Tracing power in transdisciplinary sustainability research: an exploration

Abstract

While transdisciplinary (TD) sustainability research is closely tied to ideas of societal change, critical enquiries into power dynamics both within and stemming from these practices have been scant. In this article, we operationalise theories of power for an exploration of the multiple ways in which power relations pervade interactions between researchers and practitioners in these knowledge production processes. By combining theories of power over, power to and power with, we propose a set of empirical questions to systematically study both productive and repressive forms of power. Using empirical examples, we illustrate how the proposed approach makes it possible to trace power throughout TD processes: 1. developing the project and framing the research problem, 2. co-producing knowledge, and 3. bringing results to fruition. The power perspective proposed here can guide the thinking of those actors involved in TD processes as well as meta-analyses by third parties. An enhanced understanding of the workings of power can help improve process design and facilitate reflexive TD practice.

Keywords

co-production, participation, power, transdisciplinary research, sustainability

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Drawing on diverse knowledges has called further attention to varying degrees of credibility and authority ascribed to them within TD processes (Rosendahl et al. 2015). Despite widespread acknowledgement that power relations pervade TD processes, their role is rarely explored in detail or in a systematic way (Zingerli 2010). Analytical tools for studying power relations and their impact on research processes are necessary.

In this article, we consider how we can empirically grasp different forms of power in TD sustainability research. Our goal is to operationalise abstract theories of power to explore how power relations shape interactions between researchers and practitioners in sustainability-oriented knowledge production processes. Guided by social theories of power over, power to and power with, we propose a set of empirical questions that take into account repressive and productive forms of power. Using examples from TD practice, we illustrate how this approach allows us to trace power throughout TD processes in: 1. developing the project and framing the research problem, 2. co-producing knowledge, and 3. bringing results to fruition. The proposed power perspective can guide the thinking of researchers and practitioners involved in TD processes and meta-analyses by third parties, including acompañing research. Unveiling the often tacit ways in which power affects TD processes provides a first step towards dealing with them in a constructive manner. Greater knowledge of the workings of power subsequently contributes to reflexive process design and implementation, and facilitates conscious management of (un-)desired power dynamics.

Through this exploration, we aim to build a platform for future discussions on fundamental questions such as which forms of power impede joint knowledge production and problem-solving, and which forms increase the potential for reaching epistemically and transformational goals. Such questions show that analysing power is not only of theoretical interest, but also of practical relevance for those engaging in TD research.

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**Methods and material**

This article combines theoretical and exploratory qualitative research (figure 1). The theoretical framework was based on a combination of existing social theories of power and TD sustainability scholarship. It was then applied and refined in an expert workshop with seven TD researchers from across Switzerland in Lausanne in November 2018. The following criteria guided the selection of participants: experience in practising and researching transdisciplinarity, a focus on sustainability-related topics, and a variety of Swiss institutions. The participants were asked to choose one TD project in which they had been closely involved and that would be completed by the time of the workshop. Guided by an earlier version of the empirical questions (table 2, p. 47), they mapped their experiences with power on a matrix that combined power forms and process phases (figure 2). Based on these real-world situations in which power unfolded, the framework’s analytical categories were refined, and mechanisms and sources of power were derived (table 3, p. 48). The three-hour workshop was documented by two note-takers. The article’s first author merged the notes of the two observers, discussed unclear passages with them, and combined them with flipcharts, mapping grids and her own verbatim from memory. This material provided the basis for the qualitative analysis, which synthesised deductive and inductive elements (table 1). Examples are presented in aggregated form in order to ensure anonymity and prevent traceability to individual projects.

While these examples serve to illustrate the application of the proposed power perspective, they do not allow for drawing conclusions on when and under what circumstances different manifestations of power occur. The exploratory nature of the workshop limited the extent to which the specificities and situatedness of the projects could be considered. Since only researchers took part in the workshop, the interpretation of power manifestations from practitioners’ standpoints were not accounted for. In the workshop setting with a limited time frame, some forms of power were challenging to reveal than others. Notably, discursive and invisible forms of power related to norms of “good” participation or “appropriate” science-society relations and epistemic authority and knowledge hierarchies were underexplored. The latter require further research based on a rich methodological repertoire (includ-
ing participatory observations, analysis of project outputs, multisited ethnography and in-depth interviews presenting various actors’ perspectives).

**Seeing transdisciplinary sustainability research through a power perspective**

In this section, we present the theoretical premises and derived empirical questions we propose for systematically studying power in TD sustainability research. The proposed power perspective is founded on two building blocks: conceptual elements of TD research and selected theories of power.

**Conceptual elements of a generic transdisciplinary sustainability research process**

**Interlinked process phases:** We used a process-oriented perspective and a common distinction between the three inter-linked phases of TD research: 1. the development phase (framing of the problem, choosing the appropriate sustainability approach, defining goals); 2. the knowledge production phase (applying participatory methods for knowledge generation), and 3. the dissemination phase (re-integrating results in research and practice, in some cases implementing the findings) (Schneider and Buser 2018).

**Diverse societal actors:** Participation of and interaction between researchers and practitioners are defining features of transdisciplinarity. TD collaborations as understood here are social and interactive processes (Fritz and Binder 2018). Interactions between researchers and practitioners can but do not necessarily take place across all phases. The intensity of these interactions oscillates throughout the process (Stauffacher et al. 2008).

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2 We differentiate between two types of actors: researchers and practitioners. Researcher describes a person who conducts research as their main profession and acts as a “certified expert” in her/his function (Collins and Evans 2002) in a given field. Although practitioners might have academic training, they do not conduct research as their main vocation. However, they are also experts in the specific fields. These actor groups are not homogenous entities. Researchers include scientists from the natural and social sciences, at different career stages, with diverse epistemological and ethical values. Practitioners include policy-makers, politicians, public service providers, private sector actors, third sector actors (such as NGOs) and individual citizens. Our focus here is on research-practice interactions and not the other features of transdisciplinarity, such as interdisciplinary exchanges (Schneider and Buser 2018).
**Epistemic ends:** TD processes, as understood in this article, are knowledge (co-)production processes; the participation of practitioners primarily serves these epistemic ends (Defila and Di Giulio 2018). In sustainability research with transformative goals, the epistemic and social/democratic ends of transdisciplinarity might co-exist and/or overlap (Lamine 2018). In this case, we are more interested in the epistemic role of participation than in its democratic function, as in the case of political decision-making processes.

**Situated and interacts with context:** While TD processes create their own social context (the project context), they also belong to the wider social context, of which the researchers and practitioners are part (practice and academic context; figure 3). Norms, discourses and structures in this wider context can shape power relations within a TD project. Similarly, a project or some of its actors might aim implicitly or explicitly at transforming the surrounding structures, discourses and norms, especially in TD research with transformative goals (Schneidewind et al. 2018).

In transdisciplinary research, power works in multiple ways and can be desirable and undesirable. Within-project power dynamics and power gradients in the societal context, which imbue transdisciplinary spaces, should be revealed concomitantly.

**Selected theories of power**

Power is a contested concept with myriad meanings. Some theorists conceive of power as being held by actors, some powerful and others respectively powerless. In this conception, the gaining of power by some happens at the expense of others. For other theorists, power is embodied in complex relations and discourses. Here, power is fluid and accumulative—it can be shared or created by actors and their networks (Gaventa 2006). Given our aim of studying power in researcher-practitioner interactions, we will only focus on relational theories of power and follow approaches that integrate both structures and actors in the analysis of power. In this sense, manifestations of power result from the configuration of the contexts in which actors and their interactions exist and take place, as well as from actors’ relative position in these contexts. The latter are shaped in part by actors’ capacity to mobilise contextually relevant resources (Bourdieu 2016).

In order to grasp the diverse and complex manifestations of power, we follow Partzsch’s (2015) work on power in sustainability research and base our reasoning on Allen’s (1998) combination of theories of power over, power to and power with. We complement the latter’s conceptualisation with elements that seem particularly relevant with regard to participation in knowledge production processes and the specificities that flow from their epistemic ends. For this, we use literature on power and participation in development research and in science and technology studies.

**Power over**

*Power over* refers to power that is exerted over actors, structures and discourses, and is often distinguished in four dimensions, also referred to as “faces of power” (Partzsch 2015, p. 52).

The first face of power describes the ability of A to get B to do something that B might not do otherwise (Dahl 1957). Actors’ capacity to mobilise financial and symbolic resources such as knowledge to influence a decision or process is key in this face of power (Gaventa and Cornwall 2008). The first *power over* dimension is considered fairly visible in decision-making processes.

Bachrach and Baratz (1962) redefine much of the power debate by introducing the second face of power. Here, the powerful can avoid conflict by limiting the scope of decision-making to issues that do not threaten the status quo (Hayward 2000). This dimension of *power over* is hidden, for example, when certain actors control what goes on the agenda prior to a participatory process. It is exercised through mechanisms that exclude and delegitimise the concerns or knowledge of certain actors (Gaventa 2006). The game rules—that is, the configuration of the context in which interactions take place and actors’ capacity to mobilise key resources—facilitate access to a process for established actors and complicate meaningful participation for others. Actors who are initially excluded and gain access may be required to imitate the language, behaviour or knowledge of established actors. Social positioning is a basis of power here (Gaventa and Cornwall 2008).

Lukes (1974) adds a third view on power according to which power can also be exerted if B consciously wants to do what A desires. In this case, power is wielded by means of manipulating the desires and beliefs of B (Digeser 1992). This third face concerns invisible forms of power that are exercised by covertly manipulating others to do something and/or changing what they think they want (Gaventa 2006). Knowledge and its control are crucial here for influencing people’s consciousness (Gaventa and Cornwall 2008).

Following Foucault’s work, interrelations between knowledge, power and politics bring us to a fourth face of *power over* (Digeser 1992). While in the first three faces As and Bs are taken for granted, the fourth face goes one step further in that subjects do not exist in a natural state. Power here means that subjectivity and individuality are historically and socially constructed (Partzsch 2015, p. 52). As Foucault (1980, p. 187) put it: “there exist relations of...
power which are not purely and simply a projection of the sovereign’s great power over the individual, they are rather the concrete, changing soil in which the sovereign’s power is grounded”. In our case, such an understanding of power implies that the categorisation of actors as knowledge-holders and/or epistemic authorities is not pre-determined and should not be taken as given. To understand power, the construction and effects of norms and values must be addressed. The power of an idea and/or discourse – in our case practitioners’ participation in science, for example – exists only in relation to other ideas and/or discourses (i.e., objective science). Moreover, actors tend to be seen as more legitimate when they invoke knowledge that is aligned with established ideas and discourses (Fuchs and Glaab 2011). Knowledge and power therefore mutually forge one another (Foucault 1977). What is considered reliable knowledge or even truth is shaped by various actors’ standpoints (Harding 1992) and status as “certified experts” (Collins and Evans 2002). The fourth dimension of power over emphasises the role of accepted truths and knowledge regarding desirable developments in stabilising and concretising certain paths of action. Within this perspective, knowledge production, thus, is not only an epistemically secure process but also has an ontological dimension, as act “of making, rather than merely depicting, what is at stake” (Passoth and Rowland 2016, p. 38). Whereas in the other faces it is possible for relationships to not be mediated by power, here power is ubiquitous and cannot be obliterated.

**Power to**
The notion of power to captures the individual actors’ capacity to form and shape processes despite resistance (Hauggaard 2012), and is roughly synonymous with empowerment4 (Allen 1998). Allen (1998, pp. 34f.) defines power to as “the ability of an individual actor to attain an end”. Resistance is one possible manifestation of power to, just as domination is a manifestation of power over (Allen 1998). The emphasis in this form of power lies on the individuals’ agency and their capacity to achieve their goals.

**Power with**
In power with, power appears as the capacity to collectively learn and act. Finding commonalities and developing collective strength are the core of power with. The notion refers to learning processes and the development of a new group or community consciousness (Partzsch 2015). Power with is associated with Arendt’s (1970, p. 44) view on power being “the human ability not just to act but to act in concert”. Following this interpretation, Allen (1998, p. 35) defines power with as “the ability of a collectivity to act together for the attainment of a common or shared end”. The emphasis in this form of power lies on the productive forces of power (Partzsch 2015).

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4 We use the notion of empowerment simply to refer to an actor’s capacity to act. Furthermore, we concur with Cashmore (2019, p. 26) that “irrespective of the precise way in which empowerment is understood, what is central to the notion is that empowerment allows individuals or collectives to positively shape their futures”.

**FIGURE 3:** Process view of a generic transdisciplinary process interacting with its contexts.
Combining multiple forms of power and phases of transdisciplinarity

Rather than following the approaches of scholars who interpret power in either one of its forms (Haugaard 2012), the power perspective proposed in this article highlights the interrelatedness of power over, power to, and power with. These forms of power are analytical rather than ontological categories (Allen 1998). Combining them in one approach emphasises the fact that consensual forms of power or empowerment at the local scale are not free of macro-societal power over mechanisms, which shape individual actors’ ability to articulate themselves and lead to the marginalisation of certain groups, discourses or knowledge within a community. Likewise, it incites us to look for ways in which power with (e.g., through collective action) disrupts discourses and structures that maintain power over (Partzsch 2015). A multidimensional approach makes it possible to scrutinise the productive aspects of power without neglecting the unproductive ones.

Based on these theoretical foundations, in table 2 we distil empirical questions5 for systematically studying power throughout TD sustainability research processes. While certain questions are equally relevant for all phases of a generic TD process, others are particularly important at specific points in the process. The main process phase described in table 2 provides an analytical starting point. However, it does not mean that the questions are relevant exclusively in the phase indicated.

An illustrative application of the power perspective

In this section, we schematically show how the power perspective can be applied for an empirical study of TD sustainability research. Rather than providing a comprehensive analysis of power in TD knowledge production, we will use examples discussed in the above-mentioned expert workshop to illustrate how various forms of power can manifest themselves and shape interactive processes and their results. Presenting these examples, we point to the interrelatedness of the three forms of power within a single project phase, their potential to change throughout the various project phases and their embeddedness in structural contexts at different scales. This illustration demonstrates how the empirical questions can be applied and the answers obtained systematically interpreted: for each power manifestation, we identify the mechanism by which researchers, practitioners or funders exercise power, and highlight the sources actors mobilise and the structural (project, academic, practice) context in which these sources exist (table 3). We hope that this will provide ideas for more in-depth empirical analyses of power in TD projects. In the following, we elaborate on table 3. We structure the insights gained through the workshop along the phases of a TD knowledge production process.

Development phase

Workshop participants identified funding bodies6 as directly influencing the development of the TD endeavour. By determining the framework within which the research project had to fit, they wielded power over it, reaffirming the crucial role of the funding context and control of financial resources in shaping TD practices. Some workshop participants identified specific actor constellations, where the funder was also a practitioner involved in the project and, in this way, influenced decisions at the project’s micro-level. This constellation entailed hierarchies among different practitioners. Furthermore, workshop participants stated that while project proposals had to comply with funding requirements, decisions regarding the format, timing and agenda of interactions and participant selection were taken by project actors, mostly researchers. After project approval, the researchers emancipated themselves from the constraints of funding requirements and developed power to act according to their research interests. In specific cases, power to manifested in the empowerment of researchers as legitimate actors in the practice context, as they were financially supported by renowned institutions with well-established social relations (e.g., Ministries and governmental agencies). These examples illustrate how power dynamics in one actor relationship – between researchers and the funding body here – can take different forms depending on the funding context and the process phase. This demonstrates the importance of analysing power relations as dynamically constructed in interactions.

When researchers unilaterally took the above-mentioned decisions on the terms of involvement and the research problem, the workshop participants referred to power over dynamics in researcher-practitioner relations. In several projects, the allocation of resources was conducive to such dynamics from the outset. When practitioners did not receive financial support, their ability to engage was circumscribed. Alternately, examples were provided in which one practitioner or a small group of practitioners strongly influenced the problem framing. As such, the interests and values of (certain) practitioners dominated the development phase. An overt exercise of power over was observed in a project wherein a practitioner omitted a research question from the set of possible questions. This shows how the mobilisation of power

5 In order to stimulate reflection, the questions are deliberately framed as open questions (vs. closed yes-or-no questions). As such, the answers must be interpreted. For instance, if the answers to the questions on power reveal 1. that only one actor group takes decisions, 2. that project structures privilege some actors over others, 3. that the distribution of resources is unequal, or 4. that any other imbalances exist, power over is likely to be at work.

6 Initially, funding bodies were not mentioned explicitly in our theoretical approach. They were added inductively by the workshop participants. Funding bodies can include actors from academia, such as national science funds, or and actors from practice, such as philanthropic foundations. The attribution of funding bodies to either “science” or “practice” is not always clear. Furthermore, funding contexts can be part of both the academic context and the practice context. We therefore assign funding context neither to the academic context nor the practice context.

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to (one actor is able to achieve his/her goals) related to exercises of power over in an actor’s relationship to others. It also shows how, depending on an actor’s standpoint, the same interaction reflects different forms of power, thus stressing their analytical, versus ontological, nature.

In the development phase, workshop participants identified trust building among the actors involved as an indication of power with. Regarding early trust building, workshop participants found path-dependencies of power relations: projects that were dominated by only a few actors at the early stages were thought to be less likely to develop towards power with at later stages. Still, oscillations of different forms of power were described: while the overall project design may be shaped by researchers unilaterally, responsibilities for designing and conducting workshops may be shared between researchers and practitioners, while yet other steps may be dominated by practitioners’ preferences.

**Knowledge production phase**

Workshop participants detected researchers’ power over modes of interaction and the timing of participatory knowledge production steps. Their power over the structuring and implementing of the process was reinforced in situations of unequal allocation of financial resources, for example, when practitioners did not have support structures and lacked time resources to establish and form the process. Workshop participants found practitioners to wield power over the process on the basis of their position and social relations in the practice context. Researchers depended on the latter’s participation for gaining access to the field, facilitating data

**TABLE 2:** Empirical questions for multidimensional analysis of power in transdisciplinary (TD) sustainability research. Source: adapted from Fritz and Meinherz (2020).

| FORM OF POWER                      | EMPIRICAL QUESTIONS                                                                 | MAIN PROCESS PHASE          |
|-----------------------------------|-------------------------------------------------------------------------------------|-----------------------------|
| **POWER OVER ...**                |                                                                                     |                             |
| ... is wielded over actors, structures and discourses | Which actors from research and/or practice define the problem to be assessed, the sustainability approach adopted and the research design? | development phase           |
| ... is the capacity to overtly influence the decisions and action of others (first face) | Which actors from research and/or practice decide who is or is not invited to participate and set the terms and conditions for how participants in the TD process interact? Which criteria, norms or discourses orient these decisions? | development phase           |
| ... is the capacity to covertly influence decisions (second face) | How are the resources required to participate in the TD process and influence decisions/processes/outputs distributed among actors from research and/or practice? | all phases                  |
| ... is the capacity to shape ideas, norms and intentions (third face) | For which tasks and in which situations throughout the TD process do researchers depend on practitioners and vice versa? | all phases                  |
| ... is the social constructedness of subjectivity in social and historical processes (fourth face) | In which ways do the funding conditions and other structural factors influence the set-up and evolution of the TD process? | all phases                  |
| **POWER TO ...**                  |                                                                                     |                             |
| ... is the individual capacity to act | Which individual actors involved in the TD process achieve their goals? | all phases                  |
| **POWER WITH ...**                |                                                                                     |                             |
| ... is the capacity to collectively learn and act | What new project goals and understanding of problems emerge in the TD process? | development phase           |
| | Which new collectives, discourses or practices emerge through the TD process? | knowledge production/ dissemination phase |
| | How do actors from research and/or practice build bridges across different knowledge areas and collectively learn from the TD process? | all phases                  |
collection and being recognised as valuable partners by other actors in the field. *Power over* also shaped interactions among practitioners. In participatory events such as scenario workshops, group dynamics were distorted when the presence of actors, who were powerful outside the TD space (albeit unintentionally), intimidated other actors or subtly influenced their behaviour in the participatory setting. In one case, the presence of a mayor impeded interactions among practitioners or subtly influenced their behaviour in the participatory setting. Workshop participants noticed such experiences of *power with* regarding the co-development of a natural resource management plan. In the example discussed this concerned a watershed management plan, which the researchers were initially in the lead to develop, but could do so only in a co-design process with local practitioners who implemented the plan.

The experts’ descriptions of *power to* in the knowledge production phase refer to the empowerment of participating farmers, whose awareness of a soil degradation problem was raised through TD encounters, which allowed them to build capacities for acting in their interest. *Power with* manifested when results were jointly created. Workshop participants narrated similar experiences of *power with* regarding the co-development of a natural resource management plan. For such steps, researchers depended on practitioners and vice versa. Workshop participants noticed similar manifestations of power in the co-creation of visions, scenarios and strategies. As a result of these processes, the practitioners felt that “their” topic gained traction and caught the attention of new actors. Additionally, they developed the capacities to act jointly despite diverging standpoints, that is, they accumulated *power with*. These examples illustrate the interrelatedness of forms of power and how the interpretation of power manifestations is

### TABLE 3: Examples of manifestations of power. The examples are taken from transdisciplinary (TD) case studies that were discussed at the expert workshop (p. 42). For each power manifestation, the mechanism by which researchers (R), practitioners (P), or funding bodies (F) exercise power are identified.

| FORM | MANIFESTATION OF POWER | ACTOR | MECHANISM |
|------|------------------------|-------|-----------|
| **DEVELOPMENT PHASE** | | | |
| power over | funding conditions shaped the design of the project and allocation of resources | F | resource allocation |
| | researchers determined formats, timing, agenda of interactions and selected participants | R | planning + agenda setting |
| | practitioners influenced the definition of the research problem and question | P | planning + agenda setting |
| | only researchers received funding, providing them the means to shape the process | R, F | resource allocation |
| power to | taking project decisions, researchers “freed” from funding structures | R | planning + agenda setting |
| | researchers were legitimised by funding body to approach practitioners | R | empowerment |
| power with | trust built as basis for further collaboration | R, P | joint action |
| | joint initiation of project based on previous collaboration | R, P | joint action |
| | researchers determined methods used for TD activities and knowledge integration | R | planning + agenda setting |
| | unequal distribution of resources reduced practitioners’ capacity to actively shape the process | R | resource allocation, knowledge constellation |
| | practitioners granted researchers access to the field; researchers depended on the support of practitioners | P | actor composition |
| | hierarchies outside TD process were transferred into the TD space and distorted group dynamics | P | actor composition |
| **KNOWLEDGE PRODUCTION PHASE** | | | |
| power to | empowerment of practitioners through awareness raised | P | learning processes |
| | solutions developed legitimised researchers as experts in the field | R | empowerment |
| power with | co-production of results, co-creation of management/action plans, visions, scenarios | R, P | joint action |
| | practitioners developed capacities to act jointly despite different standpoints | P | joint action |
| **DISSEMINATION PHASE** | | | |
| power over | knowledge compilation by researchers only | R | agenda setting |
| | funding body and practitioners shaped dissemination and publication requirements | F, P | agenda setting |
| power to | enhanced capacities to act on the basis of process results | P | empowerment |
| | researchers were endorsed by practitioners as valuable partners | R | trust building |
| power with | co-validation of results | R, P | joint action |
| | joint development of follow-up projects | R, P | joint action |
| | development of networks and partnerships | R, P | joint action |
| | implementation of findings, acting upon the knowledge-co-produced | P | joint action |

7 In the example discussed this concerned a watershed management plan, which the researchers were initially in the lead to develop, but could do so only in a co-design process with local practitioners who implemented the plan.
Both the sources actors mobilise and the structural (project, academic, or practice) context in which these sources exist are highlighted.

| STRUCTURAL CONTEXT          | SOURCE OF POWER                                                                 |
|------------------------------|--------------------------------------------------------------------------------|
| funding context              | capacity to mobilise financial resources                                       |
| project/process; academic    | capacity to mobilise financial resources + knowledge                             |
| project/process; practice    | capacity to mobilise financial resources, social relations, knowledge            |
| context                      | capacity to mobilise financial resources                                         |
| project; project/process     | building capacity to mobilise knowledge and experience                           |
| practice context             | building capacity to mobilise social relations and status                        |
| project/process              | jointly building various resources that can be mobilised together                |
| project/process              | drawing on jointly built experiences + understandings                             |
| project/process              | capacity to mobilise social status, knowledge + experience                        |
| project/process              | capacity to mobilise financial resources, knowledge + experience                 |
| practice context             | capacity to mobilise social relations                                            |
| project/process; practice    | capacity to mobilise social relations + status                                    |
| context                      | building capacity to mobilise knowledge + experience                             |
| project/context              | jointly building knowledge, understanding + experience                            |
| context                      | capacity to mobilise jointly built understanding + knowledge                     |
| project/process; academic    | capacity to mobilise experience and knowledge                                     |
| context                      | capacity to mobilise financial resources + extant norms                          |
| funding + practice context   | capacity to mobilise financial resources + knowledge                             |
| practice context             | building capacity to mobilise social relations                                   |
| project/process              | drawing on jointly built knowledge + experience                                  |
| academic + practice context  | drawing on jointly built experiences + social relations                          |
| academic + practice context  | drawing on jointly built social relations                                        |
| practice context             | drawing on jointly built knowledge + experiences                                 |

Tied to the scale of analysis: what is perceived as power with within the TD space (micro-scale) can lead to power over other actors who were not involved in the process in the practical context (macro-scale). Depending on the structural context and actor constellations within it, it is conceivable that the same mechanism can contribute to changes in power structures (power over) by offering alternative problem framings, options or evidence as a basis for decision-making.

**Dissemination phase**

With regard to bringing results to fruition, workshop participants recalled situations in which researchers asserted power over knowledge compilation, mostly via the writing of publications. In doing so, the researchers partly responded to the implicit or explicit expectations of funders and practitioners who, to varying degrees, wielded power over dissemination practices or requested that dissemination formats be adapted so as to increase their usability. Likewise, workshop participants found project evaluation norms and academic reward structures to shape dissemination strategies. Again, this illustrates how one actor – the researchers here – can be in a position to exert power over others – the practitioners – and simultaneously be subjected to exercises of power over by others, in this case the funding bodies. It further demonstrates how different faces of power over can interact – in this case, its first face through explicit requirements by funders and its discursive fourth face through established norms regarding knowledge dissemination.

Workshop participants experienced situations of power to when practitioners were empowered with new knowledge resources that enhanced the legitimacy of certain actions, for example, policy measures. Power to also unfolded when participants developed the capacity to use methods for co-producing knowledge in their day-to-day business. Likewise, power to manifested in the empowerment of researchers by practitioners, who informally endorsed them as valuable partners and invited them to other activities in the practice context. Power with was discerned in processes of co-validation of results and when co-created plans and visions were acted upon. The development of networks, long-term partnerships and follow-up projects were another indication of power with stemming from the TD process. These examples point to interrelations between power to and power with. Collective learning in the TD space (power with) can enhance individual actors’ capacities to achieve their goals in the practice context (power to).

**Concluding remarks and outlook**

We set out to provide a platform for debating on and confronting power in TD sustainability research. We argued that enquiries into the normative goals of balancing power relations and transforming an unsustainable status quo, which are often implicit in TD sustainability research, are as necessary as the elucidation of power relations within TD processes. The power perspective we propose has the potential to uncover how different forms of power come to be, depending on the constellation and characteristics of actors, the layout of the process and the configuration of the wider context. As the examples suggest, in TD projects, power works in multiple ways and can be both desirable and undesirable. The latter implies a normative judgment, which depends on the objectives set and the observer’s standpoint. From our schematic application of the power perspective, we...
conclude that some aspects require particular attention in future analyses of power in TD research:

- **Considering scale**: Different forms of power overlap. Determining which form of power is at work depends on the scale of analysis considered and the standpoint. What is perceived as power with in the frame of the project can entail power over in the wider societal context or power to from the perspective of an individual actor.

- **Considering situatedness**: Analysing power requires considering TD spaces’ embeddedness within the wider socio-political context and predominant science-society relations. Power constellations within TD processes vary according to hierarchies and structures in the practice context as well as the funding and academic context. Likewise, power constellations within TD processes can affect their capacity to shape the wider context.

- **Considering dynamics**: An analysis of power must consider how power relations can evolve throughout TD processes and identify possible path dependencies. Considering dynamics also suggests accounting for histories of research-practice collaborations prior to the project of interest.

In addressing the aspects outlined in this article, future research should be attentive to practitioners’ experiences of power. While their perceptions are largely absent in the scholarly debate, understanding them is critical when it comes to acting on the TD process and its results. A solid empirical basis on the workings of power will allow TD researchers and practitioners to design and conduct participatory elements in a way that stimulates forms of power, which are productive regarding the goals of participation and minimise unproductive ones. The empirical questions proposed allow for rendering power dynamics visible and thus provide a first step towards tackling them. While some mobilisations of power can be restrained by careful design and choice of methods, others are elusive and require continuous reflection and transparency. By stressing the diverse manifestations of power, we hope to entice TD sustainability scholars to share their experiences of both productive and repressive forms of power, thus contributing to building an empirical knowledge base on the workings of power in TD research.

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GAIA Masters Student Paper Award

The international journal *GAIA – Ecological Perspectives for Science and Society* invites Masters students to participate in the 2021 *GAIA Masters Student Paper Award*. Masters students are encouraged to submit their results from research-based courses or from Masters theses in the field of transdisciplinary environmental and sustainability science.

**Submission guidelines and more information:**

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**Deadline for submission:** October 19, 2020.

The winner will be selected by an international jury and will be granted a prize money of EUR 1,500 endowed by the Selbach Umwelt Stiftung and Dialogik gGmbH, as well as a free one-year subscription to *GAIA*, including free online access. The winner may also be encouraged to submit his or her paper for publication in *GAIA*.
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