Epistemic Responsibility in Science

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I Motivating the problem

Examples:

- "Observation of Top Quark Production in $p\bar{p}$ Collisions with the Collider Detector at Fermilab" – A 1995 paper by the CDF Collaboration, 600+ physicists.
- The mass of the Higgs boson is 125 GeV. – Discovered by ATLAS and CMS collaborations at CERN, 5,000+ collaborators in 2015.
- Superluminal neutrino? – Anomalous result reported in 2011 and retracted in 2012 by OPERA collaboration, 160+ physicists.

Who is epistemically responsible in these cases? (1) The epistemic labor is too distributed or too diffuse. We may say no one is truly responsible. Or that everyone is responsible. (2) Only the experimental designer or the leader of the collaboration is responsible, if there is such a person.

These responses stems from what I call "**an unified concept**" of epistemic responsibility in science, which defines epistemic responsibility is an all-or-nothing concept. Depending on such a unified concept leaves us in a rather bleak place: epistemic responsibility is either extremely difficult to adjudicate or cannot be adjudicated at all.

New concept of epistemic responsibility: epistemic responsibility should be distributed among members of a group when epistemic labor is distributed.

A tripartite view: I argue that epistemic responsibility in science has three distinct senses—*attributability*, *answerability*, and *accountability*. An epistemic agent can be responsible for her assertions to different degrees and may be only responsible in one or two senses of responsibility, and sometimes in all three senses.

An agent can be epistemically responsible for a claim that P if that claim can be properly *attributed* to the agent. An agent can be *answerable*-responsible for a claim that P in so far as the agent is able to report the reasons and justifications for holding that P. And finally an agent can be held *accountable* for a claim that P if it is appropriate to blame or praise the agent for asserting that P in accordance to epistemic norms.

II Rejecting the "unified concept" of epistemic responsibility

Huebner, Kukla, and Winsberg (2017, 2014): An unified concept of epistemic responsibility is…

(1) an all-or-nothing concept, either someone is epistemically responsible for a claim or not, there are no degrees of responsibility;
(2) for an agent to be epistemically responsible for the contents of a scientific paper, she must be able to give a consistent "justificatory story" for all of her claims in that paper; and

(3) for an agent to be epistemically responsible for the contents of a scientific paper, she must be in a social position to retract the claim if it were appropriate to do so in response to criticism or new information.

In short, epistemic responsibility amounts to there being at least one epistemic agent who is able to rationally reconstruct, defend, and answer for every aspect of the underlying justificatory story of a scientific claim.

In collaborative research, there is not one person who can play this role because…

(i) the research is so complex and historically contingent (path dependent) that it is beyond the cognitive ability of a single agent to fully comprehend,
(ii) methodological decisions are made locally and informed by local values which are opaque to other collaborators, and
(iii) different researchers are using different disciplinary expertise which cannot be evaluated by other collaborators.

HKW goes further to claim that there is not even a subset of people who can be epistemically responsible either. There is no guarantee that different collaborators have the same understanding of the project to piece together a consistent justificatory story: "If the represented results are challenged, there may be no single justificatory story to be told about the methodological choices made and the epistemic standards used—not even one that would need to be told piecemeal by the various participants" (2017).

Unified concept of epistemic responsibility → no responsible agent

Plural subject account? A group G has a reason R to believe that P just in case all members of G would properly express openly a willingness to accept R jointly as the group's reason to believe that P. This falls to the same problems (i)-(iii).

HKW's negative result is not satisfying. We ought to be able to assign epistemic responsibility in science, if we use a different concept of responsibility.

III Moral responsibility and epistemic responsibility

A popular analysis of moral responsibility (Watson, Scanlon, Smith): First sense, "responsibility as attributability" which concerns the conditions that must be met in order for an agent to be eligible for various forms of moral appraisal. Second sense, "responsibility as accountability" which concerns conditions that must be met in order for an agent to be eligible for moral responses and demands beyond appraisal, that is holding an agent responsible with respect to negative or positive sanctions.

Smith: Attributability as answerability—being responsible for some action or attitude Φ is just a matter of being answerable to others for Φ. Agents who are in proper "rational relation" to Φ are answerable for Φ and therefore open to legitimate moral criticism if it should turn out that Φ violates any moral norms or expectations.

Shoemaker (2011): there are important cases where Φ is attributable to an agent but the agent is not answerable for Φ. Shoemaker suggests that there are cases where one can be responsible in the attributable sense *without* being answerable.

> Cases: irrationality. An agent may both fear spiders and also sincerely believe spiders are not dangerous. We may attribute this irrational attitude to the agent even though the agent is not answerable for it, since her attitude does not actually reflect any judgments about reasons.
>
> Cases: non-rational emotional commitments. A mother of a serial killer may still emotionally care for her son despite judging that he is a morally reprehensible person. These agents cannot be answerable for their attitudes because "they are simply devoid of the resources necessary to engage with your communicative attempt" (p. 611). However, our emotional commitments are still attributable to us, even though we lack the ability to rationally justify them.

Take away: Agents may properly hold attitudes or commit actions for which the reasons are somehow not properly connected to the them.

The structure of the problem of moral responsibility bears on the epistemic case.

Shoemaker's distinction between attributability and answerability obtains in epistemic cases. Epistemic agents can hold beliefs for which the justifiers are not fully accessible to them, i.e. collaborating scientists often make claims in published papers which they are not answerable for because all the justifiers for claims are not directly available to them.

IV The positive view

For an agent S, in a scientific collaboration, to be epistemically responsible for producing a scientific claim that P:

Attributability: P is attributable to S if and only if (1) S has accepted that P and asserted (publicly avowed) that P, and (2) S has causally contributed justifiers in support of P as a member of the scientific collaboration.

Answerability: S is answerable for P in so far as S ought to be able to report the reasons for P. S is always answerable for any justifiers directly contributed in support of P. S may also be answerable to other justifiers which are epistemically accessible to S.

Accountability: If P is attributed to S, then S can be held attributable-accountable for all contributed justifiers in support of P. If S is answerable for P, then S is answerable-accountable for any and all justifiers which are epistemically accessible to S. If S is judged either attributable-accountable or answerable-accountable or both, then S is open to legitimate epistemic criticism if it should turn out that P or reasons for P violate any epistemic norms or expectations. Likewise, S is also open to legitimate epistemic praise if it should turn out that P or reasons for P are judged praiseworthy in accordance to epistemic norms or expectations.

Accountability, attributability and answerability are not reducible to each other. Attributability is not co-extensive with answerability. It is possible that we have beliefs for which the reasons are not fully accessible to us. There are at least two sources of such inaccessibility of reasons…

(1) The nature of the evidence: some of our claims about the world rely on a vast amount of complex evidence which would be impossible for any single epistemic agent to be answerable for.
(2) Division of epistemic labor: scientists have different expertise and they rely on each other's expertise to make inferences about the world. But differences in expertise makes certain lines of reasoning opaque to us.

Epistemic answerability must come in degrees, unlike attributability which is binary.

Epistemic responsibility as answerability is a demand for reasons to a degree which is appropriate to expect given the capacities and experiences of the agent as an epistemic agent.

Let's work through an example:

> Marie is a senior researcher and the principle investigator (PI) of a lab. In her lab, she has planned and conceptualized an experiment in collaboration with a graduate student Adam and a post-doc Bob. Adam conducted the bench work by running the experiment and recording the data. Bob conducted the statistical analysis of the data. Throughout this process, Marie, Adam, and Bob had weekly lab meetings and updated each other on the respective parts of their project. Marie, being the senior researcher, offered advice and solutions when Adam and Bob encountered difficulties in their work. Bob wrote the first draft of the paper reporting their results. Adam made minor revisions. Marie made major and final revisions to the paper. Before the paper was sent to a journal, Adam and Bob read and approved the final paper. The paper with the discovery claim that P was published with Bob as the first author, Adam as second author, and Marie as last author.

Who is attributable-responsible for P? All three members of collaboration are attributable-responsible.

Who is answerable-responsible for P? The determination of answerability hinges on to what degree each agent has access to the reasons for P. Marie, Adam, and Bob are answerable in different degrees for P.

Who is accountable-responsible for P? Our judgments about accountability differ in accordance with who is attributable and who is answerable. Adam is only attributable-accountable: this is reflected in the lab's practice of listing him as the second author. Bob and Marie are both attributable-accountable and answerable-accountable; they are first and last authors.

> Real life example: OPERA's superluminal neutrinos
> - Attributable-responsible: the engineers
> - Answerable-responsible: no one
> - Accountable-responsible: the spokesperson

V Answerability and justification in science

Possible problem: If we asked different researchers "why" questions to get at their reasons and justification for asserting the conclusion of the study, each researcher will report a different set of reasons. Some of these sets of reasons may even conflict. If the answers from different collaborators for the same claim that P do not match up, can the group be said to be justified in making the claim that P?

According to HKW, if there is no consistent justificatory story—that is, if collaborators cannot all tell the same justificatory story for the same claim—then there is no epistemically responsible agent. In taking this line of argument, HKW uses a hidden premise that collective justification of a claim requires that all members of the group are in consensus over all reasons for that claim. → If collaborators disagree over the reasons for that claim then there is no collective justification for that claim.

I will argue that consensus is too strong an requirement for collective justification in general. Disagreement is an inherent characteristic of social groups that are composed of people who are dissimilar to each other. Collective justification then cannot require widespread consensus among group members of both the reasons for P and P. *Some degree of disagreement among collaborators over the reasons must be tolerated in a collaboration so long as there is consensus over the conclusion or final discovery claim.*

I can only give two sketch arguments here for this claim.

First argument: This is what happens in collaborative science.

> "In subsequent interviews, when CDF physicists were asked whether they still endorsed the claims made in the Evidence [for the Top Quark] paper, they typically replied that they did, and then many went on to explain how one or another part of the analysis was flawed, but that other aspects of the analysis had in fact been evaluated conservatively (or not included in the central evidence claim at all), so as to compensate for those flaws. Different critics, however, identified different strengths and weaknesses. Thus, although the collaboration reached a general consensus on their evidence claim, this was a heterogeneous consensus insofar as the reasoning on the basis of which this claim was accepted varied from one individual to another." (Regh and Staley 2008)

Second argument: the structure of scientific collaborations themselves. Scientific collaborations pull together a diverse group of people with different expertise and backgrounds. As the number of collaborators rise, it is less likely that every member of the collaboration will agree with each other on every single point. Heterogeneous consensus will be a straightforward solution to how a collaboration can manage such disagreement among its members. So long as there is consensus on the discovery claim or main conclusion, then some disagreement among individuals over how that discovery claim or main conclusion is justified ought to be tolerated.

Let's survey the space of possibilities…

- consensus among collaborators across both reasons and conclusions (reject)
- consensus among collaborators about the reasons and tolerate some disagreement over the conclusion (reject, normatively bad)
- disagreement on both reasons and conclusion (reject, failure of collaboration)
- some disagreement about the reasons so long as there is consensus about the conclusion (yes, because robustness of the conclusion)

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