The Validity of the Argument from Inductive Risk*

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forthcoming in *The Canadian Journal of Philosophy*

Havstad (2022) argues that *the argument from inductive risk* for the claim that non-epistemic values have a legitimate role to play in the internal stages of science is deductively valid. She also defends its premises and thus soundness. This is, as far as we are aware, the best reconstruction of the argument from inductive risk in the existing literature. However, there is a small flaw in this reconstruction of the argument from inductive risk which appears to render the argument invalid. This flaw is superficial, and a small amendment to it rescues the claim of validity. (We leave aside the question of soundness here.)

It is widely assumed that the argument from inductive risk as discussed in the current literature on science and values remains more or less unchanged between Rudner (1953) and Douglas (2000), with the major difference being that Douglas widens the scope of Rudner's argument and adds considerations about the appropriate and inappropriate roles for values in managing inductive risks. Havstad (2022) shows that this assumption is mistaken; Rudner's argument is simpler, as well as weaker by virtue of its less obviously defensible premises. Havstad rightly encourages us to end the "regressive practice of reattributing credit for Douglas's argument from inductive risk away from Douglas herself and towards Rudner" (309n37). Thus, Havstad takes "the argument from inductive risk" to be shorthand for "the argument from 'Inductive Risk and Values in Science,' written by Heather Douglas and published in Philosophy of Science in the year 2000" (Havstad 2022, 305).

Havstad's reconstruction of the argument has two parts. The first goes like this:

*Our gratitude to Joyce Havstad for helpful feedback on drafts of this paper.

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1. "To claim that scientists ought not consider the predictable consequences of error (or inductive risk) is to argue that scientists are somehow not responsible for their actions as scientists."
2. IMPLICIT: To claim that scientists are somehow not responsible for their actions as scientists is to argue that scientists do not have the same moral responsibilities as the rest of us.
3. "[S]cientists have the same moral responsibilities as the rest of us."
4. {DERIVED: It is not the case that scientists are not responsible for their actions as scientists.}

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5. DERIVED: Therefore, it is not the case that "scientists ought not consider the predictable consequences of error (or inductive risk)." (Havstad 2022, 305)[1]

This argument is valid by two applications of *modus tollens* (see Appendix §A).

The second part of the argument is as follows:

6. "In cases where the consequences of making a choice and being wrong are clear, the inductive risk of the choice should be considered by the scientists making the choice."
7. "[W]here the weighing of inductive risk requires the consideration of non-epistemic consequences, non-epistemic values have a legitimate role to play in the internal stages of science."
8. "In the cases I [Douglas] discuss below, the consequences of the choices include clear non-epistemic consequences[.]"
9. {DERIVED: Scientists should weigh the inductive risks that in these cases require consideration of clear non-epistemic consequences.}

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[1]The argument is quoted from Havstad, including the square brackets; the quotation marks within the block quotation are from Douglas (2000), 563. We have added additional steps left enthymematic in Havstad's reconstruction in {curly brackets} and renumbered the steps accordingly.

10. DERIVED: Therefore, in the discussed cases, "non-epistemic values have a legitimate role to play in the internal stages of science." (Havstad 2022, 307)[2]

Premise (6) is taken to be a restatement of the first Conclusion (5) with narrowed scope, focusing on choices and consequences. The second part of this argument (6-10) is a valid argument by *modus ponens* (plus conjunction introduction). The second Conclusion (10) amounts to a denial of the value-free ideal. (See Appendix §B for formalization.)

Each of these individual arguments is deductively valid. Havstad proceeds here by carefully considering the scope of the argument as restricted by (6) & (7), and defending the truth of the most contested premises. The neatness and clarity of Havstad's reconstruction of the argument from inductive risk is a very significant contribution to the values in science literature, as defenders of a value-free ideal for science must now either challenge a particular premise or attempt to sidestep the argument altogether. A further merit of her reconstruction is that it shows that this version of the argument from inductive risk applies only to a particular class of cases, namely those in which there are non-epistemic consequences of error and those consequences themselves are epistemically accessible.

However, in sticking close to the exact language of Douglas's article, Havstad has introduced a problem in the argument that leads the overall argument to be invalid. The problem is the relation between lines (5) and (6);[3] these are not at all equivalent. Put aside for the moment the restricted scope concerning the clarity of the consequences. The first argument comes to the conclusion that "It is not the case that scientists ought not consider the predictable consequences of error." The second argument (eliding the qualifier), begins with "Scientists ought to consider the predictable consequences of error." But the latter does not follow from the former. In general, from 'it is not the case that one ought not x' it does not follow that 'one ought x'. For example, it is not the case that Nancy ought not go free-diving in the Maldives, but from that it doesn't follow that Nancy ought to go free-diving in the Maldives.

Using the tools of simple propositional logic, it is tempting to pull the "not" in "ought not" to the front of the proposition, and then cancel the double-

[2] cf. Douglas (2000), 565.

[3] $\neg C$ and C' in the formalizations given in the Appendix.

negation to get: "Scientists ought to consider the predictable consequences of error (inductive risk)." But that won't do. "Ought" is best understood in this context as a modal operator (Chrisman 2018). In a deontic modal context, "not-ought-not P" is not equivalent to "ought P." If anything, it would be equivalent to "may P" (i.e., "not obligatory that not P" = "permissible that P" or $\neg\Box\neg p = \Diamond p$).

The source of the confusion may be the complex rhetorical situation of Douglas (2000), which seeks not only to reject the value-free ideal (which is an "ought-not" claim), but also to defend a claim about what scientists *should* do (an "ought" claim). And so Douglas wants to argue both a not-ought-not claim and the stronger ought claim, i.e., both that it is not the case that "scientists ought not consider the predictable consequences of error (or inductive risk)" by making non-epistemic value judgments, and that it *is* the case that scientists ought to do so.

This is not to say that Havstad (2022) does not *motivate* the move from (5) to (6). Indeed, in a discussion of Douglas (2003), she discusses both the justification of step (4) and the move from (5-6) via the moral responsibilities of scientists (Havstad 2022, 305–7). The problem is that the move between these two steps is not licensed formally, because they are not equivalent, and Havstad gives no formal reconstruction of that move. Generally motivating a move is not the same as showing that the move is formally valid. This endangers Havstad's claim that the entire argument from inductive risk is valid and (probably) sound.

To defend the stronger claim (that scientists *ought* to consider the consequences), which we take to be the ultimate goal, what we need to do instead is start with the negation *outside* the modal context from the beginning. In this way, the argument is easily fixed as follows:[4]

11. If it is not the case that scientists ought to consider the predictable consequences of error (or inductive risk), then it is not the case that scientists are responsible for their actions as scientists.

[4]We are sticking closely to Havstad's reconstruction, though other reconstructions are surely possible. We have continued to omit the scope qualification, though it could be added back easily enough.

12. If it is not the case that scientists are responsible for their actions as scientists, then it is not the case that scientists have the same moral responsibilities as the rest of us.
13. Scientists have the same moral responsibilities as the rest of us.
14. Therefore, it is not the case that scientists are not responsible for their actions as scientists.
15. Therefore, it is the case that scientists ought to consider the predictable consequences of error (or inductive risk).
16. Where scientists ought to consider inductive risks and the weighing of inductive risk requires the consideration of non-epistemic consequences, non-epistemic values have a legitimate role to play in the internal stages of science.
17. In the cases discussed by Douglas, the consequences of the choices include clear non-epistemic consequences.
18. So in these cases, scientists should weigh the inductive risks, and doing so requires consideration of clear non-epistemic consequences.

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19. Therefore, in the discussed cases, non-epistemic values have a legitimate role to play in the internal stages of science.

This argument is deductively valid all the way through. (See Appendix §C for the formalization.) What's more, it makes clear what some have missed, that Douglas's ambition is not simply to refute the value-free ideal (a claim about what scientists ought not do) and thus render the use of values *permissible*, but rather to make an argument concerning what scientists *ought* to do (use non-epistemic values to weigh inductive risks). We close by noting that Havstad argues convincingly that the premises of this argument are true, *including* premise (11) in its revised form. On this basis, we believe the above argument is also sound.[5]

[5]It is worth noting, however, that our views differ regarding the implication of the soundness of the argument from inductive risk. One of us defends a version of the value-free ideal which is immune to the argument from inductive risk (Menon and Stegenga 2023), while one of us holds that the value-free ideal in any form is untenable (Brown 2020).

Appendix: Formalization of the Arguments

A Havstad's Reconstruction Part 1

C: Scientists ought not consider the predictable consequences of error (inductive risk)
R: Scientists are responsible for their actions as scientists
M: Scientists have the same moral responsibilities as the rest of us.

1. $C \rightarrow \neg R$ (Premise)
2. $\neg R \rightarrow \neg M$ (Premise)
3. M (Premise)
4. $\neg\neg R$ (DN & MT 2, 3)
5. $\neg C$ (MT 1, 4)

B Havstad's Reconstruction Part 2

C': In cases where the consequences of making a choice and being wrong are clear, scientists ought to consider the predictable consequences of error (inductive risk).
N: The weighing of inductive risk requires the consideration of non-epistemic consequences.
V: Non-epistemic values have a legitimate role to play in the internal stages of science.

6. C' (Reinterpretation of 5)
7. $C' \wedge N \rightarrow V$ (Premise)
8. N (Premise, based on case studies)
9. $C' \wedge N$ ($\wedge$I 6, 8)
10. V (MP 7, 9)

C The Revised Reconstruction

C'': Scientists ought to consider the predictable consequences of error (inductive risk)
R: Scientists are responsible for their actions as scientists

M: Scientists have the same moral responsibilities as the rest of us.
N: The weighing of inductive risk requires the consideration of non-epistemic consequences.
V: Non-epistemic values have a legitimate role to play in the internal stages of science.

11. $\neg C'' \rightarrow \neg R$ (Premise)
12. $\neg R \rightarrow \neg M$ (Premise)
13. M (Premise)
14. $\neg\neg R$ (DN & MT 12, 13)
15. C'' (MT 11, 14 & DN)
16. $C'' \wedge N \rightarrow V$ (Premise)
17. N (Premise, based on case studies)
18. $C'' \wedge N$ (CI 15, 17)
19. V (MP 16, 18)

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