



A collective alternative to the Inward Turn in environmental sustainability research

Chad S. Boda¹ · David O'Byrne¹ · David Harnesk¹ · Turaj Faran¹ · Ellinor Isgren¹

Accepted: 22 November 2021 / Published online: 26 November 2021
© The Author(s) 2021

Abstract

It has become quite common in environmental sustainability research to promote the influencing of so-called inner dimensions of individuals as means to address pressing environmental problems such as climate change, what we refer to as the Inward Turn. We argue that the conceptual foundations of the Inward Turn, an extreme form of methodological individualism, limit it significantly as a strategy for addressing climate change and other socially relevant environmental problems. After briefly reviewing major shortcomings with the way the Inward Turn conceptualizes the relationship between individuals and social change, including its neglect of causal structures and propensity to abstract its analysis away from problems that are specific to place and time, we sketch the basic tenets of an alternative methodological approach capable of overcoming these limitations. Our approach, however, does not go to the other extreme and neglect the role of individuals; rather, our recognition of the structural drivers of particular environmental problems points to the necessity of specific collective actions by individuals, for example, in the practice of social movements. This recognition demands a rethinking of the role of individual factors, like emotion and empathy, in addressing environmental sustainability problems, namely as they relate to collective action/social movement emergence, development, and outcomes.

Keywords Individual action · Methodological individualism · Agent and structure · Collective action · Structural change

Introduction: the Inward Turn in environmental sustainability research

Few would deny that societies around the globe face worsening crises including climate change, biodiversity loss, and deepening material inequalities. In recent years, it has become increasingly recognized in civil society and much of academia that structural change at different levels is needed to fully address these persistent problems. This recognition, and the inaction of governments and the private sector, has provided the impetus for an increase in organizing in civil society, as normal people band together to try and force particular kinds of structural change on the economy and politics.

We argue below that ours is a time when sustainability researchers should be trying to understand how to contribute to collective movements as agents of social change

for environmental sustainability. But some sustainability researchers (e.g., Ives et al 2020; Woiwode et al. 2021) are suggesting a turn in the opposite direction. That is, running parallel to these real world developments is the increasing promotion of influencing individuals' behavioral motivations as means to address these same crises, captured under a variety of terms, e.g., "inner transformation," "environmentally friendly values," etc. The justification for this "Inward Turn" is often that more traditional approaches (e.g., environmental policy) are perceived to be insufficient, and instead widespread *individual mindset* change is required to effectively address societal problems.

In this article, we argue that this Inward Turn is based on a problematic conceptualization of the relationship between individual agents and the structural drivers that cause socially relevant environmental problems, and highlight some of the major tensions coming from this limiting understanding. Following our characterization and critique of the Inward Turn, as well as similarly problematic one-sided structuralist approaches, we outline a more appropriate understanding of how individuals living under constraints in society can contribute to structural changes, and what

✉ Chad S. Boda
chad.boda@lucsus.lu.se

¹ Lund University Centre for Sustainability Studies, Lund, Sweden

this implies about sustainability research methodology. Our approach, however, does not go to the other extreme and neglect the role of individuals; rather, our recognition of the structural drivers of particular environmental problems points to the necessity of *specific collective actions* by individuals, for example, in the practices of social movements. In turn, this requires a rethinking of the role of “inner dimensions” in processes of social change. Our general argument echoes recent calls for researchers to adopt a theory of social change in action-oriented environmental science that incorporates collective action as an agent of change (Smith et al. 2020; O’Byrne et al. 2018), and from this points towards the need for a better understanding of how science can contribute to this collective action for sustainability (Harnesk and Isgren 2021; O’Byrne 2020a; Isgren et al. 2019).

Methodological individualism and its limits

A coherent justification for focusing primarily on individual mindsets as means to achieve social change relies on two assumptions. The first is that socially relevant environmental problems like climate change are created through the aggregation of billions of individual choices (e.g., Wynes and Nicholas 2017; Woiwode et al. 2021). That is, one assumes a direct line of *causality* from the decisions people make in their everyday lives to global change phenomena like climate change. The second is that these decisions are freely made, based in individual preferences (e.g., Dhadra 2019). That is, peoples’ actions are a direct reflection of their predilections, and not deeply shaped by forces beyond the inner life of the individual. This position is most accurately characterized as an extreme form of *methodological individualism*, the central tenet of which is that explanation of social phenomena can be reduced to the behavior of individuals alone, without taking the relations between individuals into account (Hodgson 2007). This has the effect of focusing on the realm of individual behavior that is free of social influence, rather than for example turning towards more collective forms of agency (O’Byrne et al. 2018). In practice, this research translates to a variety of interventions that aim to instill in individuals appropriate knowledge and/or environmentally friendly mindsets, which then motivate more sustainable behavior. This can be anything from more general attempts to overcome knowledge deficits in schooling curricula (Wynes et al. 2020), to providing guidelines for greening individual consumption (Ivanova et al. 2020), to promotion of mindfulness training (Dhadra 2019) and individually tailored “formative life experiences” (Balmford et al. 2017), and in a class of their own, the promoters of the philosophy of “anti-natalism” (Hereth and Ferrucci 2021).

This focus on the motivations behind individual behavior is of course within the standard purview of behavioral

sciences such as psychology, orthodox economics, and (some kinds of) political science. In these fields, it is part and parcel of the discipline, and is in no way problematic as such. That is to say, behavioral scientists are already “inward”¹; thus, the inward *turn* does not apply here. Steg and Vlek (2009), for example, have “identifying the desired behavior” to be changed as the first-tier heuristic for formulating interventions in the vein of environmental psychology. The Inward Turn thus applies particularly to interdisciplinary researchers interested in sustainability—those reaching outside of their home disciplines (e.g., ecology) into social sciences to try to develop solutions to environmental problems.

In sustainability research, the turn towards behavioral sciences is typically justified this way:

“Human behavior is responsible for many of our greatest environmental challenges. The accumulated effects of many individual and household decisions have major negative impacts on biodiversity and ecosystem health. Human behavioral science blends psychology and economics to understand how people respond to the context in which they make decisions... Behavioral insights have informed new strategies to improve personal health and financial choices. However, less is known about whether and how these insights can encourage choices that are better for the environment.” (Byerly et al 2018)

However, when analyzing the causes of environmental problems, there is no reason to take it as given that individual behavioral motivations are the most important driver of a given environmental problem in a concrete context. Indeed, it may be more reasonable to assume that many environmental problems have social dimensions and instead require the use of appropriate *social* theory to account for the causes of such problems (O’Byrne et al 2018). As we see it, the Inward Turn is in many ways a turn *away* from social theory. It is perhaps ironic that the historical impetus for the development of social theory was a recognition of the limits of Enlightenment faith in the rationality of properly educated individuals (see Callinicos 1999, Chapter 1).

The Inward Turn’s problematic conceptualization of social change processes leads to two serious limitations. First, the individualized causal framing by definition neglects the causal role of structural forces in producing environmental degradation. This means that solutions developed from this perspective can only address changes that are possible within existing structural conditions, rather than aiming to change those conditions. Second is the

¹ However, this common position has been recently criticized even within psychology (Schmitt et al 2020).

Table 1 Four problematic assumptions of the relationship between individuals and social structures

How social structures are assumed to influence individual choice	Exemplary quotes
<ul style="list-style-type: none"> • Some assume individuals are <i>essentially free of any significant structural constraint</i> 	“sustainability can be achieved by engaging consumers to make minimal behavioral shifts that facilitate more sustainable lifestyles, increase the demand for sustainable goods and decrease irresponsible consumption.” (Dhadra 2019, p. 83)
<ul style="list-style-type: none"> • Some assume <i>individuals and structures are parallel dimensions that do not interact</i> 	“Structural barriers must be removed wherever possible, but this is unlikely to be sufficient. Psychologists must work with other scientists, technical experts, and policymakers to help citizens overcome these psychological barriers.” (Gifford 2011, p. 290) ¹
<ul style="list-style-type: none"> • Some acknowledge the influence of structures on individual choice, but <i>assume no possibility for normal individuals to influence social structures</i>, unless they are in a position of unusual power 	“Most people are not in positions of power where they can directly influence government or corporate policy, but all people consume materials and energy in their daily lives, and as such, each person can choose to adopt behaviors that are comparatively better for the environment.” (Osbaldiston and Schott 2012, p. 258)
<ul style="list-style-type: none"> • Some assume <i>individual behavioral changes will aggregate to structural change</i> 	“We recommend four widely applicable high-impact (i.e., low emissions) actions with the potential to contribute to systemic change [...] for example, living car-free reduces the need to build more roads and parking spaces, and supports higher-density urban design...” (Wynes and Nicholas 2017, p. 3)

¹ Though Gifford is a psychologist and not a sustainability researcher per se, this article is highly cited and influential in sustainability research, and we think typifies a prominent attitude in this literature

methodological assumption that intentional individual action aggregates to explain macro-level environmental problems like climate change. The resultant focus on abstract indicators of environmental impact (i.e., “footprints”) excludes the possibility of addressing a whole range of environmental problems that are specific in place and time. That is, its propensity to focus on abstract indicators will not aim at any *particular* urgent environmental problems. To the people in coastal communities that face inundation by rising seas, for example, the mantra to “cut your personal carbon footprint” offers little guidance.

Structures, agency, and social change

Though we find the Inward Turn’s conceptualization of the relationship between individuals and social change to be problematic, those advancing this perspective are consistent in so far as they focus on free individual choice (even if we argue they grossly overestimate its capacity). This position finds theoretical support in orthodox economics. Take the example of advocates of greening individual consumption in order to reduce one’s personal carbon footprint. For orthodox economists, demand for commodities in the market is solely driven by individual preferences, and preferences expressed on the market simply emerge from people’s tastes. It is not the role of the economist to question where these tastes come from (Schumpeter in Hodgson 2007 p. 213). Not all Inward Turn proponents so flagrantly disregard the influence of social structures on individual choice, but when attempts are made to bring in the question of structure and

its relations with individual behavior, it is often done in an undertheorized fashion (see Table 1).

We argue that free individual choice is an inadequate account of how climate change, and indeed any social or socially mediated phenomenon, is caused or effectively addressed. Rather, as is foundational in sociology, any explanation of *social* phenomena must also take account of structural factors (see Mills 2000; Longo et al. 2021). By structures we simply mean durable relations between individuals, which range from inescapable institutions like money and taxes, to softer cultural forces like the social pressure to recycle. In the explanation of social phenomena, structures amount to impersonal forces that drive particular environmental problems and set the conditions for possible individual action. These forces are not reducible to individuals alone; that is, if individuals were to somehow be replaced, the group would behave more-or-less the same under similar structural conditions. To explain global environmental changes like climate change, including their local manifestations, the wealth of research coming from this perspective points to on-going and highly uneven macro-structural change processes in the last few centuries largely associated with the development and spread of capitalism, such as industrialization, urbanization, agricultural modernization, and their reliance on fossil fuels (see Jorgenson et al. 2019). These processes of course play out in the lives of everyday people, but are not reducible to them. While it is a tautology to say that nothing happens in society without people doing something, from this obvious fact it does not follow that something like climate change is caused by “individual decisions.” It is inaccurate to imply that

environmental problems like climate change are caused by the free choice of individuals. On the contrary, the potential for free individual choices to influence e.g. GHG emissions from industrial processes is exceedingly small.

A structural approach, that we advocate, can easily be mistaken by the promoters of the Inward Turn as ignoring the active role of the conscious individual, and prompt the allegation of determinism. There may have been such deterministic use of the term, but that is not what we understand by a structural approach. On the contrary, the crucial point in focusing on identifying the causal role of social structures for social phenomena is to provide the objective knowledge that is indispensable for the actions of the agents if, in the face of deep-seated social structures, they are meant to be effective. It is also necessary to point out here that we are not claiming that all the actions of individuals are completely determined by social factors (see Anderson 1980, Chapter 2, esp. pp. 19–22). There are of course areas where people are not structurally limited in their behavior and so improved knowledge, ethical appeals to values, or other behavioral approaches such as nudging, can be effective (for example, the knowledge of how to properly sort recycling).

Structural change without an agent?

It is not only proponents of the Inward Turn who maintain a separation between individual actors and social structures. There are adherents of purely structural approaches in the social sciences who support such a separation. These are the theorists who, whether explicitly or not, subscribe to the notion that social change is a process *without* an agent. In doing so, they lend weight to the common but inaccurate impression held by researchers not accustomed to, or taking their first step into, social science, that this is how structural factors are treated in social research generally. This further encourages the continued isolation of individual action from wider processes of social change.

One version of one-sided structuralism comes from within the left-leaning literature on de-growth. In a call for system-wide change, one prominent author in this tradition considers the situation so dire that, though de-growth might be necessary, “this does not make it politically feasible” (Kallis 2017, p. 7). In fact the author is left in the hopeless position of having to “bet instead on a social miracle and hypothesize that under a system other than capitalism it will be possible to have fundamental social changes and achieve high levels of perceived well-being with much lower levels of energy consumption” (p. 7). This social miracle would involve “the monumental transformation of desires,” but the author provides no clear suggestions as to how any individual action, or even collective action, can contribute to such transformation.

On the other side of the political spectrum are market enthusiasts. They find their best theoretical support in the social and economic theory of Hayek (2014). For Hayek, a properly functioning market organized through the system of price signals can address any social problem of significance, at least to the extent that is possible without inhibiting the liberty of individuals. An example of this in environmental debates is the enthusiasm for negative emission technologies known as geoengineering. Supporters of geoengineering claim that it can allow us to meet emission targets without transitioning from our reliance on fossil fuels. One study of geoengineering even claims that it can help us to meet carbon emissions targets at the same time as retrieving “otherwise stranded fossil fuels” (Clark and Herzog 2014, p. 1). Therefore, neither individual action nor structural change is required as the current economic structure will solve the problem.

Towards a collective alternative to the Inward Turn

While the Inward Turn tends to overemphasize “inner dimensions,” clearly a one-sided structuralism leaves no place for them at all, as individuals play no causal role in structural change. In contrast to the methodological individualism and one-sided structuralism discussed above, our account of the micro-foundation of social action relies on the interaction of collectively acting individuals with macro-structures. As such, our approach renders irrelevant neither micro-level nor macro-level analysis—rather, it requires both, but above all, it is the *interaction between* the micro- and macro-level that becomes the primary analytical focus (see e.g. O’Byrne 2020b). This opens up for the inclusion of “inner dimensions,” in so far as they relate to individuals’ engagement in collective action in general and social movement emergence, development, and outcomes in particular.

Once we accept that socially relevant environmental problems like climate change are caused by structural forces, the task for solution-oriented research aiming to address them must be to identify *how these structural forces should/can be changed*, and, equally importantly, *how normal people can contribute to this change*. While some may accept that structures constrain individual choice, it is often forgotten that individuals, particularly when they come together to act *collectively*, in organizations or movements, can also influence social structures (Della Porta and Diani 2015). This implies that research, rather than assuming the primacy of individual behavioral motivations, should aim to analyze:

1. The *structural drivers* of a particular problem,
2. How to *modify* them and at what *level*, and

3. What role *social organizations* can have in changing them.

This includes which organizations, if they exist, can bring about the necessary change, or how these organizations can be built if they do not already exist. In principle, the agency for change could be derived from any section of society, including political parties, private enterprise, or civil society. In practice, the demonstrated failure of politicians and the private sector to address pressing social and environmental problems, and the history of social movements stepping in when such failures have occurred in the past (Tarrow 2011), points to social movements as the most likely agency for structural change. However, they do not act independently of economics and politics. Social movements are a form of *collective* social power that can force reforms on the economy and the state (Smith et al. 2020).

Our approach is methodological, and entails the concrete analysis of particular problems and their solutions, in particular geographical contexts, rather than a grand theory for how social structures create or perpetuate environmental problems. Those who have taken the Inward Turn tend to focus their analysis on the motivations for individual behavior, and in turn propose concrete solutions like tailor-made interventions and school syllabi. But the result of this focus on individual motivations is that the environmental problem, and therefore the proposed solution, remains abstract, e.g., reducing carbon footprints. This is because of the assumption that these individual behaviors aggregate to define the problem (i.e., methodological individualism). We advocate focusing on the concrete dynamics of particular environmental problems, in which individual behaviors are just one small piece. We argue that scientific analysis should be aimed at, and capable of revealing, the range of causal structural mechanisms (whether political, economic, cultural, etc.) that constrain individuals from sustainable behavior, and how individuals in turn can (collectively) act in order to modify these.

Exactly what structural modifications are necessary, and how to achieve them, is a question that must be approached contextually. Even when dealing with a global and general problem like climate change, when looking towards the possible collective agency for change, we have to deal with the different political regimes and economic circumstances which strongly determine how individuals and organizations can act, for example, the level of democratization of a particular state (Tilly 2008). Some structural modifications may remain aligned with market forces, but use regulation to effectively change individual behavior, for example, putting a tax on plastic bags (e.g., Convery et al 2007). Others may by nature be more emancipatory in outcome, meaning that they improve the possibilities for individuals to take conscious actions for sustainability. For example, expanding

the availability of public transport in urban settings or opting for ecologically sound farming practices by removing inhibiting constraints. This methodological orientation underpins the environmental sustainability research engaged in analyzing, for example, the role of collective action in overcoming structural barriers to sustainable agricultural development in Uganda (Isgren 2018), de-carbonization of the transport sector in Sweden (Harnesk 2018), or sustainable coastal management in the USA (Boda 2018; O'Byrne 2020a).

We want to again stress that collective action too involves “inner dimensions,” as exemplified in the attention to cognitive and affective dimensions of social movements (Eyerman and Jamison 1991). Our intention is not to ignore the relevance of knowledge, emotion, empathy, etc., but to afford them their proper role in the integrated study of structurally determined problems and their solution through collective action. For example, we may wish to study how social movements appeal to emotion or ethics in framing processes, where they seek to expand their numbers and organizational strength, as one component of understanding the movement's growth and evolution. Such analysis should be conducted in conjunction with e.g. analysis of the resources available to a particular movement and the openness or resistance of the political regime to change (see McAdam et al. 1996). Of course, proponents of the Inward Turn may argue that they too intend to highlight the significance of normal people joining such organizations. Our response would be (1) if this is indeed the intention, then this should be made explicit, and (2) in such case, they should avoid making the mistake of assuming that individual values alone determine whether someone will or will not join a movement, but that structural conditions will make it far more likely for some actors in society to join than others.

It is important to note that we see the manifestation of the Inward Turn as the product of wider trends in academy and society, which encourage the individualization of solutions to sustainability challenges, rather than the misguided choices of individual researchers. These wider trends are often discussed under the label of *neo-liberalism*, a diffuse practice of cultural, social, and economic reform which, since the early 1980s (see Carchedi and Roberts 2013), has intensified commercialization and the application of market-logic within both economic and extra-economic sectors, such as the institutions of research and education (Etzkowitz 2001) and environmental conservation (Igoe and Brockington 2007). Such reforms tend to place a strong emphasis on individual autonomy and responsibility while downplaying or rejecting many forms of social coordination, collaboration, and collective action (Wrenn and Waller 2017). Within the academy, the solution to this tendency towards individualization of causes and solutions lies, at least in part, in better cross-disciplinary interaction and interdisciplinary research, including engagement with social theory. Perhaps

more importantly, it points to the need for better platforms for science-civil society interaction, particularly in relation to social movements for sustainability. This will require an explicit struggle within education and research institutions against the current trajectory of an increasingly neo-liberalized academia (Giroux 2009, 2003).

Conclusion

We have argued that sustainability researchers seeking to do interdisciplinary work aimed at solving environmental problems should be wary of turning inward, by which we mean seeking to solve structurally determined problems with an appeal to changes in individual behavioral motivations. Rather, we advocate an approach that identifies the structural drivers of problems, how these structures might be modified, and how social organizations (and the individuals of which these are composed), in particular social movements emanating from civil society, can have a role in modifying those structures.

Author contribution N/A

Funding Open access funding provided by Lund University.

Data availability N/A

Code availability N/A

Declarations

Competing interests The authors declare no competing interests.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

- Anderson P (1980) Arguments within English Marxism. Verso Books
- Balmford A, Cole L, Sandbrook C, Fisher B (2017) The environmental footprints of conservationists, economists and medics compared. *Biol Conserv* 214:260–269
- Boda C (2018) The beach beneath the road: sustainable coastal development beyond governance and economics. Lund University
- Byerly H et al (2018) Nudging pro-environmental behavior: evidence and opportunities. *Front Ecol Environ* 16(3):159–168
- Callinicos A (1999) Social theory. Cambridge Polity
- Carchedi G, Roberts M (2013) The long roots of the present crisis: Keynesians, Austerians, and Marx's Law. *World Rev Polit Econ* 4(1):86–115
- Clark VR, Herzog HJ (2014) Can "stranded" fossil fuel reserves drive CCS deployment? *Energy Procedia* 63:7261–7271
- Convery F, McDonnell S, Ferreira S (2007) The most popular tax in Europe? Lessons from the Irish plastic bags levy. *Environ Resource Econ* 38:1
- Della Porta D, Diani M (2015) The Oxford handbook of social movements. Oxford University Press
- Dhadra TK (2019) Achieving triple dividend through mindfulness: more sustainable consumption, less unsustainable consumption and more life satisfaction. *Ecol Econ* 161:83–90
- Etzkowitz H (2001) The second academic revolution and the rise of entrepreneurial science. *Technol Soc Magazine IEEE* 20(2):18–29
- Eyerman R, Jamison A (1991) Social movements: a cognitive approach. Penn State Press
- Gifford R (2011) The dragons of inaction: psychological barriers that limit climate change mitigation and adaptation. *Am Psychol* 66(4):290
- Giroux HA (2009) Democracy's nemesis: the rise of the corporate university. *Cultural Studies and Critical Methodologies*
- Giroux HA (2003) Public pedagogy and the politics of resistance: notes on a critical theory of educational struggle. *Educ Philos Theory* 35(1):5–16
- Harnesk D (2018) Adding fuel to the fire. Dissertation. LUCSUS, Lund University, Lund, Sweden
- Harnesk D, Isgren E (2021) Sustainability as a real utopia – heuristics for transformative sustainability research. *Environment and Planning E: Nature and Space* 1–18. <https://doi.org/10.1177/25148486211018570>
- Hayek FA (2014) The constitution of liberty. Routledge, London
- Hereth B, Ferrucci A (2021) Here's not looking at you, kid: a new defence of anti-natalism. *South Afr J Philos* 40(1):14–33
- Hodgson GM (2007) Meanings of methodological individualism. *J Econ Methodol* 14(2):211–226
- Igoe J, Brockington D (2007) Neoliberal conservation: a brief introduction. *Conserv Soc* 5(4):432–449
- Isgren E (2018) Between nature and modernity: agroecology as an alternative development pathway: the case of Uganda. Lund University
- Isgren E, Boda CS, Harnesk D, O'Byrne D (2019) Science has much to offer social movements in the face of planetary emergencies. *Nat Ecol Evol* 3:1498
- Ivanova D et al (2020) Quantifying the potential for climate change mitigation of consumption options. *Environ Res Lett* 15(9):093001
- Ives CD, Freeth R, Fischer J (2020) Inside-out sustainability: the neglect of inner worlds. *Ambio* 49:208–217
- Jorgenson AK et al (2019) Social science perspectives on drivers of and responses to global climate change. *Wiley Interdiscip Rev Clim Chang* 10(1):e554
- Kallis G (2017) Socialism without growth. *Capitalism Nature Socialism*. 1–18
- Longo SB, Isgren E, Clark B, Jorgenson AK, Jerneck A, Olsson L, Kelly OM, Harnesk D, York R (2021) Sociology for sustainability science. *Discover Sustainability* 1(2):1–14
- McAdam D, McCarthy JD, Zald MN, Mayer NZ (1996) Comparative perspectives on social movements: political opportunities,

- mobilizing structures, and cultural framings. Cambridge University Press
- Mills CW (2000) *The sociological imagination*. Oxford University Press
- O'Byrne D (2020a) No more water, but fire next time: the conflict between environmental aims and social claims in Louisiana's post-Katrina coastal planning. 2020, Lund University: Lund, Sweden
- O'Byrne D (2020b) A contribution to building unified movements for the environment: aligning interests, forming alliances. *Hum Geogr* 13(2):127–138
- O'Byrne D, Isgren E, Boda CA (2018) A reply to Balmford et al. *Biol Conserv* 218:293–294
- Osbaldiston R, Schott JP (2012) Environmental sustainability and behavioral science: meta-analysis of proenvironmental behavior experiments. *Environ Behav* 44(2):257–299
- Schmitt MT, Neufeld SD, Mackay CM, Dys-Steenbergen O (2020) The perils of explaining climate inaction in terms of psychological barriers. *J Soc Issues* 76(1):123–135
- Smith SR, Christie I, Willis R (2020) Social tipping intervention strategies for rapid decarbonization need to consider how change happens. *Proc Natl Acad Sci USA* 117(20):10629–10630
- Steg L, Vlek C (2009) Encouraging pro-environmental behaviour: an integrative review and research agenda. *J Environ Psychol* 29(3):309–317
- Tarrow SG (2011) *Power in movement: social movements and contentious politics*. Cambridge University Press, Cambridge
- Tilly C (2008) *Contentious performances*. Cambridge University Press
- Woiwode C, Schöpke N, Bina O et al (2021) Inner transformation to sustainability as a deep leverage point: fostering new avenues for change through dialogue and reflection. *Sustain Sci* 16:841–858
- Wrenn MV, Waller W (2017) Care and the neoliberal individual. *J Econ Issues* 51(2):495–502
- Wynes S, Nicholas KA (2017) The climate mitigation gap: education and government recommendations miss the most effective individual actions. *Environ Res Lett* 12(7):074024
- Wynes S, Zhao J, Donner SD (2020) How well do people understand the climate impact of individual actions? *Clim Chang* 162(3):1521–1534

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.