We live in a world of risk. Most of the time, the risky decisions we make are inconsequential. Should you take an umbrella today? Should you try the new thing, or go with the old favorite? But risk pervades the most important decisions we ever have to face. A pilot has to decide whether to bomb a target, without being completely certain whether the people in it are combatants or by-standers. A jury has to decide whether to convict without being completely certain whether the defendant is innocent. Consequentialists have a working theory of decision-making under conditions of risk; they can use the standard expected value theory to determine when one action is better than another. Frank Jackson and Michael Smith, “Absolutist Moral Theories and Uncertainty,” *Journal of Philosophy* 103/6 (2006), Michael Huemer, “Lexical Priority and the Problem of Risk,” *Pacific Philosophical Quarterly* 91/3 (2010), and Yoaav Isaacs, “Duty and Knowledge,” *Philosophical Perspectives* 28 (2014) have argued that consequentialists have a monopoly on the standard theory. But this appearance is illusory: even those non-consequentialists who believe in absolute prohibitions can make use of expected value for risky decisions.

The view I develop in this paper is simple. Suppose that some actions are absolutely prohibited, so that it is forbidden to perform them no matter what good may come of it. The pilot’s killing a non-combatant or the jury’s convicting an innocent are plausible examples of actions that are absolutely prohibited. My view says that, up to a point, agents are allowed (and sometimes required) to risk violating an absolute prohibition. For example, if it’s 95% likely that no innocents would be killed by bombing, the pilot may be required to do so. This can hold even though the pilot would be forbidden from bombing if it were only 94% likely that no innocents would be killed, regardless of any other considerations.

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Problems with decision-making under risk have been pressed against some consequentialists as well. Suppose that you accept a view on which some pleasures, for instance, are lexically better or worse than others, so that any amount of a lexically preferred pleasure is better than any amount of a lexically dispreferred pleasure. To illustrate, we’ll assume that art appreciation is lexically better than sunbathing: the smallest amount of pleasure from art appreciation is better than any amount of sunbathing-related pleasure. You now face a decision of how to donate some money. You could give all the money to charity A, which is sure to bring some large amount of sunbathing pleasure. Or you could give it all to charity B, which will start an outreach program that may or may not get people to appreciate art. How likely does the success of B’s program have to be before it becomes right to donate to them? When should you forgo a certain lower pleasure to risk obtaining a higher pleasure? This question is closely related to the one for absolutists, and the problems they face in answering it are quite similar. For reasons discussed below, I will not try to handle views that incorporate lexical value, though hopefully my theory can be helpful to them.

§1 sets up the issue. There, we precisify the goals of the investigation, and provide a basic framework for the theory. Having done that, in §2 we discuss the more substantive desideratum we want out of a theory of decision-making under risk. §3 shows when the desiderata can be met, and how to meet them. This should be seen as the first part of a two-pronged defense of absolutism under conditions of risk. By showing how to give a theory of risk that fits with the standard tools of decision theory, I want to assuage worries that absolutists cannot do so, or that they cannot do so in a principled way. Finally, in §4 I defend absolute prohibitions from recent attacks. This is the second prong of my defense of absolutism under risk. Although many of my arguments in §4 don’t rely on the theory I propose in §3, the theory gives us a concrete way to state and respond to the objections.

1. Expected Value for Deontologists?
My theory is at its heart a version of expected value theory for non-consequentialists. So I have to justify my use of expected value to handle absolute prohibitions. That will come, but there are some other things to clear up beforehand.

First, what is a theory of decision-making under risk a theory of? I will take the popular, though controversial, line that theorists are offering a theory of the subjective ought. Suppose that you can choose whether to bet on a fair coin where you’ll win $5 if it lands heads, and lose $1 otherwise. There is a sense of “ought” on which you ought to take the bet just in case the coin will land heads. If it does, you’ll get $5, and you ought to do that. If it doesn’t, you’ll lose $1, and you shouldn’t do that. This is often called the objective ought. But there is another sense in which you should take the bet: given your ignorance of how the coin will land, the possible reward outweighs the risk, so that the bet is a good one on balance. This sense of “ought”, which depends on the information you have, is the subjective ought.

So I am trying to offer a theory of the subjective ought for absolutists. Returning to our pilot example, suppose that the pilot’s information makes it 99% likely that the people at the target are combatants. But the pilot’s evidence is misleading — they are in fact innocent. In this case, I would say that bombing the target is objectively wrong, even though it is subjectively right. Not much hangs on the commitment to the objective/subjective ought distinction; for our purposes, it lets us make our goals clear. If you reject the objective/subjective distinction for oughts, you can translate what I have to say into your favorite language.

The objective/subjective distinction helps to clarify another goal. You might think that the subjective ought is “subjectivized” by the agent’s information and their substantive normative commitments. If so, a person acting under full non-normative information can do what

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2. See fn. 19.

3. This is in line with the literature. See Jackson and Smith, op. cit., 269–270 and Huemer, op. cit., 334–335.
they subjectively ought to do while doing what they objectively ought not to do. This could happen if they are committed to a false moral theory. On the other hand, you could think the subjective ought only depends on the agent’s non-normative judgments, so that agent does what is subjectively wrong. My theory is neutral between these two interpretations, but the availability of each is important. Even if you reject absolute prohibitions, there’s a question of what a rational person who is committed to them will do. My theory places constraints on that.4

At this point, we can explain the role that expected value plays in my theory. As I see it, expected value is one way of getting a subjective ought out of an (alleged) objective ought. It isn’t problem-free:5 expected value may not give good verdicts in cases where agents are (i) risk-sensitive Lara Buchak, Risk and Rationality (Oxford University Press, 2014) (ii) deciding under uncertainty rather than risk;6 or (iii) in any of the other problem cases for the theory.7 Moreover, expected value may be psychologically unrealistic in a way that undermines its normative import Christopher Meacham and Jonathan Weisberg, “Representation Theorems and the Foundations of Decision Theory,” Australasian Journal of Philosophy 89/4 (2011). If we decide that expected value is not the best theory of decision-making when agents act from ignorance, we would have to check that a theory like mine would work for the best theory. Additionally, the framework I use is based on von

5. Thanks to Will Fleisher and Holly Smith for pressing me to expand on this point.
7. Here I have in mind the problems that expected value has with “infinitistic” decisions, like the St. Petersburg game or throwing darts at the real line.

8. To jump ahead, this is roughly the assumption that my decision about whether to shoot the skier is causally and evidentially independent of the skier’s innocence.
deontic values.\textsuperscript{11}

Now, my goal is not to assign a very large (or infinite) negative weight to killing an innocent person and calling it a day. I will show how substantive claims about risky actions allow us to derive a system of deontic values for risky actions from one for non-risky actions. But adopting this conception of deontic value does constrain the theory in certain ways. Though it allows for agent-relative reasons or duties, it is not apparent how to incorporate genuine moral dilemmas or supererogation. Admittedly, this is a cost to the theory. In my defense, there is no agreed-upon method of handling dilemmas and supererogation in the non-risky case.\textsuperscript{12} This is a refrain I will sing time and again. I consider it a success if I can show that there is no problem for absolute prohibitions under risk beyond the problems for absolute prohibitions under certainty. The arguments that I address try to present a problem for absolutism on grounds of its treatment of risk specifically.\textsuperscript{13}

Finally, my goal is to give a sensible theory of when an agent subjectively ought to perform an action or not. I am less concerned with explanatory considerations. Generally, I will move from a claim about the permissibility of one action to a claim about the deontic value of another action to a claim about the permissibility of a large class of actions. This may not properly reflect the order of explanation, but all I need are the relevant biconditionals (e.g., an action has more deontic value than another iff the first is preferable to the second). I won’t try to address explanatory concerns, but that doesn’t mean they’re irrelevant. The theory leaves many gaps for substantive ethical inquiry to fill, and for all I say, explanatory considerations can play a role there.\textsuperscript{14} This is consonant with the existing literature, which primarily challenges absolutists to give a sensible extension for the property “S ought to ___” (or cognate properties).

The point of all this is not an idle exercise in formalization. Absolutists shouldn’t want to use expected value just so they can sit at the cool kids’ table. Expected value theory lets us make the predictions of an absolutist theory precise: if it’s right to φ rather than ψ, that puts constraints on when it is permissible to χ. We can also use the theorems of expected value theory to solve other problems for non-consequentialism. For example, Holly Smith, “The Subjective Moral Duty to Inform Oneself Before Acting,” Ethics 125/1 (2014) challenges non-consequentialists to account for the duty we have to inform ourselves before acting. Without getting into the details, we know ahead of time this won’t be a problem for agents who are representable as expected value maximizers. Good’s theorem guarantees that such agents always seek out reliable, cost-free information.

Even if you are not an absolutist, it is worthwhile to get clear on why absolutism is false. If, as I argue, there are no special problems for absolute prohibitions under risk, then the reason to reject absolutism must come from the non-risky part of the theory. To the extent that a person is willing to live with the unintuitive results of absolute prohibitions under certainty, they should feel comfortable with them under conditions of risk.

2. Desiderata

In this section, we’ll build our formal framework, which will then be used to construct an expected value representation of the theory of absolute prohibition under risk. With this framework in place, we can state the desiderata for our theory.

It will help to have a toy theory on the table to frame our discussion. Jackson and Smith, op. cit. and Huemer, op. cit. both use examples involving skiers. We’ll start with a simple consequentialist theory on which all that matters in making a decision is the net number of lives saved. More is better and fewer is worse. Our agent is watching a skier

\textsuperscript{11} Notice that I don’t require that deontic values aggregate in any particular way.

\textsuperscript{12} Cf. Campbell Brown, “Consequentialize This,” Ethics 121/4 (2011).

\textsuperscript{13} On that note, given a system of deontic values for non-risky actions, my theory doesn’t need any further redescriptions of actions in order to work. The specter of redescription haunts attempts at formalization. On redescription, see Jonathan Broome, Weighing Goods (John Wiley & Sons, 1995), ch. 5.

\textsuperscript{14} I.e., they may be relevant for determining points of moral certainty and hope, discussed in §3.
ski down the mountain. They notice that the skier threatens to cause an avalanche, which will kill 10 people at the bottom of the mountain. The agent knows the only way to prevent the avalanche is to shoot the skier. The agent isn’t sure whether, left to their own devices, the skier will intentionally cause the avalanche or whether it will be an accident. But that doesn’t matter on our simple consequentialist theory. So it is obvious that, according to the simple consequentialist theory, the agent ought to shoot. But suppose we want to move from this simple consequentialist theory to a more complicated theory that recognizes absolute prohibitions. In our case, we are interested in adding a prohibition against intentionally killing the innocent, no matter how many lives would be saved in the process (notice that there is no absolute prohibition on allowing innocents to die). How confident does the agent have to be that the skier intentionally poses a risk before they are permitted to shoot? More generally, when we add absolute prohibitions to an existing consequentialist theory, what does the resulting theory tell us to do in cases where there is only a risk of violating the prohibition?

In attempting to answer this question, a theorist might rely on the particular prohibitions that the favored theory recognizes. For example, responses may stress that the absolute prohibition is based on rights or is individualistic, or they may appeal to the doctrine of double effect. This is fine as far as it goes, but it would be nice if we could rely only on the general structural properties of a theory with absolute prohibitions, rather than its particular content. The construction I provide does not rely on the idea that absolute prohibitions are justified by rights, or concern for individuals, or anything along these lines.\(^{15}\)

We start with a set of actions whose deontic values can be held fixed. These can be ranked on welfarist, or more broadly consequentialist, or even non-consequentialist grounds. What’s important is that the parties to the debate are willing to grant the ordering of actions \(\succeq\), if we ignore the absolute prohibitions. We can read \(A \succeq B\) as “ignoring absolute prohibitions, it is required to choose \(A\) rather than \(B\)”. Similarly, \(A \succeq B\) means “ignoring absolute prohibitions, it is (at least) permissible to choose \(A\) rather than \(B\)”. This can happen because the agent is in fact required to choose \(A\), or because \(A\) and \(B\) are both permissible. If \(A \succeq B\) and \(B \succeq A\), then, ignoring absolutist considerations, \(A\) and \(B\) are permissible in exactly the same situations. If \(A \succeq B\) but \(B \not\succeq A\), then \(A \succeq B\): if you are (at least) permitted to choose \(A\) rather than \(B\), but not permitted to choose \(B\) rather than \(A\), you are required to choose \(A\) rather than \(B\).

We’ll say that \(\succeq\) comes with a function \(u\) that gives an expected (deontic) value representation of \(\succeq\). In the example above, “shoot skier” \(\succeq\) “don’t shoot skier”, as reflected in the fact that \(u(9\text{ lives saved on balance}) > u(9\text{ lives lost on balance})\). This gives an evaluation of an outcome, setting aside absolute prohibitions. Some may be skeptical that absolutists can or should evaluate actions, independently of whether or not they are absolutely prohibited. Suppose I am considering whether to kill an innocent in order to get \(\$1\). Clearly, this act is absolutely prohibited. But as I’ve set things up, this outcome should score very low on non-absolutist grounds: even setting aside the fact that killing an innocent is absolutely prohibited, the gains to me do not come close to compensating for the loss of life. So, the way I’ve set things up, this act is condemned twice over. But this looks unnecessary at first glance. The absolutist already has an explanation of why this action is wrong; it violates the absolute prohibition. It seems like the welfarist loss doesn’t factor into things.\(^\text{17}\)


\(^{16}\) Jackson and Smith, op. cit. and Huemer, op. cit. both consider responses that appeal to DDE.

\(^{17}\) In this way, my construction can be seen as making good on the promissary remarks of Mark Colyvan, Damian Cox and Katie Steele, “Modelling the Moral Dimension of Decisions,” Nous 44/3 (2010). They lay down some desiderata for a theory with absolute prohibitions and gesture towards the possibility of such a theory. However, they do not show how to construct it, or when that is even possible. To be fair, our goals are different: they are discussing whether absolute prohibitions can be represented in an expected value framework at all, rather than whether an existing theory can incorporate absolute prohibitions.
This argument moves much too quickly. Even an absolutist should be able to evaluate outcomes on welfarist (or other non-absolutist) grounds, setting aside whether they violate the absolute prohibition. Suppose that I kill an innocent person in order to get $1. You kill an innocent person in order to save a million other lives. The absolutist must say that both of our actions are wrong, since they both violate the absolute prohibition. However, the absolutist can and should say that my action is more seriously wrong than yours. I cannot offer a full defense of the claim that absolutists can recognize degrees of wrongness here, but philosophers are happy to appeal to such notions.\(^\text{18}\) To my knowledge, no one has suggested that there is a particular problem here for absolutists.

Once the absolutist grants that my action is more seriously wrong than yours, they need a way to evaluate acts independently of whether or not they violate the absolute prohibition. Since both our acts violate the absolute prohibition, there must be something else that determines why my act is more seriously wrong than yours. The most obvious factor is that my action is also seriously wrong on welfarist grounds, whereas yours is amazingly good on welfarist grounds. To make this comparison, we must temporarily set aside that these acts violate the prohibition, since they are exactly the same in that respect.

We want to move from the theory given by \(\preceq\) to a theory that has absolute prohibitions. Sticking with the skiers, my examples will use “number of innocent people killed”, where each additional innocent killed is a new violation of an absolute prohibition. We’ll call the set of prohibitions \(\mathcal{A}\) (for the absolutist part of the theory). It will be convenient to let \(\mathcal{A}\) be a subset of natural numbers, ordered as usual. There is a “level 0 prohibition” on killing 0 innocents, but it has no force; there is a prohibition on killing 1 innocent, and it has force; there is a prohibition on killing 2 innocents, and that has yet more force, etc. From the point of view of the absolutist part of the theory, it is preferable to kill none; failing that, to kill 1, etc. When the prohibition is “all or nothing”, we can get by with just 0 and 1. 0 is “prohibition not violated” and 1 is “prohibition violated”. Since our lives are, by and large, finitistic, this constraint is reasonable. As it happens, I think a plausible theory won’t have all-or-nothing absolute prohibitions. An absolutist should say that given the choice between killing one innocent here and now and killing two innocents here and now, it is obligatory to choose the first action. The second action violates the prohibition more thoroughly. But the theory I give is compatible with an all-or-nothing prohibition.

As I say, this is a reasonable constraint for a theory of absolute prohibitions, but it is not necessary. My argument extends to all countable, linear orderings for \(\mathcal{A}\). In this way, we can incorporate several absolute prohibitions at once. Suppose that there is an absolute prohibition on lying and one on breaking a promise, so that no other considerations can outweigh these prohibitions. It could be that, given the choice between a lie (here, now) and a broken promise (here, now), you must lie regardless of other (e.g. welfarist) considerations. But given the choice between 3 lies and a broken promise, you must break the promise regardless of other considerations. My theory can handle such combinations of absolute prohibitions, so long as they can be arranged in a countable, linear way. Additionally, for example, if we “flip” the ordering on \(\mathcal{A}\) so that higher levels of \(\mathcal{A}\) are always preferable to lower levels, we can partially model decisions that risk bringing about different grades of pleasure: any quantity of a higher grade of pleasure is always preferable to any quantity of a lower grade of pleasure.\(^\text{19}\)

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\(^{19}\) Only partially: Doing things in this way represents cases where an outcome is a single pleasure of a specified quality, intensity, and duration. So we can compare a “grade 5” pleasure to a “grade 2” pleasure. In more complicated cases, we would want to compare (a) the certainty of a mild grade 5 pleasure together with a very intense grade 0 pleasure to (b) the certainty of a very intense grade 5 pleasure together with a mild grade 0 pleasure. This cannot be done in an expected value framework, which is unfortunate. There are two things to say on this matter. First, when authors in the literature do discuss the theory of lexically ordered pleasures under risk, the examples do not rely...
If we recognize absolutist obligations of various levels in addition to prohibitions,\textsuperscript{20} we probably want something that looks more like the integers than the natural numbers: a zero point, where the agent has no obligations and violates no prohibitions, together with prohibitions of increasing severity trailing downwards and obligations of increasing urgency trailing upwards. And this is only a small sample of all the possibilities. For simplicity, I stick with the case where we only have absolutist prohibitions in \( A \).

We start with an initial theory given by \( \succeq \), and our final theory will be given by a new ordering over acts \( \succeq^* \), determining when one risky act is preferable to another. We can read \( A \succ^* B \) as “it is all-things-considered forbidden to choose \( B \) rather than \( A \)”. This will come along with a \( u^* \) that gives an expected (deontic) value function for the actions, taking into consideration absolute prohibitions. What do we want out of \( \succeq^* \)? Here are the desiderata I propose for a theory that adds absolute prohibitions to an existing, non-absolutist theory.

- **Absoluteness**: For non-risky acts \( A \) and \( B \), if \( B \) violates the prohibitions at a higher level than \( A \), \( A \succ B \).
- **Weak Conservativeness**: For any non-risky acts \( A \) and \( B \), if \( A \) and \( B \) violate the prohibition at the same level, \( A \succeq^* B \iff A \succeq B \).
- **Strong Conservativeness**: For any acts \( A \) and \( B \), if \( A \) and \( B \) are guaranteed to violate the prohibition at the same level, \( A \succeq^* B \iff A \succeq B \).
- **Representation**: There is an expected (deontic) value representation \( u^* \) of \( \succeq^* \).

**Absoluteness** tells us that the prohibitions really are absolute: no matter what the non-absolutist considerations are, a lower-level violation is always preferable to a higher-level violation. **Weak Conservativeness** tells us how the new theory should treat non-risky actions coming from the old theory. If you are choosing between two actions that are not risky, and both involve the same level of prohibition violation, then the old ordering is all that matters. **Strong Conservativeness** extends this to actions that are risky with respect to non-absolutist considerations. Finally, **Representation** just says that there is a function that allows us to do expected (deontic) value calculations.\textsuperscript{21}

**Absoluteness** doesn’t get us quite as far as we might want, since it only refers to non-risky actions. We want a version of **Absoluteness** to apply to acts in general: If \( A \) and \( B \) are any actions, but \( B \) is guaranteed to violate a prohibition at a higher level than \( A \), \( A \succ^* B \). Fortunately, **Absoluteness** and **Representation** entail this property (by an application of the dominance principle).

It is obvious why we want **Absoluteness** and **Representation**: **Representation** shows that we can use the standard expected value tools from decision theory, and **Absoluteness** means that this can be done in a way that respects the fact that there are absolute prohibitions. **Weak** and **Strong Conservativeness** spell out the idea that the change to the non-absolutist part of the theory should be minimal. When absolutist prohibitions don’t bear on a decision, we should want the new theory to agree with the old.

3. The Theory

With our terminology settled, we can develop the theory. First, I’ll outline the main idea of the theory, and then construct a toy model using our skiers example. After that, I will present and explain three theorems that show how this construction can (and cannot) be extended for other absolutist theories.

\textsuperscript{20} As Colyvan, Cox and Steele, op. cit. do.

\textsuperscript{21} **Absoluteness** corresponds to (D\textsubscript{1}) and (D\textsubscript{3}) of Colyvan, Cox and Steele, op. cit. If \( A \) were ordered like \( \mathbb{Z} \), we could state and verify versions of their (D\textsubscript{2}) and (D\textsubscript{4}). They have no analog of **Weak** or **Strong Conservativeness**, since their goals are different.
3.1 How It Works, and a Toy Model

The main idea of the theory is to extend the way absolutists treat absolute prohibitions to the risky case, in as natural a way as possible. Suppose you are given the choice between A and B, and you know for sure that B includes killing an innocent person and that A does not. If it is absolutely prohibited to kill an innocent person, then it doesn’t matter what great features B has in other respects. Killing an innocent person can never be traded off against welfarist (or whatever) gains. Some certainties are too awful to be traded off. The first extension is to say that some risks are too awful to be traded off. Suppose, for instance, that it is 99.9999% likely that D will kill an innocent person, and certain that C will not. Such a great risk of killing an innocent is so terrible that we don’t need to consider other factors. It is (subjectively) required to choose C rather than D. At some point, it is effectively certain that an action will violate the prohibition, and agents can treat it as if it does violate the prohibition.

More formally, for each level of prohibition violation $n$ (greater than 0), we should be able to determine the risk $x_n$ at which an action is effectively certain to violate the absolute prohibition at that level or higher. We can call this a point of moral certainty: when an action runs a greater than $x_n$ risk of violating the prohibition at level $n$ or higher, it is morally certain to violate the prohibition. It should never be chosen over an action which is certain not to violate the prohibition at that level (or higher).

To illustrate moral certainties, let’s consider the skiers again. You have the opportunity to shoot a skier in order to prevent an avalanche, saving some number of people. When the chance that the skier is innocent is low, and the number of people you can save is high, it seems permissible for you to take the shot. But suppose that if it is more than 10% likely that the skier is innocent, it is never permissible to shoot the skier. You are required to allow the people at the bottom of the mountain to die, no matter how many there are. This means that 0.1 is the point of moral certainty for the prohibition on killing one innocent. No welfarist gains can trade off against that risk of killing a single innocent. There will be an analogous point of moral certainty for the prohibition on killing two innocents: if action B runs a greater than $x_2$ risk of killing two or more innocents, you are required to take some other action A which is certain to kill fewer. Even if B promises great welfarist gains, this cannot make up for the risk of killing two innocents. The points of moral certainty for the other levels are defined analogously.

The theory, by itself, doesn’t put any restrictions on where the points of moral certainty are, other than that they be (strictly) between 0 and 1. If we set the point of moral certainty at 0, then no risk of violating an absolute prohibition would ever be justifiable, no matter how small. If it were at 1, then any risk, short of certainty, could be traded off for a sufficiently good welfarist gain. This would have the effect of making absolute prohibitions effectively toothless. Still, we can use the framework to make some progress in determining where the points of moral certainty are. For example, consider a case where you can save 2 people at the bottom of the mountain by shooting the skier. When the chance that the skier is innocent is 1%, you are required to take the shot. 1% is a small risk, and there is an assured welfarist gain if you shoot. Similarly, for every number up to 5%, you ought to take the shot. However, if the chance that the skier is innocent is greater than 5%, it is forbidden to take the shot. At that point, you are incurring a substantial risk of killing an innocent person for a comparatively small welfarist gain (net 1 life saved).

Now consider the case where you can save 3 people by shooting the skier. If you can save 3 people, it is permissible to shoot even when the risk that the skier is innocent is 6%. Although you are taking a greater risk, the risk is still small enough that it can be traded off against a welfarist gain. Saving two lives, net, is enough to justify the risk of killing an innocent person up to, let’s say 7.5%. If the chance that the skier is innocent is greater than 7.5%, saving three people at the bottom

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22. See Huemer, op. cit., 333.
of the mountain cannot compensate for that risk. If you can save four people, it is forbidden to take a greater than 8.75% chance of killing an innocent. If we continue in this way, increasing the number of people that you could save by shooting the possibly innocent skier, it will turn out that the point of moral certainty for killing an innocent is 10%. This is because this sequence has a limit of 10%. So if an action B poses a 10% (or greater) risk of killing an innocent person, you should always choose an action A which doesn’t risk killing an innocent. This will hold no matter how bad A is or how good B is from a purely welfarist point of view. However, if the risk of killing an innocent person is less than 10%, there will be some (perhaps very large) number of innocents you could save, so that the risk will be worth it. So, for our example, we’ll say that \( x_1 = 0.1 \).

A similar series of comparisons allows us to determine the other points of moral certainty. This time, we consider a case where you can kill 2 skiers in order to save 3 people at the bottom of the mountain. This action promises a small welfarist gain (net 1 life saved) but runs a risk of violating the prohibition more thoroughly than in the one-skier case. So, presumably, even a 5% chance that the skiers are both innocent is too awful to trade off against the small welfarist gain. As in the one-skier case, we increase the number of people at the bottom of the mountain you could save by killing the two skiers. In the limit, we will settle on the point of moral certainty for killing two innocents. We can suppose that \( x_2 = 0.1 \) as well. This means that, if B runs a greater than 10% risk of killing two innocents, you must always choose an A which is certain not to kill two innocents. This holds irrespective of how good B is on welfarist grounds, how bad A is on welfarist grounds, or how likely A is to kill (only) one innocent. In this way, we can determine \( x_3, x_4, \ldots \).

The second extension from absolutism under certainty starts in the same place as the first. An action A, which is certain not to kill an innocent person, is always preferable to an action B, which will kill an innocent. Even if B promises amazing welfarist gains, it is so much more important to avoid killing an innocent that A is still preferable. Some certainties are too important to be passed up, no matter how poorly they fare in other respects. The second extension is to say that some chances are too important to be passed up. Compare D, which is certain to kill an innocent person but provide great welfarist gains, and C, which is certain to provide horrible welfarist losses but only runs a 50% chance of killing an innocent person. Even though C does much worse on welfarist grounds, the sizable chance that it will not kill an innocent person is too important to be passed on. At some point, it is worth it to take an action in the hope that it will avoid violating the prohibition, and agents can treat it as if it does not violate the prohibition.

More formally, for each level of prohibition violation \( n \) (greater than 0) we should be able to determine the risk \( y_n \) at which an action is effectively certain not to violate the absolute prohibition at that level or higher. We can call this a point of hope: when an action runs a risk lower than \( y_n \) of violating the prohibition at level \( n \) or lower, it is worth it to take it in the hope of avoiding violating the prohibition at that level. It should always be chosen over an action which is certain to violate the prohibition at that level (or higher), no matter how good or bad each action is on non-absolutist grounds.

To illustrate points of hope, we can also use the skiers. The cases are a bit trickier to set up, since we need to compare actions which are certain to violate the prohibition with actions which merely risk violating it. I think the following kind of case will do the job:

**Innocent Skier:** A skier, whom you are certain is innocent, is about to cause an avalanche. If you shoot the skier, you are guaranteed to kill an innocent, but some number of people will be saved. If you don’t, those people are sure to die. However, you find that you have no memory of the last 24 hours. Because of this, you recognize some chance that you have intentionally poisoned the skier, who would die shortly after causing the avalanche.

I take it that, if you were certain you had poisoned the skier, you
would be required to take the shot. You know that no matter what you do, you have killed an innocent. At that point, you ought to at least save the people at the bottom of the mountain. On the other hand, if you were certain that you had not poisoned the skier, you would be required not to take the shot. Although the people at the bottom of the mountain will die, you will entirely avoid violating the prohibition. My claim is that, at some point short of certainty, it is impermissible to shoot the skier no matter how many people you could save by doing so.

As with the points of moral certainty, the theory does not place constraints on where the points of hope are, other than that they be between 0 and 1. However, we can pull the same trick as before to determine where they are. Suppose that there are two people at the bottom of the mountain. If the chance that you have poisoned the skier is 90% or 80%, it is still worth it to take the shot. However, if there is a less than 75% chance that you have poisoned the skier, you ought not to take the shot. Even though you might have only a 30% chance of avoiding violating the prohibition, the sacrifice you make for this chance is relatively small, in welfarist terms. If there are 3 people at the bottom of the mountain, it won’t make sense to refrain from taking the shot until you have a better chance at avoiding violating the prohibition. A mere 30% chance of avoiding the prohibition is not worth it, in the face of a loss of at least three innocent lives. But, when the chance that you have poisoned the skier is less than (say) 62.5%, you shouldn’t shoot. That is a decent enough chance that you are required to let the three people at the bottom of the mountain die in hopes of avoiding violating the prohibition. If we continue in this way, for four, five, six, etc. people at the bottom of the mountain, we will determine the point of hope for avoiding killing one innocent.

If the pattern of the last couple of cases continues, we will get y_1 = 0.5. That is to say, an action A which has a less than 50% chance of killing an innocent person can be treated as if it is certain not to. It will be preferred to any action B which is certain to kill at least one innocent, no matter how good B is or how bad A is on welfarist grounds.

A 50% chance (or better) of avoiding prohibition violation is too good to let go. We can use a similar series of cases to determine y_2, y_3, ... Now, there are two skiers whom you know to be innocent, and some chance you have poisoned them both. You have to decide whether to shoot the skiers in order to save the people at the bottom, or refrain in the hope that you haven’t poisoned them and can avoid violating the prohibition that way. If we suppose that y_2 = 0.5, then an action which has a 50% chance of killing two innocents will be preferred to any action that is certain to kill two or more innocents, regardless of welfarist concerns.

It would be natural to require that x_1 = x_2 = x_3 . . . and y_1 = y_2 = . . . . This expresses a kind of risk-neutrality when it comes to absolute prohibitions. When you are considering an action which risks killing innocents or has a chance of avoiding killing innocents, each additional innocent person plays the same role in your deliberation. That is to say, suppose you are comparing an action A which risks killing one innocent to an action B that is certain not to kill any. It is just as difficult to justify the choice of A over B as it is to justify the choice of C, which risks killing two innocents, over D, which is certain to kill one. More generally, the idea is that each new level of prohibition violation is as hard to justify as the last. The awfulness of prohibition violation doesn’t diminish as you risk violating the prohibition more and more thoroughly.23 For this reason, we can say that a deontic value function is _A-linear when x_1 = x_2 = x_3 . . . and y_1 = y_2 = y_3 = . . . . We’ll impose this constraint on our toy model, but non-_A-linear deontic value functions are also possible.

At this point, we only need one more ingredient to give a toy model of how to make skier-shooting decisions. We still need to know the original welfarist value function _u, so we can ensure that the resulting deontic value function is strongly conservative. For the sake of illustration, let’s say it’s

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23. And similarly, the importance of avoiding an additional prohibition violation doesn’t diminish as you chance avoiding violation more thoroughly.
is unique, up to positive affine transformation. That is to say, \( u_1 \) and \( u_2 \) give rise to the same expected value ordering just in case there is a positive \( a \) and a \( b \) so that \( u_1(o_i) = a \cdot u_2(o_i) + b \). Once we know \( x_{n+1} \), we can determine an upper bound on the deontic value of violating the prohibition at that level. No action which violates the prohibition at that level can have more deontic value than that: if it did, it would be worth it to risk violating the prohibition at some risk beyond the point of moral certainty. \( y_{n+1} \) plays a similar role in determining the lower bound. Those two values uniquely determine the \( a \) and \( b \) so that for all \( o_j \), \( u^*(o_j, n + 1) = a \cdot u(o_j) + b \). This ensures that, when the “\( n + 1 \)” part can be ignored, \( \succeq^* \) orders actions just like \( \succeq \) does. But that can be ignored only when we are comparing actions which are guaranteed to violate the prohibition at the same level. In other words, this is how we get a Strongly Conservative function.

For the particular choices we made about the toy model in this section, the deontic value function we get is the much simpler:

\[
u^*(o_j, n) = 9^n(u(o_j) - 350) + 350
\]

Equipped with this function, an agent can determine which actions are permissible, taking into account both welfarist and absolutist risks, compatibly with all four constraints from the previous section. For example, you may be uncertain about whether the skier is innocent and how many people you could save by shooting the skier. Moreover, this is the unique such function satisfying the four constraints for this choice of \( u, x_n \), and \( y_n \). We can build a similar deontic value function for any choice of bounded \( u, x_n \), and \( y_n \), as witnessed by Theorem 1: If \( u \) is bounded, then there is a \( \succeq^* \) that is Absolute, Strongly Conservative, and Represented. Moreover, \( \succeq^* \) is unique up to choice of the points of moral certainty and hope.

The restriction to bounded \( u \) is not entirely innocent, because of
Theorem 2: If \( u \) is unbounded, then there is no \( \succ^* \) that is Absolute, Strongly Conservative, and Represented.

But there is a consolation prize in the form of

Theorem 3: If \( u \) is unbounded, there is a \( \succ^* \) that is Absolute, Weakly Conservative, and Represented.

We have already seen an example of how theorem 1 works, in this section. The method we used to determine the \( x_n \)'s, the \( y_n \)'s, and the formula for turning \( u \) into \( u^* \) will work for any choice of bounded \( u \). However, the theorems require some more discussion, especially theorem 1’s restriction to bounded \( u \)s.

3.2 Discussion of the Formal Results

We can have Strong Conservativeness only if the underlying non-absolutist considerations are bounded. An absolutist who wants to use my theory of decision-making under uncertainty must then make a choice: give up on Strong Conservativeness or make sure the non-absolutist considerations are bounded. I don’t think absolutists should be too quick to give up on Strong Conservativeness. It expresses the idea that, when absolute prohibitions are not at issue, the absolutist should make the same recommendations about actions as a non-absolutist. I do not have any knock-down arguments that absolutists must accept Strong Conservativeness, and I will leave it to others to argue that Weak Conservativeness is enough. This means I am committed to working only with bounded non-absolutist value functions.

But this restriction raises two related issues, which we must address. First, it is (perhaps) no surprise that when non-absolutist considerations are bounded, an absolutist theory can smoothly extend them. The thought is that, since the non-absolutist considerations are bounded, we can simply say that the deontic value of violating a prohibition is some very large negative number. This will ensure that we can proceed to use expected value as normal, and that theorem 1 is, on balance, not terribly important. I will address this complaint first.

The second concern is that many non-absolutists won’t accept bounded value functions for their own theories. If you have an unbounded value function and the absolutist can only accept a bounded \( u \), then you will disagree with the absolutist about how some actions compare to others, even when there is no risk of violating a putative absolute prohibition. This means that absolutism requires revision of the non-absolutist part of a moral theory — an uncomfortable position for the absolutist.

3.2.1 Significance of Theorem 1

As noted in the last section, it is not terribly surprising that, when non-absolutist considerations are bounded, they can be augmented with absolutist considerations in the way I’ve indicated. It is well-known that this can be done; Jackson and Smith, op. cit., Huemer, op. cit., and Isaacs, op. cit. all discuss versions of this strategy, and their criticisms will be addressed in the next section. Although it is useful to have a rigorous proof of what we knew from the start, I’d like to offer the absolutist more than that.

I think Theorem 1 does offer something new. Once the absolutist has settled on the non-absolutist considerations, theorem 1 shows that they need only make two more choices in order to get a full theory of decision-making under risk. Having made choices for the points of moral certainty and hope, theorem 1 guarantees a unique theory of risky decision-making with the four properties mentioned in the last section. Moreover, as I argued in presenting the ideas of the points of moral certainty and hope, the absolutist probably wants to accept the existence of these points anyway. The claim that there is a point of moral certainty just is the claim that agents can take some risks to be, effectively, absolutely prohibited as compared to non-prohibition-violating options. On the other hand, the claim that there is a point of hope just is the claim that agents can take some chances to be, effectively, absolutely required as compared to prohibition-violating options.
As we saw in the last section, the extension from non-absolutist risks to absolutist risks can be done in a formulaic way. Finally, the framework offers a systematic way of determining where the points of moral certainty and hope are, once the absolutist has decided that there are any. Start with two sequences of non-absolutist outcomes. The first improves and approaches the upper bound on non-absolutist value. The second worsens and approaches the lower limit on non-absolutist value. For each pair of progressively better and worse outcomes $b_i$ and $w_i$, consider the following set of decision scenarios: Each scenario features a choice between $B$ and $W$. $B$ offers an $r$ risk of getting outcome $b_i$ while violating the prohibition, and a $1 - r$ chance of getting $b_i$ without violating the prohibition. $W$ offers the certainty of getting $w_i$ without violating the prohibition. For some values of $r$, strictly between 0 and 1, the agent will be required to choose $W$ over $B$. Pick out the least such $r$, and call it $r_i$. Continuing in this way, we get a sequence $r_1, r_2, r_3, \ldots$.

The limit of this sequence is the point of moral certainty. A similar framework offers a systematic way of determining where the points of absolutism may also have to change their ideas about non-absolutist considerations, and this could easily be seen as a cost to the theory. Here, I will explain why bounding is natural for absolutists. I will also explain why the kind of revision required is not particular to absolute prohibitions. That is to say, we may have to change our opinions about non-absolutist considerations, but we would have to do so only in a way that we usually do, when we recognize new kinds of considerations.

Of course, all of this assumes that $u$ is bounded. When $u$ is unbounded, theorem 2 shows that there is no theory the absolutist can give that will satisfy all four desiderata. Although theorem 3 shows that most of them can be salvaged, we lose the guarantee of systematicity that theorem 1 promised. This is because there will not be a unique $\succeq^+$ that is Absolute, Weakly Conservative, and Representable. It could very well be that imposing further conditions allows absolutists who insist on unbounded $u$ functions to give a principled, systematic theory of risky decision-making, but that will have to be left for future work. At any rate, I think the absolutist has principled reasons to insist on bounded non-absolutist considerations, which I’ll offer now.

3.2.2 Bounds

Because of theorem 2, many non-absolutist theories cannot be augmented with absolute prohibitions in a way that satisfies our desiderata. Someone who is considering the switch from non-absolutism to absolutism may also have to change their ideas about non-absolutist considerations, and this could easily be seen as a cost to the theory. Here, I will explain why bounding is natural for absolutists. I will also argue that many non-absolutists may want to, anyway, accept a bound on non-absolutist considerations. Even for those who don’t, I will explain why the kind of revision required is not particular to absolute prohibitions. That is to say, we may have to change our opinions about the value of non-absolutist considerations, but we would have to do so only in a way that we usually do, when we recognize new kinds of considerations.

To get a better grip on what is at stake, it will be helpful to get a concrete idea of the difference between bounded and unbounded value functions. In the context of expected value theory, the existence of an upper bound is equivalent to the following claim:

There are two outcomes $o_1$ and $o_2$ (with $o_2 \succeq o_1$), and some risk $r$ (strictly between 0 and 1) so that for any $o_3$, the certainty of $o_2$ is preferable to an action which carries an $r$ risk of $o_1$ and a $1 - r$ risk of $o_3$.

25. There will be such an $r_i$ as long as we require that $\succeq^+$ satisfies Absoluteness.

26. To save space, I will only discuss upper bounds explicitly, though everything I say can be “dualized” so as to apply to lower bounds.
This makes it clear why boundedness is tied up with absolutism. The existence of an upper bound on non-absolutist considerations is equivalent to the existence of a point of moral certainty. Take $o_1$ to be any outcome where you kill an innocent, and $o_2$ to be any outcome where you don’t. As long as $r$ is above the point of moral certainty, you will prefer the certainty of $o_2$ to any action which is morally certain to kill an innocent, no matter what good thing might happen should you get $o_3$.

However, if you are starting from a non-absolutist theory, you’d only be able to appeal to $o_1$, $o_2$, and $o_3$ which don’t take into account absolute prohibitions. Even then, I don’t think it is absurd to reject the claim about risks. Suppose that we, right now, live in a world with a billion people all living exceptional lives. We can choose to stick to the status quo $Q$, or take the Demon’s Bet $B$. If we accept $B$, the demon will conduct one trillion raffles, each with a trillion tickets. If we lose any of the raffles, we get the bad result: all existing people will be put in hell and suffer immensely. Additionally, the demon will create billions of extra people, each suffering just as badly as we would. If we win all of the raffles, we get a good result.

I do not think it is absurd to claim that there is no good result good enough to make the Demon’s Bet attractive. The status quo is already exceptionally good, and it is so incredibly unlikely that we’ll get the good result. Such a small chance of getting any good result cannot compensate for the immense likelihood of suffering a huge loss. However, if a non-absolutist accepts that claim, then they accept that welfarist considerations are bounded. We need not say that the status quo is lexically or absolutely better than the bad result, just that $B$ could never be a risk worth taking. We could gin up similar examples to motivate the claim that non-absolutist considerations are bounded more generally.

Still, some may be willing to accept the demon’s bet, no matter how unlikely it is to win, as long as the prize is good enough. Those who would, would have to revise that judgment if they wanted to incorporate absolute prohibitions into their theory. To the extent that this is a cost, it is not a very steep one. When recognizing new considerations, we routinely have to give up on old judgments about how risks trade off. Suppose, for instance, that we live in a world where there are a million people, each living a life at a very low but positive welfare level, say 2. We have the opportunity to stick to the status quo, or adopt some risky policy. If the policy goes poorly, one of the million people will go down to welfare level 1. The rest will be unaffected. If the policy turns out well, all million people will move up to welfare level 3. Additionally, very many new people (as many as you like) will come into existence, also at welfare level 3.

At first, it looks attractive to say that, no matter how likely it is (short of 1) that somebody loses a single util, there is some number of additional people at welfare level 3 that would make the policy a good idea. The idea is that even a near-certainty of a very small loss should be able to be traded off against the small chance of a big gain. If the policy pays off, everyone will be better off, and all these new people with lives worth living will come into existence. Even though a life at welfare 3 is barely worth living, it is better than living at welfare 2, and we have the opportunity to add all this extra value to the world.

However, by an argument similar to the one showing the link between upper bounds and risks, this implies that the value of populations at welfare level 3 is unbounded. This leads directly to

**The Repugnant Conclusion:** For any perfectly equal population of amazing lives $A$, there is some population of people with lives that are barely worth living, $Z$, so that $Z$ is strictly better than $A$.

It’s easy to see why: Take any perfectly equal population of amazing lives. It has some value, $v$. Since the population of lives at welfare level 3 is unbounded, there will be some such population whose value is more than $v$. And so this large population of lives barely worth living is better than the population of amazing lives.
Many non-absolutists want to avoid the repugnant conclusion, and this means they need to accept that not every risk can be compensated for by some kinds of gain. Questions in population ethics are often portrayed as trade-offs between quality and quantity: in avoiding the repugnant conclusion, we want to say that a population with a small quantity but high quality is better than any population of high quantity but low quality. As we’ve seen, though, to make room for considerations of quality, we have to change ideas about how quantities trade off with each other.

I am not claiming that if you reject the repugnant conclusion, you should accept my absolutist view. My point is more modest. Often, when we want to incorporate a new constraint into our theorizing — quality or absolute prohibitions — we need to revise our opinions about how old considerations — quantity or non-absolutist considerations — trade off against each other. In bounding the deontic value of non-absolutist considerations, the absolutist is asking for the same kind of change that non-absolutists make when they bound the value of low-quality populations to avoid the repugnant conclusion.

To summarize, then, I suggest the absolutist should make a concession to the non-absolutist. Unbounded non-absolutist theories cannot be augmented with absolute prohibitions. But this concession is, on-balance, small. If non-absolutists are unwilling to accept the Demon’s Bet, they already accept an upper bound on non-absolutist considerations. Even then, the kind of change required is familiar.

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28. One may object that using examples from population ethics is unfair, since views which reject the repugnant conclusion accept a kind of lexicality in value. As mentioned above, the problems discussed in this paper have also been pressed against lexical views. However, the kind of lexicality at issue in population ethics is weaker. The claim is not that any amount of quality is better than any quantity. Just that some amount of quality is better than any quantity. In Gustaf Arrhenius and Wlodek Rabinowicz, “Millian Superiorities,” Utilitas 17/2 (2005)’s terminology, this is the claim that some goods are weakly, rather than strongly, superior to others. Compare Huemer, op. cit., 335.

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4. Objections and Replies

In this final section, I will reply to some objections that have appeared in the literature. My responses take two forms: either the objection does not apply to my view, or it applies to other theories. The first kind of response may not be available to all theorists of absolute prohibitions under risk. But the second response can be of use to anyone. In particular, I will at times argue that an objection applies to all theories, absolutist or not. This is a classic tu quoque response. At other times, I will argue that a version of an objection applies to absolutism, even under conditions of certainty.

The dialectical value of the second kind of argument isn’t obvious. Instead of solving a new problem for absolutism under risk, I will argue it is an old problem for absolutism under certainty. That is to say, I don’t think there is any special problem for absolutism under risk. Either way (the thought goes) a problem is a problem, and absolutism is to be rejected. I am not an absolutist, so of course I think that the arguments against absolutism are more convincing than those in its favor. Still, this kind of response is valuable for a couple of reasons.

First, if we reject absolutism, we should be clear on the reasons why. If my arguments succeed, it is not because of how absolutism handles risk; it is some broader problem with (for instance) how absolutists handle a certain kind of trade-off, whether in risky or non-risky cases.

Second, dialectically, those in the literature have tried to pose problems for absolutism specifically under conditions of risk. For instance, Jackson and Smith, op. cit., 267–268 say

Bad consequences . . . never justify breaking [an absolute prohibition] no matter how bad they may be. That is a very familiar issue. Our concern in this paper is with an issue that seems to have slipped under the radar. . . . What should absolutists . . . say about how the element of doubt affects the question of what you ought to do in such a case? . . .

Our discussion will not be especially friendly to absolutism; the message will be that absolutism has serious trouble giving a
plausible answer to our question.\(^{29}\)

Obviously, I cannot hope to provide a full defense of absolutism in this paper. In this section, though, I show that there is no special problem for absolutism when it comes to risk. That is an advance.

Third, this gives absolutists a clear game plan. The problems that affect absolutism under certainty are problems for all absolutists, regardless of whether they accept my theory of absolute prohibitions under risk. They need solutions to these problems anyway. Once they have solved these problems, they can rest assured that, equipped with my view of risk, they can offer a decision theory. For these reasons, I think that the theory of absolute prohibitions under risk is no worse than the theory of absolute prohibitions under certainty, and that is a significant result.

Jackson and Smith, *op. cit.*, 276 and Isaacs, *op. cit.*, 97 discuss a version of my approach. They object that this makes the resulting theory arbitrary in an objectionable way. Setting the point of moral certainty at 10% rather than 11% will have ramifications for the subjective ought. But there seems to be no principled reason to favor the one rather than the other. Now, I’m of the opinion that this remains to be seen. We would have to consider particular theories and their attendant arguments before insisting that the line can’t be drawn in a principled way.

Since the view I am offering is schematic, it wouldn’t be wise to bank everything on this possibility. Instead, I’ll offer a *tu quoque*. Every theory of decision-making under risk has to say when it’s appropriate to risk a bad outcome for the sake of a good one. Even very small changes in these attitudes will propagate throughout the rest of the theory. A consequentialist might try to fall back on the idea that values are ultimately determining the attitudes towards risk on their theories. But it is hard to see how such a bare appeal to value could non-arbitrarily settle that the difference between an hour of intense pleasure and an hour of mild pleasure is 3.42, rather than 3.43, times as great as the difference between an hour of mild pleasure and an hour with no pleasures or pains at all.\(^{30}\) At any rate, the absolutist has a response analogous to the bare appeal to value that relies on the strength of reasons or duties: the point of moral certainty is at 10% rather than 11% because the deontic disvalue of killing an innocent person is \(m\) rather than \(n\).

In response, Isaacs, *op. cit.*, 107 says “consequentialists can offer a perfectly sensible explanation for the cutoffs they endorse — the cutoffs are where the risks and rewards equal out”. But the non-absolutist can make the parallel move. Here is the “perfectly sensible explanation” for why the point of moral certainty is where it is: at that point, the risks can never again equal the rewards. In fact, given the tight relationship between attitudes towards risk and values, as illustrated in theorem 1, it’s not obvious that the consequentialist and the deontologist are committed to different kinds of arbitrariness in the first place.

Moving on, one recurring objection is that the theory of absolute prohibitions under risk cannot handle sequences of acts.\(^{31}\) Jackson & Smith gave the original example:

Suppose that there are two skiers, X and Y, whose probability of innocence is individually just below the threshold, 0.95 as we are supposing, and whose paths threaten separate groups of people. On the threshold view, you ought to shoot X if the number saved is large enough because the probability of innocence is below the threshold level at which the absolute prohibition kicks in; ditto for

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\(^{29}\) See also Huemer, *op. cit.*, 336–337, who seems to grant absolutism under certainty, for the sake of argument. Isaacs, *op. cit.*, §1 says that the issue of absolutism under risk is the “motif” of his paper.

\(^{30}\) This is phrased in terms of the ratio of value differences, which are the quantities significant for expected value, since it is measured cardinally. For those who think values themselves are significant, the point is just as well-made by asking, “Why is the value of this thing 101.63, rather than 101.64?” A non-absolutist might try to respond to this objection.

\(^{31}\) Jackson and Smith, *op. cit.*, Huemer, *op. cit.*, and Isaacs, *op. cit.* all press versions of this objection.
Y. But, on the version of absolutism under discussion, you ought not shoot X and Y no matter how many would be saved, as the probability that shooting both is to shoot at least one innocent person will exceed the threshold, or so we may suppose consistently with their individual probabilities of innocence being below the threshold. This means that the threshold version of absolutism violates agglomeration. It allows the possibility that you ought to shoot X, and that you ought to shoot Y, when it is false that you ought to shoot X and Y. Jackson and Smith, op. cit., 276.

My response to this problem is two-fold. First, the theory does not lead to violations of an agglomeration principle worth having. Second, even if it did, absolutist prohibitions lead to violations of agglomeration even under conditions of certainty. This is not a special problem for the theory of absolute prohibitions under risk.

Agglomeration for “ought” says that if you ought to A, and you ought to B, then you ought to A and B. In this case, Jackson & Smith contend that the theory says that you ought to shoot X, and you ought to shoot Y, but it’s not the case that you ought to shoot both. It is apparent that the theory says that you ought not to shoot both: that would make it a moral certainty that an innocent person has been killed. What about the judgments that you ought to shoot X and that you ought to shoot Y? It is true that shooting X and shooting Y have the same expected deontic value on our theory. So the ordering on acts should rank them the same. This doesn’t yet determine what the agent ought to do. There are two options for a theory that brings us from a ranking to an ought. It could be that you ought to A just in case A ranks higher than all other options, or that you ought to A just in case nothing ranks higher than A.

If we take the first option, then it is not true that you ought to shoot X, and it is not true that you ought to shoot Y. This is because neither ranks higher than all other options; shooting X ties for highest with shooting Y. On this way out, there is no violation of agglomeration, since the antecedent of the conditional is false. However, if we compare the options “shoot one of the skiers” to “shoot neither”, then you ought to shoot one of them. It ranks higher than shooting neither, and it ranks higher than shooting both. Again, there is no violation of agglomeration. On this first option, “S ought to φ” works like “S is obligated to φ”. Given the lives that you could save by shooting, you are obligated to shoot one of the skiers. But, (given the symmetry of the case), you are not obligated to shoot X rather than to shoot Y, and you are not obligated to shoot Y rather than to shoot X. And, of course, you are forbidden from shooting both.

On the second option, we do get a violation of agglomeration. But that’s OK. This is an agglomeration principle not worth having. On this view, several options can be tied at the top, such that you ought to do each of them. This makes “S ought to φ” work like “S is permitted to φ”, since permission allows for ties among the options. But permissions don’t agglomerate, and it is not obvious why the proponent of absolute prohibitions has to accept that they do when “ought” is understood in this way.

But suppose that, for some reason, opponents have a good reason to insist that absolute prohibiters are committed to agglomeration for the “permission” sense of ought. This would be bad for them, since they are committed to something that their own theory furnishes counterexamples to. But there is no special problem here introduced by risk. We can get counterexamples to agglomeration even under conditions of certainty. Suppose, for instance, that property acquisition is subject to an absolutist Lockean proviso, so that it is absolutely prohibited

32. As Huemer, op. cit. and Isaacs, op. cit. point out, this doesn’t technically make sense, since in decision theory options are maximally specific among things the agent cares about. But we can make fine informal sense of it.
33. See Bob Beddor, “Justification as Faultlessness,” Philosophical Studies 174/4 (2017), who uses the example of a child in a toy store. The child might be permitted to pick out any one toy to take home, but forbidden from picking out all of them. Huemer, op. cit., 343 provides a counterexample to the claim that oughts, understood in this way, agglomerate. Huemer’s example doesn’t bring in absolute prohibitions. In the next paragraph, I provide one that does.
to acquire natural resources without leaving enough and as good for everyone else. Now let’s say there are two unclaimed hunks of unobtainium left in nature. One other person is interested in obtaining a bit of unobtainium, and everyone else has either (rightfully) acquired their hunk or has waived their right to one. Your child, too weak to mine their own unobtainium, has a sickness that can only be cured by the precious mineral. In this case, you ought to mine the first hunk, in order to save your child. And you ought to mine the second hunk for the same reason. But it’s not true that you ought to mine both. That wouldn’t leave enough and as good for the other person, so it would violate the absolute prohibition. But there is nothing risky in this case. It is easy to multiply examples for other absolute prohibitions. If this is a problem for absolutist theories, it is not because of how they treat risk.

Here, we have seen another application of the view. We used the ranking $\succeq^*$ to distinguish between two senses of “ought”. Using one sense, the theory does not violate the agglomeration principle. On the other sense, we get an implausible agglomeration principle. But there are yet more versions to consider. Huemer, op. cit., 337 suggests the following agglomeration principle:

If it is permissible to $\phi$ whether or not you $\psi$, and permissible to $\psi$ whether or not you $\phi$, then it is permissible to $\phi$ and $\psi$.

The idea is that this principle avoids counterexamples like that above, so it is more plausible than the “permission” version of agglomeration: it is not permissible to take the one hunk of unobtainium whether or not you take the other. It is permissible to take the one if and only if you don’t take the other. Pressing forward, the objection would be that it is permissible to shoot $X$ whether or not you shoot $Y$, and vice versa. But it is not permissible to shoot the both of them. Therefore, my theory violates Huemer’s agglomeration principle. The strategy for a response is straightforward. The absolutist should deny that the antecedent is satisfied. Since it is permissible to shoot $X$ if and only if you don’t shoot $Y$, we should see the skier case as a risky version of the unobtainium case. So, again, there is no problem for absolutism here.

There are two objections to this reply, one coming from Huemer and one that is as-yet unpublished though is frequent in conversation.34 Let’s discuss Huemer’s first. He objects to views which deny that shooting $X$ is “ethically independent” from shooting $Y$ by saying that they lead to implausible conclusions when we face a sequence of similar choices multiple times.

Whatever plausibility the approach may have in such cases evaporates once we turn our attention to cases involving policies that subsume large numbers of actions. Assume that there is an absolute prohibition on punishing the innocent, with a risk threshold of $t$ [i.e. this is the point of moral certainty]. And consider a policy of punishing defendants in criminal trials whenever the probability of the defendant’s being innocent is less than $0.001$. This would seem a more than sufficiently cautious policy. But if the policy is applied in millions of criminal trials, then the sequence of trials will almost certainly far exceed the acceptable risk of punishing someone innocent. On the view in question, then, the implementation of this policy is absolutely prohibited. In general, the view will prohibit almost any criminal justice system for a large society — unless either the standard of proof for individual defendants or the risk threshold is set absurdly high… the appropriate standard of proof for criminal trials would increase dramatically as more trials were conducted — to decide whether to convict a given defendant, one would have to take into account the total risk of punishing the innocent created by all other juries. To stay under the acceptable risk threshold, we would have to rapidly increase the standard of proof toward absolute certainty. Huemer, op. cit., 343–344

34. Thanks to Ron Aboodi, Jimmy Goodrich, and Philip Swenson for discussion here.
In order to avoid violating the agglomeration principle, my view has to say that it is not permissible to convict defendant 1,000,000 whether or not you convict the other defendants. What you should do in the millionth trial depends on what you did in the previous trials. This means that, after enough convictions, it will become impermissible to convict anyone further (unless we progressively increase the burden of proof).

First, I should say that I am unsure whether this is an implausible result if we take absolute prohibitions seriously. In the real world, it could very well be a moral certainty that any criminal justice system will punish some innocents. We should expect it to be very difficult to justify a criminal justice system that looks anything like what we have now. But, to confront the problem head-on, inasmuch as this is an implausible result, it has nothing to do with theory of absolute prohibitions under risk. If policy-makers know how many criminal trials will be brought before the court, they can set the standard of proof at the outset, so that we never reach the point of moral certainty. But this is unrealistic. Policy-makers don’t have this information. But similar problems arise when we have to set a policy for non-risky actions. Suppose that it is absolutely prohibited to kill an innocent person and consider:

**Death by a Thousand Cuts:** We discover that an innocent person, Larry, has magical properties. If a natural disaster is looming and you cut Larry, an angel comes down from heaven and averts the disaster. But Larry is only human. He can survive exactly 999 cuts. Upon the thousandth cut, he will die.

What should the absolutist say about this case? If we know how many disasters there will be and how bad each is, the answer is easy. Pick out the 999 worst disasters, and cut Larry to prevent just those. If we don’t know, then any policy we settle on is going to cause problems. Suppose we decide to cut Larry only when a disaster is going to kill 10,000 or more people. “But if the policy is applied in millions of [natural disasters], then the sequence of [cuts] will” violate the prohibition. So any once-and-for-all policy is prohibited, unless it sets the standard for cutting Larry absurdly high. The other option is to raise the standards as we cut Larry more and more. It will be harder to justify the 900th cut than it was to justify the first one. As we approach the thousandth cut, the number of people who stand to die before we decide to cut Larry will increase dramatically.

Now this idea, that we should become more reluctant to cut Larry as the thousandth cut approaches, or that we should increase the burden of proof as more trials are brought to the court, doesn’t look so bad to me. But what **Death by a Thousand Cuts** illustrates is that this doesn’t arise because of our uncertainty about whether an action violates an absolute prohibition. It arises because we are not sure how long the sequence of decisions is. Insofar as it is an issue, it arises even when thinking about actions which either are certain to violate the prohibition or are certain not to. At any rate, non-absolutist theories have to deal with the same problem, so long as they recognize two considerations such that there’s some amount of the first that is better than any amount of the second.35 Very similar issues arise when we are deciding how to distribute finite resources across future generations. The analogy is fairly tight: it feels unfair to distribute resources unevenly to generations, just because they come earlier or later. And it feels unfair to change the standard of proof for defendants just because their case comes before or after other convictions. I don’t mean to downplay the interest or urgency of figuring out what to do when we face such sequences of decisions. But these issues are much broader than absolute

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35. This is a sufficient condition. In Arrhenius and Rabinowicz, op. cit.’s terminology, this is recognizing weak superiority between considerations. It would be possible to state necessary and sufficient conditions formally, but they are unnecessarily complicated for our purposes. This sort of boundedness is commonly postulated in the population ethics literature. See, for example, Derek Parfit, “Overpopulation and the Quality of Life,” in Jesper Ryberg and Torbjörn Tännsjö (eds.), *The Repugnant Conclusion: Essays on Population Ethics* (Kluwer, 2004) and Larry Temkin, *Rethinking the Good* (Oxford University Press, 2012) for stronger versions than what is needed here. Note that this is different from lexical priority, which says that *any* amount of the first is better than *any* amount of the second.
prohibitions under risk.

So much for Huemer’s argument against the way my view handles his agglomeration principle. The second argument targets the motivations for the view, rather than its consequences. The objection is that absolutist views should be, in some ways, individualistic. You should care about individuals’ rights or interests or lives or something. You shouldn’t care about whether your action increases the risk above some threshold. My view says that a certain action is too risky, even though there is no person whose rights (interests, life, etc.) is at risk. In this way, my view fetishizes risk and loses sight of the motivations for absolutism. Bona fide absolutism, the objection continues, should allow you to shoot both skiers.

In response, I want to argue that my view does a better job at capturing the motivations behind absolutism. To see this, it is helpful to compare it to Aboodi, Borer and Enoch, op. cit.’s. They argue that absolute prohibitions, in general, should be based on individualistic considerations. In the case of the two skiers, they say, “So long as there is no one person whom we kill when lacking moral certainty that they intend the deaths of the ten, the probability that at least one of the relevant group of persons is innocent is not relevant to the applicability of the relevant deontological constraint” Aboodi, Borer and Enoch, op. cit., 265. That is to say, they accept that in Jackson & Smith’s two-skiers case, you ought to shoot both skiers.

To start, I doubt that Aboodi, Borer and Enoch, op. cit. (or anyone who allows shooting both skiers) can find a decision theory that they can use for their theory. They say that it is permissible to shoot both skiers when each has a probability just below the threshold of being innocent, but not when there is one skier who is just above the threshold. As shown in the appendix, this means their theory will violate either transitivity or stochastic dominance. Stochastic dominance is a generalization of the idea that if it is objectively forbidden to choose B rather than A no matter what the world is like, it is subjectively forbidden to choose B rather than A. Stochastic dominance is (to my knowledge) a requirement of all normative decision theories. However, since the view I’ve developed here is representable by expected deontic value, it satisfies stochastic dominance.

Whether Aboodi, Borer and Enoch, op. cit. can find a decision theory or not, I think their view is unacceptable for absolutists. Suppose that there are 100 skiers who threaten to cause an avalanche, killing some very large number of people. You can save the people only by killing all 100 skiers with one gigantic bullet. You know that exactly one skier is innocent, but you have no idea which. Since, for each skier, the probability that they are innocent is 1%, “there is no one person whom we kill when lacking moral certainty that they intend the deaths”. So their view entails that you should kill all 100 skiers. In order to solve a related problem, they appeal to the distinction between intending and foreseeing Aboodi, Borer and Enoch, op. cit., §4. Whatever the merits of that move in general, it is fairly clear that by shooting the 100 skiers, you intentionally kill someone innocent, even though it is not true that, for any one person, you intentionally kill them despite their innocence. My view, on the other hand, forbids killing the 100. It treats this case the same as if you knew which of the 100 were innocent. My view does a better job of upholding absolutist motivations. It is no defense against the charge of killing a known-innocent skier, even though it is not true that, for any one person, you intentionally kill them despite their innocence. This is a problem for any view which allows agents to shoot both skiers. These views treat the killing of each skier as completely independent (except on welfarist grounds) from the others. This does not

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36. For example, Buchak, op. cit.’s REU and any Hurwicz rule, including minimax and maximax with reasonable tie-breaking procedures. This holds at least in the finitistic cases we are dealing with. In fact, in infinite cases, it is considered a problem for expected utility theory that it fails to respect stochastic dominance: it fails to differentiate between the Pasadena and Altadena games. 37. Huemer, op. cit., 364–365 offers a very similar example, though he doesn’t make the point about stochastic dominance.
respect the fact that you can intend to violate someone’s right, even though there is no person whose rights you intend to violate. When the risk of violating someone’s rights by shooting is too great, you should refrain from shooting. It shouldn’t matter whether there is some particular person whose rights you risk violating. It is instructive, at this point, to consider a parallel dialectic. Frances Kamm, *Morality, Mortality* (Oxford University Press, 1993) and Frances Kamm, “Aggregation and Two Moral Methods,” *Utilitas* 17/1 (2005) argue that (roughly), even on person-centered theories, it is obligatory to save 100 lives, leaving 1 to die, rather than the reverse. This is initially puzzling: each person has a claim to being rescued, and no one person’s claim outweighs any of the others. Given that the view is person-centered, there is no one else (e.g. an aggregate 100-person entity) who has a claim to being rescued. So how can it be obligatory to save the 100? The basic idea behind Kamm’s resolution of the puzzle is to point out that to treat the 1 vs 100 case the same as a 1 vs 1 case is to ignore the rights of the other 99 people. This gives each of the 99 a justified complaint, since you would be making your decision as if they did not bear on your decision at all. The Balancing Argument shows that we should not treat questions about which skier to shoot as completely independent from each other. By the same token, we should not treat questions about which skier to shoot as completely independent from each other.

To summarize the second argument: my theory avoids violating Huemer’s aggregation principle by denying that it is permissible to shoot X whether or not you shoot Y (and vice versa). According to objectors, my view compromises an essential motivation for absolutism, namely that rights are individual in a particular way. The Real Absolutist should allow that shooting X is “ethically independent” from shooting Y. My response is two-fold. First, Real Absolutist views will allow agents to intentionally kill innocents, as long as there is no person they intend to kill-despite-innocence. Second, my view respects individualistic constraints while denying independence in the same way that Kamm, *op. cit.*’s Balancing Argument does. My view is therefore both (i) more plausible and (ii) closer to the spirit of absolutism. It is to be preferred over Aboodi, Borer and Enoch, *op. cit.*. Suppose, though, that my appeal to Kamm fails, and my view does not respect individualism. In this case, I would say my view is still preferable as a version of absolutism. The claim that no one is ever allowed to intentionally violate an absolute prohibition (like killing the innocent) is more central to absolutism than the claim that it should be rights-based or individualistic is.

As we see, the theory developed so far is a natural extension of absolute prohibitions to decisions under risk. It introduces no new difficulties that absolutism didn’t already have in non-risky cases. Moreover, it avoids problems that plague the rival theory of Aboodi, Borer and Enoch, *op. cit.*. And it allows the absolutist to make use of the familiar tools of orthodox decision theory, without giving up on absolutism. The theory relies on one simple idea that the proponent of absolute prohibitions should accept anyway: just as some certainties aren’t worth trading off, some risks aren’t worth trading off. When we require that our theories respect this constraint, we can extend non-absolutist theories to theories with absolute prohibitions. Therefore, absolutists have nothing to fear from risk.

### Appendix A. Proofs of Claims

My proofs heavily rely on the von Neumann-Morgenstern representation theorem/the mixture space theorem. See David Kreps, *Notes on the Theory of Choice* (Westview Press, 1988), ch. 5 for a good treatment of both. We’ll have a set of outcomes Ω. Members of Ω are denoted oᵢ. An act is a function p:Ω → R (with finite support\(^{39}\)) such that \(\sum p(oᵢ) = 1\).

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38. Though Aboodi, Borer and Enoch, *op. cit.* go the other way, they recognize this parallel at p. 264.


40. This is just to avoid infinitistic St. Petersburg-type decisions.
It will be convenient to use $p_i$ to refer to $p(o_i)$. The non-absolutist part of the theory is given by a weak order $\succeq$ over the acts, with $u: \Omega \to \mathbb{R}$ representing $\succeq$. We also have $A = \mathbb{N}$, with its usual ordering. The enriched act space is $\Omega^+ = \Omega \times A$. $\succeq^+$ is a weak order over the acts on $\Omega^+$. Again, we use $p_{i,n}$ to refer to $p(o_i, n)$. The desiderata are formalized as follows:

- **Absoluteness:** $\forall o_i, o_j \, n < m \iff (o_i, n) \succeq^+ (o_j, m)$
- **Weak Conservativeness:** $\forall o_i, o_j, n \, (o_i, n) \succeq^+ (o_j, n) \iff o_i \succeq o_j$
- **Representation:** $\exists u^*: \Omega \times A \to \mathbb{R}$

$$p \succeq^+ q \iff \left[ \sum_{(o_i, n) \in \Omega \times D} p_{i,n} \cdot u^*(o_i, n) \geq \sum_{(o_i, n) \in \Omega \times D} q_{i,n} \cdot u^*(o_i, n) \right]$$

**Strong Conservativeness** requires a bit more in the way of definition. Say that an act $p$ is $A$-certain just in case: $\exists N \forall o_i \, p_{i,n} > 0 \iff n = N$. There is a natural mapping from the $A$-certain acts to acts over $\Omega$. The mapping “forgets” the absolutist considerations. When $p$ is $A$-certain, call the “flattened” act $p_\flat$. Say that the pair $p$ and $q$ are together $A$-inert just in case they are both $A$-certain, and that the $N$ that witnesses their $A$-certainty is the same. Then we can state:

**Strong Conservativeness:** If $p$ and $q$ are $A$-inert, $p \succeq^+ q \iff p^\flat \succeq^+ q^\flat$

**Theorem 1, Existence:** If $u$ is bounded, there is a $\succeq^+$ that satisfies Representation, Absoluteness, and Strong Conservativeness

We construct $\succeq^+$ explicitly. Since $u$ is bounded, it has a sup and inf. Introduce outcomes $\delta$ and $\omega$, and consider $\Omega \cup \{\delta, \omega\} = \Omega^+$. Extend $u$ to $u^*: \Omega^+ \to \mathbb{R}$ by setting $u^*(\delta) = \sup u$ and $u^*(\omega) = \inf u$. We can then define $u^*(0, n) = a_0 \cdot u^*(0) + b_0$ and $u^*(\omega, n) = a_n \cdot u^*(\omega) + b_n$ for $n \geq 0$. Notice that $u^*$ is bounded over $\Omega^+ \times \{0\}$.

**Step 0**
Define $u^*(0, 0) = 1$ and $u^*(\omega, 0) = 0$. There is a unique solution to the system of equations

$$\begin{align*}
u^*(\delta, 0) &= a_0 \cdot u^*(\delta) + b_0 \\
u^*(\omega, 0) &= a_n \cdot u^*(\omega) + b_n
\end{align*}$$

where $a_0$ is positive. Define $u^*(0_k, 0) = a_0 \cdot u(0_k) + b_0$. Notice that $u^*$ is bounded over $\Omega^+ \times \{0\}$.

**Step $n + 1$**
Suppose that $u^*$ has been defined for all $(0_k, N)$ where $N \leq n$. Choose some $0 < x_{n+1} < 1$. Define

$$\begin{align*}
u^*(\delta, n+1) &= \frac{u^*(\omega, n) - (1 - x_{n+1}) \cdot u^*(\delta, n)}{x_{n+1}} \\
u^*(0, n+1) &= \frac{u^*(\delta, n+1) - (1 - y_{n+1}) \cdot u^*(\omega, n)}{y_{n+1}}
\end{align*}$$

Choose some $0 < y_{n+1} < 1$. Notice that $u^*(\omega, n+1) \in \mathbb{R}$. There is a unique solution to the system of equations

$$\begin{align*}
u^*(\delta, n+1) &= a_{n+1} \cdot u^*(\delta) + b_{n+1} \\
u^*(\omega, n+1) &= a_{n+1} \cdot u^*(\omega) + b_{n+1}
\end{align*}$$

Define $u^*(0_k, n+1) = a_{n+1} \cdot u(0_k) + b_{n+1}$. Notice that $u^*(0_k, n+1) \geq u^*(\omega, n+1)$, so this is well-defined in $\mathbb{R}$.

**Step $\omega$**
Notice that $u^*$ is defined for all $(0_k, n)$. Define $\succeq^*$ over the acts over $\Omega \times A$ by $p \succeq^* q \iff EU(p) \geq EU(q)$, where $EU$ is calculated using $u^*$. 

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**Absolute Prohibitions Under Risk**

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**Notice that $u^*$ is defined for all $(0_k, n)$. Define $\succeq^*$ over the acts over $\Omega \times A$ by $p \succeq^* q \iff EU(p) \geq EU(q)$, where $EU$ is calculated using $u^*$.**
We prove by induction that if $\preceq$, Transitivity of philosophers luteness Verification A transformation of $u$ corresponding act on $\Omega$. This induces a bijection between acts on $\Omega$. For the base case, consider $(o_i, 0)$ and $(o_j, 1)$.

For the inductive step, assume that $\preceq$, Uniqueness: $\preceq$ is unique up to choice of $x_n$ and $y_n$.

We prove by induction that if $\preceq$, then $\exists a > 0, b\forall(o_i, n)\, a \cdot u^*(o_i, n) + b = u'(o_i, n)$. Base case: By Representation, Strong Conservativeness, and the mixture space theorem $\exists a > 0, b\forall o_i\, a \cdot u^*(o_i, 0) + b = u'(o_i, 0)$.

Inductive step: Assume that $\forall o_i, n \leq N\, a \cdot u^*(o_i, n) + b = u'(o_i, n)$. Since $x_{N+1}$ is equal for $\preceq$ and $\preceq'$, we have

$$u'(\beta, N + 1) = \frac{u'(\Omega, N) - (1 - x_{N+1}) \cdot u'(\beta, N)}{x_{N+1}}$$

$$= \frac{a \cdot u^*(\beta, N) + b - (1 - x_{N+1}) \cdot (a \cdot u^*(\beta, N) + b)}{x_{N+1}}$$

$$= \frac{a \cdot [u^*(\beta, N) + (1 - x_{N+1}) \cdot u^*(\beta, N)] + x_{N+1} \cdot b}{x_{N+1}}$$

$$= a \cdot u^*(\beta, N + 1) + b$$

A similar argument shows that $u'(\Omega, N + 1) = a \cdot u^*(\Omega, N + 1) + b$. By Representation and Strong Conservativeness for both $\preceq$ and $\preceq'$, the mixture space theorem entails that $u'(o_i, N + 1) = a \cdot u^*(o_i, N + 1) + b$. One more application of the mixture space theorem entails $\preceq$. The case for $A$-linear orderings is an immediate corollary.

Theorem 2: If $u$ is unbounded, there is no $\preceq'$ that satisfies Representation, Absoluteness, and Strong Conservativeness.

We start with the case where $u$ is unbounded from below. First we need to prove a lemma.

Lemma: If $\exists o_i > o_j, 0 < r < 1 \forall a_k < o_j\, r \cdot u(a_k) + (1 - r) \cdot u(o_i) \geq$

41. Here, there is a covert use of Absoluteness, which is required to guarantee that the $x_n$s are well-defined.
For suppose $u$ is unbounded from below. Let $r$ witness the property in the antecedent for $o_i$ and $o_j$. Let $o_k$ be such that $u(o_k) < u(o_j) - (1 - r) \cdot u(o_i)$. There is such an $o_k$ by unboundedness from below. Then

$$r \cdot u(o_k) + 1 - r \cdot u(o_i) < r \cdot \frac{u(o_j) - (1 - r) \cdot u(o_i)}{r} + (1 - r) \cdot u(o_i)$$

But this contradicts the antecedent. This establishes the lemma.

For suppose $u$ is unbounded from below. Let $r$ witness the property in the antecedent for $o_i$ and $o_j$. Let $o_k$ be such that $u(o_k) < u(o_j) - (1 - r) \cdot u(o_i)$. There is such an $o_k$ by unboundedness from below. Then

$$r \cdot u(o_k) + 1 - r \cdot u(o_i) < r \cdot \frac{u(o_j) - (1 - r) \cdot u(o_i)}{r} + (1 - r) \cdot u(o_i)$$

But this contradicts the antecedent. This establishes the lemma.

Now suppose that $\succeq^*$ satisfies Representation, Absoluteness, and Strong Conservativeness. Let $o_i \succ o_j$ be any two outcomes. By Representation, Absoluteness, and Weak Conservativeness, $\exists r \cdot u^*(o_i, 0) + (1 - r) \cdot u^*(o_j, 0) = u^*(o_j, 0)$. Contrapositing the lemma, $\forall o_k \ r \cdot u(o_k) + (1 - r) \cdot u(o_j) < u(o_j)$. By Representation and Strong Conservativeness, $r \cdot u^*(o_k, 0) + (1 - r) \cdot u^*(o_j, 0) < u^*(o_j, 0)$. Some algebra gets us that $u^*(o_k, 0) < u^*(o_j, 1)$. Representation entails $(o_k, 0) \prec (o_j, 1)$, which contradicts Absoluteness.

For suppose $u$ is unbounded from above. Again, we need a lemma.

**Lemma:** If $\exists o_i \succ o_j, 0 < r < 1 \forall o_k \succ o_i u(o_i) \geq r \cdot u(o_k) + (1 - r) \cdot u(o_j)$, then $u$ is bounded from above.

For suppose $u$ is unbounded from above. Let $r$ witness the property in the antecedent for $o_i$ and $o_j$. Let $o_k$ be such that $u(o_k) > u(o_j) - (1 - r) \cdot u(o_i)$. Such an $o_k$ exists by unboundedness from above.

Then

$$r \cdot u(o_k) + (1 - r) \cdot u(o_i) > r \cdot \frac{u(o_j) - (1 - r) \cdot u(o_i)}{r} + (1 - r) \cdot u(o_j)$$

But this contradicts the antecedent. This establishes the lemma.

Now suppose that $\succeq^*$ satisfies Representation, Absoluteness, and Strong Conservativeness. Let $o_i \succ o_j$ be any two outcomes. By Representation, Absoluteness, and Weak Conservativeness, $\exists r \cdot u^*(o_i, 0) + (1 - r) \cdot u^*(o_j, 1) = u^*(o_j, 1)$. Contrapositing the lemma, $\forall o_k \ r \cdot u(o_k) + (1 - r) \cdot u(o_j) > u(o_j)$. By Representation and Strong Conservativeness, $r \cdot u^*(o_k, 1) + (1 - r) \cdot u^*(o_j, 1) > u^*(o_j, 1)$. Some algebra gets us that $u^*(o_k, 1) > u^*(o_j, 0)$. Representation entails $(o_k, 1) \succ (o_j, 0)$, which contradicts Absoluteness.

**Theorem 5:** For all $\succeq$, there is a $\succeq^*$ that satisfies Representation, Absoluteness, and Weak Conservativeness

By Theorem 1, it suffices to show this for $u$ unbounded. We required that $\succ$ be represented by $\cdot \Omega \to \mathbb{R}$. Let $\phi$ be any order-preserving map $\mathbb{R} \to (0, 1)$. Define $\succeq^*$ so that it is represented by $\phi \circ u$. Since $\phi \circ u$ is bounded, theorem 1 applies. Call its witness $\succeq^*$.

For suppose $u$ is unbounded from above. Again, we need a lemma.

**Lemma:** If $\exists o_i \succ o_j, 0 < r < 1 \forall o_k \succ o_i u(o_i) \geq r \cdot u(o_k) + (1 - r) \cdot u(o_j)$, then $u$ is bounded from above.

For suppose $u$ is unbounded from above. Let $r$ witness the property in the antecedent for $o_i$ and $o_j$. Let $o_k$ be such that $u(o_k) > u(o_j) - (1 - r) \cdot u(o_i)$. Such an $o_k$ exists by unboundedness from above.

Then

$$r \cdot u(o_k) + (1 - r) \cdot u(o_i) > r \cdot \frac{u(o_j) - (1 - r) \cdot u(o_i)}{r} + (1 - r) \cdot u(o_j)$$

But this contradicts the antecedent. This establishes the lemma.
b_0. Consider any act p that has a chance greater than x_1 of violating the prohibition. Say that it has an x + ε chance of violating the prohibition.

\[
EU(p) = \sum p_{i,0} \cdot u^*(o_i, n) \\
= \sum p_{i,0} \cdot u^*(o_i, 0) + \sum p_{i,1} \cdot u^*(o_i, 1) \\
\leq \sum p_{i,0} \cdot s_0 + \sum p_{i,1} \cdot s_1 \\
= x_1 \cdot s_0 + \epsilon \cdot s_0 + (1 - x_1 - \epsilon) \cdot s_1 \\
< x_1 \cdot s_0 + (1 - x_1) \cdot s_1 \\
= b_0
\]

However, facts about mixtures entail that any action q that doesn’t have a chance of violating the prohibition will be such that \(EU(q) \geq b_0\). So \(EU(q) > EU(p)\). By Representation, \(q \succ p\).

Similarly, by construction, \(y_1 \cdot b_1 + (1 - y_1) \cdot b_0 = s_1\). Consider any act p that has a chance less than \(y_1\) of violating the prohibition. Say that it has a \(y_1 - \epsilon\) chance of violating the prohibition.

\[
EU(p) = \sum p_{i,0} \cdot u^*(o_i, n) \\
= \sum p_{i,0} \cdot u^*(o_i, 0) + \sum p_{i,1} \cdot u^*(o_i, 1) \\
\geq \sum p_{i,0} \cdot b_0 + \sum p_{i,1} \cdot b_1 \\
= (1 - y_1 + \epsilon) \cdot b_0 + y_1 \cdot b_1 - \epsilon \cdot b_1 \\
> y_1 \cdot b_1 + (1 - y_1) \cdot b_0 \\
= s_1
\]

However, facts about mixtures entail that any action q which is guaranteed to violate the prohibition will be such that \(EU(q) \leq s_1\). So \(EU(p) > EU(q)\). By Representation, \(p \succ q\).


\section*{Absolute Prohibitions Under Risk}

By the two-skier case, I mean:

Two skiers, Y and Z, threaten to cause an avalanche, killing 10 innocent people. Each has an x chance of being innocent. The innocence of Y is probabilistically independent from the innocence of Z. The only way to save the 10 is to shoot both skiers.

We’ll prove that if shooting is permissible in the two-skier case, but impermissible in the one-skier case, \(\succ^*\) either is intransitive or violates stochastic dominance. Aboodi, Borer and Enoch, op. cit. allow for there to be some value of \(x\) for which this is true. The appeal to transitivity can be replaced with an appeal to IIA by considering a combined thre-skier case.

So suppose \(\succ^*\) is transitive. The one-skier case has three possible outcomes: (i) Don’t shoot, 10 die. Call this a. (ii) Shoot, X is innocent, net 9 lives saved. Call this b. Shooting produces \(b\) with \(x + \epsilon\) probability. And (iii) Shoot, X is not innocent, net 9 lives saved. Call this c. Shooting produces \(c\) with \((1 - (x + \epsilon))\) probability. The possible outcomes in the two-skier case are: (i) a, as above. (ii) Shoot, Y and Z are both innocent, net 8 lives saved. Call this d. Shooting produces \(d\) with \(x^2\) probability. (iii) Shoot, exactly one of Y or Z is innocent, net 8 lives saved. Call this e. Shooting produces \(e\) with \(2x \cdot (1 - x)\) probability. (iv) Shoot, neither is innocent, net 8 lives saved. Call this f. Shooting produces \(f\) with \((1 - x)^2\) probability.

Notice that by assumption, shooting Y and Z \(\succ^*\) not shooting and that not shooting \(\succ^*\) shooting X. By transitivity, shooting Y and Z \(\succ^*\) shooting X. The outcomes can be ordered as follows: \(e \succ^* f \succ^* a \succ^* b \succ^* c \succ^* d\). These are ordered first by whether they violate the prohibition, then by net number of lives saved. Let \(S_X\) be the distribution function for shooting X, and \(S_{Y+Z}\) the distribution function for shooting Y and Z. \(S_X(d) = 0 < x^2 = S_{Y+Z}(d)\). \(S_X(e) = 0 < 2x - x^2 = S_{Y+Z}(e)\). \(S_X(b) = x + \epsilon < 2x - x^2 = S_{Y+Z}(b)\). \(S_X(a) = x + \epsilon < S_{Y+Z}(a)\). \(S_X(f) = x + \epsilon < 1 = S_{Y+Z}\). Finally, \(S_X(c) = S_{Y+Z}(c) = 1\). So \(\forall \theta S_X(\theta) \leq S_{Y+Z}(\theta)\) and \(\exists \phi S_X(\phi) < S_{Y+Z}(\phi)\). So shooting X stochastically dominates shooting both Y and Z. If \(\succ^*\) respects stochastic dominance, shooting X \(\succ^*\)
shooting Y and Z. Contradiction.

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