the basis for social policy on saving miners, so iterating on the choice to allow individuals to engage in convenience driving, should be the basis for social policy on convenience driving.

I should expand briefly on the notion of an emergent social problem. It could be that small risks that rarely lead to harms have a much different impact on culture or politics than small risks that occur much more often and lead more often to harms. The latter could give rise to feelings of insecurity or resentment, for example. And regardless of whether those feelings are morally warranted, they have to be taken into account. But assuming no such emergent social problem arises, iteration on justified acts should be permissible.

Note what this means at the social policy level. In a sense, we come back to using the ex ante model. For the purposes of a legislator thinking about what risks are socially acceptable, the question must be answered in two stages. In stage one, she should ask, for known conflict cases, whether the interests of individuals served by a certain policy justify the ex post risks that allowing an individual the benefit of that policy would entail. But then, when counting up the social costs of the policy, she should treat those risks not like the ex post risks for all individuals in the society. Rather, she should treat them like the ex ante risks of individuals in the society. That is, she should ask: What ex ante risk must each individual accept in order for each individual to have the benefit of that social policy? In the end, social policy choices can be modeled—as Frick said they could, though for reasons he did not articulate—on the choices of individuals facing single-person gambles. The main difference is that in known conflict cases, we must discount the claims of agents to be free, as opposed to the claims of patients not to be
harmed, to reflect the greater strength of claims not to be harmed over claims to enjoy a benefit.\(^5^5\)

**Conclusion**

Discussions of risk have assumed that risk must be modeled the same in all cases. This is a mistake. Cases that can be modeled on single-person gambles should be assessed using the ex ante model of risk. Cases that involve known conflicts between individuals should be assessed using the ex post model of risk—a model that discounts the claim not to be harmed, of whoever might be harmed, by the probability that no one will be harmed. But social risk, as relevant to policy-makers, should return to the ex ante model. We are all in society together, and the ultimate question for the policy maker is: What sorts of acts, with their attendant ex post risks, may be performed? Whether the basic unit is individual acts, or acts performed by individuals over time, the question comes out in the end: What ex ante risks can each of us be expected to accept for the sake of the benefits that each of us can be expected to want?

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\(^{55}\) I gloss over, here, two meanings of the word benefit. One simply means the avoidance of a harm; the other means something like gaining a good above a certain threshold. We don't give the second kind of benefit the same weight as the first. See Seana Shiffrin, “Harm and Its Moral Significance,” *Legal Theory* 18 (2012): 357-398. The complicates the discussion of convenience driving, as that is presumably a benefit in this second, weaker, sense. But I don’t think it changes the overall shape of the argument.