Values, science, and competing paradigms in sustainability research: furthering the conversation

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Abstract

Sustainability science is fundamentally a problem-driven and solutions-oriented science which necessitates engagement with questions of interdisciplinarity and normativity. Nagatsu et al. (2020) recently investigated the significance of these peculiar characteristics and produce a useful and timely overview of the problems facing sustainability science, as a science. Perhaps the most crucial and crosscutting challenge they identify regards the need for researchers to justify the particular values guiding sustainability research. In the spirit of advancing Nagatsu et al.'s agenda for further developing the role of values in sustainability science, I argue two things. First, that there are in practice several active and competing approaches to dealing with the problem of normativity in sustainability science that provide options to researchers. Second, that this unresolved tension at the core of sustainability science points to a more overarching problem, namely the need to more explicitly identify coherent, competing research paradigms within the field.

Keywords Sustainability science · Normativity · Hegelian ethics · Immanent critique

Sustainability science (SS) is fundamentally a problem-driven and solutions-oriented science. These particular characteristics necessitate engagement with questions of interdisciplinarity (in the analysis of complex sustainability problems) and, crucially, normativity (in the identification of possible solutions). Nagatsu et al. (2020), in their recent article, investigate the significance of these characteristics and produce a useful and timely overview of the problems facing SS, as a *science*, from a philosophy of science perspective in the analytic tradition. These include discussion on epistemological issues regarding inter- and transdisciplinary methodology, science–policy interactions, and conceptual rigor and clarity, all of which represent persistent challenges of real relevance to SS research and, equally important, related practice. In addition to these concerns, they draw attention to a particularly vital issue that, perhaps more than any other,

deserves immediate and ample attention, as nothing short of the scientific integrity of the SS mission is at stake.

Nagatsu et al. (2020, p. 1813) phrase the issue at hand this way, pointing to two challenges: “Without defending a particular form of the argument from inductive risk, our point is simply to insist that it is crucial for the success of sustainability science (1) to justify how some values, including the ethical values of sustainability scientists, may legitimately enter into science, and (2) to design methods and institutions capable of countering the problematic biases that values might produce.” These two challenges, while here formulated from the particular tradition of analytic philosophy, point to a long-standing question about the role of values in science, and what to do about them, also much discussed in other philosophical traditions and within the social sciences themselves. In the context of scientific practice, the answer to this question is not at all obvious and hotly disputed, especially when paying attention specifically to the issue of *justifying* objectively (by which I mean communicable, demonstrable, and reproducible, *not* perfect or absolute, and certainly not “value-free”) particular values in science (rather than merely making them explicit). In the spirit of advancing Nagatsu et al.'s agenda for further developing the role of values in SS, I argue two things. In addressing their first challenge, I argue that there are in practice several active

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and competing approaches to dealing with the problem of normativity in SS that provide options to researchers. In addressing their second challenge, I argue this unresolved tension at the core of SS points to a more overarching problem, namely the need to more explicitly identify coherent, competing research paradigms within the field.

That there is an important relationship between values, science, and sustainable development is uncontroversial and much discussed (Kates et al. 2005; Schneider et al. 2019), though the nature of this relationship can be conceptualized differently. However, the specific question raised by Nagatsu et al. regarding the *justification* of the values informing SS is a particularly crucial topic less often explored. While much work of course remains, an attempt to clarify this important issue was made by Boda and Faran (2018) who reviewed the reasoning in the SS literature regarding the justification for bringing certain values into research. They identified two approaches actively used in the literature, and from a critique of these, advanced a third approach they argue handles the question of normativity in science more adequately.

The first approach they consider, also noted by Nagatsu et al. (2020) from within the analytic tradition, is the model of “value-free science” associated within much of the social sciences with the widely influential work of Max Weber, most famously elaborated in two celebrated lectures, *Science as a Vocation* (1917) and *Politics as a Vocation* (1919) (Gerth and Wright Mills, 1946, pp. 77–156). Indeed, Boda and Faran (2018) identify this “value-free” position as the historical starting point for SS, though things have certainly changed within the field over the last 2 decades. In *Our Common Journey*, widely considered a founding document in SS, the authors state their position clearly: “Of course, which goals *should* be pursued [by SS researchers] is a normative question, not a scientific one” (Kates and Clark 1999, pp. 2–3, emphasis in original). From this perspective, normativity lies in the act of setting the goals, which is the job of politics, and ultimately the legitimate goals toward which SS should contribute are those set by “international political debate and action, and sanctioned at intergovernmental conferences”. This position, while philosophically legitimate, explicitly rejects the possibility of science having a role in setting goals, leaving this entirely up to politicians/citizens. While the adequacy of the goals set through such political sanctioning processes can be questioned, a real problem for SS as science is that this approach fails to provide a scientific, objective justification for the values guiding SS.

Others researchers in SS, such as the widely cited work by Wiek and colleagues (e.g., Wiek et al. 2011), reject the ideal of “value-free” science and emphasize what they see as the inherent normativity of SS. Boda and Faran (2018) argue that much of this work, probably the most dominant position in SS, finds its closest parallel in the perspective of Swedish social scientist and Nobel laureate Gunnar Myrdal

and his model of “value-laden” science. Here, scientists can/ do bring certain sets of values to the research process (rather than claiming to be “value-free”), and (part of) the job of the scientist is to try to make those values explicit in advance of the analysis. Indeed, the question of values and their role in science is viewed in part by many in SS as specifically a challenge for individual researchers or teams to “bring to the surface” their own values (e.g., Schneider et al. 2019; Horcea-Milcu et al. 2019), while discussing less often the need to provide a scientific justification for adopting those particular values. While this emphasis on making (personal) values explicit in SS research may seem to mesh well with Myrdal’s perspective on the surface, there are important differences. In the context of scientific practice, Myrdal was acutely aware, for example, of the need for the values deemed relevant to science to avoid being arbitrary, insisting “the value premises should not be taken out of the air by intelligent guesswork” (Myrdal and Streeten 1958, p. 51). In particular, Myrdal insists that, (a) “even if the value premise is now openly assumed to be extra-scientific”, it cannot be arbitrary; (b) “it must be relevant, even significant, and it must be practicable”, and in other words, it must be objective, not the whim of subjective preference; and (c) being relevant and practicable means that “it must correspond to the real valuations of existing groups in society, large enough or for other reasons having power enough to make it realistic” (Myrdal and Streeten 1958, p. 50). Put different, the argument is that the value premise brought into science cannot simply be declared, but has to *justify* itself by *demonstrating* its relevance, significance, and practicability, i.e., be related to a *social agent* willing and capable of practicing the results and implications, and importantly the demonstration should be *replicable*, not a personal/subjective choice of the author/researcher. The assertion that values are “inherent” in SS seems to suggest to some that further justification of the values guiding research is unnecessary, resulting in this crucial dimension being overlooked. It has been suggested that this disconnect between the practice of handling values in science by some SS researchers and the long-running debates on this question within traditional disciplines may be related to the lack of a coherent, systematic procedure for borrowing concepts from other disciplines in interdisciplinary sustainability research (Boda and Faran 2019).

However, it is exactly this “real valuations of... groups”, as Myrdal himself acknowledged, which leads to serious problems for this approach. His attempt falls short of his aim to make the choice of values non-arbitrary, which hinges on addressing two “difficulties”. First, “the valuations should, as far as possible, be ‘rational’, in the sense that they represent the valuations people would have if they had a better knowledge about reality”. Second, “that they must be valuations not only of the elements in the present situation but also of elements in all the possible future developments”

(Myrdal and Streeten 1958, p. 51). As the reader may appreciate, Myrdal's line of thought, far from settling the question, points to concepts such as true and false consciousness, ideology and hegemony, discourse and episteme, essentialism and constructivism and the like (concepts that only a decade after Myrdal's writing became the staple of debates in all fields of social science), which fails to justify scientifically the norms and values deemed relevant for sustainability research.

Building on a critique of the limitations of these two approaches, with Myrdal being a not fully satisfactory improvement over Weber in his conceptualization of the interaction between values and scientific practice, Boda and Faran (2018; but see also Harnesk and Isgren 2021; O'Byrne 2020; Boda 2018a, Chapter 8) advance an alternative, rooted in the Hegelian school of ethics, by arguing for *immanent critique* as a scientific procedure by which values can be objectively incorporated in SS research, a position also much-elaborated and long-defended in the Critical Realist philosophy of science (e.g., Isaksen 2018; Collier 1999; Bhaskar 1979). Here, the concept of critique signifies specifying the *limitation* of a theoretical construct and related practice, based on examining both the internal consistency of the theoretical construct and its correspondence to external data. That is, immanent critique aims to spot the contradictions of a practice and related theoretical construct that attempts to represent the whole, but is valid only for part of the whole (Beiser 2005, pp. 89–90). Procedurally, in immanent critique, one begins by tentatively accepting and clarifying the premises of a theoretical construct and related practice, then spotting the gaps, silences and contradictions in it, and finally showing the necessity of introducing new practices/concepts/systems of thought to resolve such tensions (MacIntyre 1996, pp. 192–203). The contradictions noted by immanent critique can be theoretical, practical, and/or data-related (Isaksen 2018, p. 97). This indicates that, far from a purely conceptual exercise, immanent critique is deeply concerned with the consistency of a particular *idea* with its related forms of *practice*, and how these correspond with concrete *facts* of a particular case. Once tensions, gaps, or anomalous data in a particular way of thinking or acting are uncovered, more adequate ways of thinking and acting can be shown to be necessary to overcome these inadequacies, which provides an objective justification for suggesting specific, concrete theoretical and practical improvements (i.e., normative insights) through SS research.

To demonstrate how immanent critique handles values in research, take as an example Boda's (2018a, see especially Chapters 5–7) analysis of the sustainability of coastal management practices in the U.S. State of Florida. Following the logic of immanent critique, rather than starting with a definite set of values that have to be justifiably *imported* into the research, the values are extracted from the case

through analysis, by adopting and developing the central criteria of coastal management historically employed in the coastal community of Flagler Beach, FL, i.e., maximizing people's welfare measured in aggregate GDP of the region. This approach, perhaps unsurprisingly, gave priority to coastal infrastructure protection at the price of neglecting environment. To bring in the normative value of protecting the environment, immanent critique of the dominant practice helps point to the fact that by neglecting environmental protection, this coastal management approach would diminish the attraction for tourists coming to the area, which was a main source of income for a considerable proportion of the population. Note that in this way the normative value of protecting the environment has to be introduced based on the internal logic of the original managerial approach. One could go further, as indeed Boda did in his research, and question if aggregate GDP itself would truly serve the residents' welfare (which was the cornerstone of the original coastal management approach). By exposing inadequacies in this assumption, it becomes possible to introduce, e.g., the concept of human capability, as a necessary concept to correct the shortcomings of relying solely on GDP for serving human wellbeing (see also Boda 2018b). Indeed, the theoretical tensions of the GDP approach could be traced back to its theoretical foundation, namely what in the sustainable development literature has come to be known as 'weak sustainability', and the method of immanent critique could at the abstract theoretical level show the tensions in it and the necessity of moving in steps to other approaches, each with their own related practices and values (see Boda and Faran 2018, Part II). However, the crucial point to make here is that the critique at the abstract level does not exempt the researcher from showing how the values can be inferred from examining the current practices, and the shortcomings and contradictions of their explicit or tacit values, as briefly recounted above for the case of Flagler Beach in FL. This shows how immanent critique does not force any specific values on researchers or the researched context, but puts forward a procedure that, by following it, researchers could extract values from rigorous analysis of their cases.

It is important to clarify here that, while some of my colleagues and I favor immanent critique as a way to justify the values brought into research, all of the above discussed positions are of course possible to take up (though perhaps highly contested), and this list is unlikely to be exhaustive. The challenge for current SS researchers is first of all to recognize the problem, as Nagatsu et al. emphasize, but perhaps more so to "take a side", so-to-speak. SS as a field needs to critically reflect on which approaches to scientific knowledge production are being advocated and to identify what various approaches share in common and where they diverge, and from this to attempt to coalesce into coherent, competing research paradigms in the field. These paradigms

should be built around such core differences as how they purport to address fundamental questions of normativity, and interdisciplinarity, in scientific practice. Only after identifying and clarifying multiple distinct paradigms can the fruitful work of scientific comparison between competing paradigms commence, which, following Lakatos (1978), is a necessity if SS is to ultimately mature as a research field. To date, despite historic signs of a generic “unification” in the field’s ambitions (Bettencourt and Kaur 2011), SS is still quite fragmented except at the most abstract of levels (i.e., its problems-focus and solutions-orientation). For example, it is telling that some SS researchers have recently argued that so-called “mode-2” or “post-normal” science is core to SS (Caniglia et al. 2021), while at the same time, other prominent SS researchers neglect to discuss such approaches in what they present as core contributions to the still developing field (Clark and Harley 2020). This demonstrates at very least the lack of consensus on fundamental questions in the field, hence the need for more basic research.

To conclude, while SS can clearly be coherently identified as a distinct field of problem-driven and solutions-oriented research, this does not imply unity of epistemology (philosophy of science), as indeed is the case in similarly interdisciplinary fields (e.g., Development Studies, Feminist Studies), or even disciplines in “hard” science (e.g., Physics). Building on the problems pointed out by Nagatsu et al., it seems like a fruitful pathway forward to explicitly formulate the divisions in SS along such foundational question, with the issue of how to handle normativity in science among the most crucial. At the start, I emphasized that the integrity of SS is at stake, yet it is important to also recognize that how one deals with normativity in science is not only a reflection of the quality of the science conducted, that is, philosophically/epistemologically. Rather, different paradigms matter for research practice and thus outcomes in concrete contexts; that is, they have implications for *how to do* science (i.e., methodology), as reflected in the above example of immanent critique and coastal management. While much more comparative work clearly remains, I would argue that there are good reasons to look to immanent critique, with its focus on solving internal tensions within actually utilized theoretical constructs and related concrete practices, as a coherent means to address not only normativity in science, but some of the other highly relevant concerns pointed out by Nagatsu et al. (2020). These include epistemological issues regarding inter/transdisciplinary methodology (Harnesk and Isgren 2021; O’Byrne 2020; Isaksen 2018), navigating the science-policy interface (Boda 2018b), and ensuring conceptual rigor and clarity in SS research and related practice (Boda and Faran 2019; Boda 2018c).

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References

- Beiser F (2005) Hegel. Routledge, New York, USA; London, UK
- Bettencourt LM, Kaur J (2011) Evolution and structure of sustainability science. *Proc Natl Acad Sci* 108(49):19540–19545
- Bhaskar R (1979) The possibility of naturalism: a philosophical critique of the contemporary human sciences. Routledge
- Boda CS (2018a) The beach beneath the road: sustainable coastal development beyond governance and economics. Lund University, Lund, Sweden
- Boda CS (2018b) From economic choice to social choice in coastal management: a critical assessment of the use of cost-benefit analysis in the evaluation of an erosion control project in Flagler County, Florida, U.S.A. *Ocean Coast Manag* 162:85–99
- Boda CS (2018c) Community as a key word: a heuristic for action-oriented sustainability research. *Sustainability* 10:2775
- Boda CS, Faran T (2018) Paradigm found? Immanent critique to tackle interdisciplinarity and normativity in science for sustainable development. *Sustainability* 10:3805. <https://doi.org/10.3390/su10103805>
- Boda CS, Faran T (2019) The discipline in interdisciplinarity: flagging a blind spot in sustainability science. *J Interdiscipl Sci* 3(2):21–35
- Caniglia G, Luederitz C, von Wirth T et al (2021) A pluralistic and integrated approach to action-oriented knowledge for sustainability. *Nat Sustain* 4(2):93–100
- Clark WC, Harley AG (2020) Sustainability science: towards a synthesis. *Annu Rev Environ Resour* 45:331–386
- Collier A (1999) Being and worth. Psychology Press
- Gerth HH, Wright Mills C (eds) (1946) From Max Weber: essays in sociology. Oxford University Press
- Harnesk D, Isgren E (2021) Sustainability as a Real Utopia—heuristics for transformative sustainability research. *Environ Planning E Nat Space*. <https://doi.org/10.1177/25148486211018570>
- Horcea-Milcu A, Abson DJ, Apetrei CI et al (2019) Values in transformational sustainability science: four perspectives for change. *Sustain Sci* 14:1425–1437. <https://doi.org/10.1007/s11625-019-00656-1>
- Isaksen KR (2018) Without foundation or neutral standpoint: Using immanent critique to guide a literature review. *J Critic Realism* 17:97–117
- Kates R, Clark W (1999) Our common journey: a transition toward sustainability. National Academy Press, Washington, DC USA
- Kates RW, Parris TM, Leiserowitz AA (2005) What is sustainable development? *Environment* 47(3):8–21

- Lakatos I (1978) The methodology of scientific research programmes: Volume 1: Philosophical papers. In: Worrall J, Currie G (eds). Cambridge University Press
- MacIntyre A (1996) A short history of ethics: a history of moral philosophy from the Homeric age to the 20th century. Touchstone, New York
- Myrdal G, Streeten PP (1958) Value in social theory. a selection of essays on methodology. In: Streeten PP (ed). Routledge & Kegan Paul, London, UK
- Nagatsu M, Davis T, DesRoches CT et al (2020) Philosophy of science for sustainability science. *Sustain Sci* 15:1807–1817. <https://doi.org/10.1007/s11625-020-00832-8>
- O'Byrne D (2020) No more water, but fire next time: the conflict between environmental aims and social claims in Louisiana's post-Katrina coastal planning. Lund University Press
- Schneider F, Kläy A, Zimmermann AB et al (2019) How can science support the 2030 Agenda for Sustainable Development? Four tasks to tackle the normative dimension of sustainability. *Sustain Sci* 14:1593–1604. <https://doi.org/10.1007/s11625-019-00675-y>
- Wiek A, Withycombe L, Redman CL (2011) Key competencies in sustainability: a reference framework for academic program development. *Sustain Sci* 6(2):203–218

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