REVIEW

Imagination and transformations to sustainable and just futures

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The ability of individuals and groups to identify, assess, and pursue alternative possible futures is an essential component of their ability to deliberately and collectively respond to major sustainability challenges rather than experience unguided or forced change. Deliberately engaging in transformation processes inevitably requires imagination. We refer to imagination for transformations as interdependent cognitive and social processes that create representations of present and possible future states of the world that can inform public deliberation, policy, decision making, and behavior from the individual to the global scale. We contend that imagination is an essential capacity for securing ecological, social, economic, and cultural well-being in times of rapid and often unpredictable global change. We sketch an emerging interdisciplinary research agenda on imagination as a transformational capacity and its role in transformation processes, building on contributions to a special issue on this subject. We specifically focus on imagination in relationship to transformative agency, causation, and individual-collective dynamics. Our aim is to identify research questions and challenges that are most pressing with a view to supporting efforts of transformations toward sustainability.

Keywords: Imagination, Transformation, Social–ecological, Cognition, Transformative capacity, Resilience, Arts, Sustainability, Futures

1. Addressing the triple failure of the imagination

Within global environmental change scholarship, there is concern about the persistent failure to create pathways toward more sustainable and just futures and that this may be, in part at least, due to a triple failure of imagination. First, the significant risks posed by global environmental challenges, especially their long-term impacts on every aspect of communities, cultures, and societies around the world, seem difficult to comprehend and respond to sufficiently at the scales that matter (Milkoreit, 2017). Second, there may be a lack of the sociological imagination—the ability to see the social structures that are continuously recreating and reinforcing our current environmental conditions (Mills, 1959; Norgaard, 2017). Although these two failures concern the collective understanding of present realities, the third failure refers to the collective ability to imagine a rich and detailed set of possible futures (Bendor, 2018) and the various options and pathways that will lead toward them (Wapner, 2016).

Yet, amid this concern and the various calls to action, creative, robust, and ever-growing imaginations are being generated and articulated, as Anderson and Jones (2015) describe, at the intersection of anti-racism, anti-colonial and feminist movements and scholarship, digital media, metaphysics, speculative futures research, religion, visual studies, performance, art, and the philosophy of science. These works criticize the apocalyptic “end of world” discourses largely driven by white scholarship, arguing that surviving colonialism, slavery, systemic oppression, and more means to have already faced the end of a world (e.g., Whyte, 2018; Mitchell and Chaudhury, 2020).

Through a variety of cosmologies and ontological orientations toward the future—not as a mere point along a linear temporal scale—scholars offer imagined alternative ways of being, highlighting the need to transform all that creates injustice and unsustainability in the present (e.g., Wynter, 2003; McKittrick, 2015; Chan, 2016; Montenegro, 2017; Barber, 2018; Whyte, 2018; Ware, 2020).

Considering these literatures, the two concepts imagination and transformation are clearly important to each other. However, insights about these concepts have been generated across multiple disciplines, including cognitive science, political science, feminist theory, Afro- and Asia-futurism, social psychology, sociology, science and technology studies, modern literature, Indigenous fiction and
science fiction, and ecology. Attempts to synthesize insights from across this fragmented and rapidly growing body of knowledge are important to create guidance in ongoing transformation processes.

This Special Feature is dedicated to responding to the urgent and growing calls for transformations in the face of the paradoxical failure of imagination and its simultaneous activation. We started this project with a number of questions, most importantly, how does imagination affect transformations? What is the relationship between imagination, power and governance, and how do the politics of imagination shape the unfolding (or not) of transformations to sustainable and just futures? How do cognitive, social, and ecological factors affect imagination, and in turn, transformation? The ambition of this Special Feature was not to provide comprehensive answers to these substantive and enduring questions. Instead, we aim to generate a rich, interdisciplinary conversation that begins to lay the foundation for a coherent research program that could honor and connect scholars across diverse disciplines.

To achieve this, the articles assembled in this Special Feature have been informed by specific definitions of each of these terms: imagination and transformation. We present these definitions below based on a survey of the literature. The literature review also generated three themes (theoretical lenses) that form the basis of an emerging analytical framework for understanding the relationship between imagination and transformation: (1) the role of imagination in transformative agency, (2) the potential causal power of imagination in transformation processes, and (3) imagination as a component of the dynamic relationship between the individual and the collective. We then apply this rudimentary analytical framework to the collection of articles in this Special Feature. As expected, more questions emerge about the notion of developing collective imaginative capacities in relation to transformations to sustainable and just futures, and thus, we conclude with areas to explore in a future, inter- and transdisciplinary research agenda.

2. Conceptualizing and defining imagination

Across multiple social science disciplines, imagination is often conceptualized in terms of the imaginary—collective, institutionalized ways of making sense of the present social conditions (Castoriadis, 1997) or envisioning the future (Jasanoff and Kim, 2015; Milkoreit, 2017). Advancing theories of the imaginary by adding a cognitive, and interdisciplinary perspective, we propose a more general definition of imagination specifically related to transformations to sustainability: the interdependent cognitive and comprehensive social processes that generate shared understandings of the present and visions of possible future states of the world. We argue that this definition enables an understanding of imagination as a potential capacity of agents and communities pursuing sustainability transformations, given its role in creating, shaping, and informing deliberation and decision making across social–ecological scales and ultimately its crucial contribution to creating alternative sustainable and equitable realities.

2.1. Cognition and imagination

Imagination tends to be associated with the ability to generate ideas in the mind about things that cannot be perceived with the senses, including alternative or fictional realities. It is connected to diverse mental processes, including learning, meaning making, and creativity (Zitoun and Cerchia, 2013). Importantly, as Kind and Kung (2016) have pointed out, imagination has at least two seemingly contradictory functions. On the one hand, it is necessary to learn about the world as it is or was and to acquire new knowledge through (re)construction (Salis and Frigg, 2019)—in sum, to gain an understanding of social reality. On the other hand, imagination serves as a form of freedom from (Kind and Kung, 2016), or even resistance to, reality (Marcuse, 1966; Stoezler and Yuval-Davis, 2002). Fulfilling this second function, imagination can serve as a reservoir of ideas protected from the challenges posed by various forms of rationality (Freud, 1958; Hairston, 2016) and can give rise to novelty and change. The ability of imagination to facilitate escape from reality by mentally generating alternatives, whether those are fictional worlds, utopian, or dystopian futures (Stoezler and Yuval-Davis, 2002), is key for many social change processes, especially for social movements (Hawlina et al., 2020). Together, these two functions enable individuals to both know reality and to possibly change it.

Recently, research in the cognitive sciences has focused on a specific dimension of the second function: imagination as future thinking or “prospection”—the mental processes involved in constructing scenes of the future or new experiences (Gilbert and Wilson, 2007; Szpunar et al., 2014; Thomas, 2019). The mental processes of “future event simulation” (Szpunar and Schacter, 2018) appears to share a common brain mechanism with memory, that is, the simulation of past events and the imagination of fictional worlds (Mullally and Maguire, 2014). This link raises important questions for the role of imagination in transformative change.

To the extent that cognitive future making involves the adaptive use of experience-based information to anticipate future events (Schacter et al., 2007), the (collective) imagination might be limited by the “source material” provided by (collective) memory and experience. These constraints are particularly important for transformation processes that seek to create systemic change and require some departure or detachment from past and present states. Further, if making memories—that is, creating new source material for imagining the future—includes experiences of the world using the human senses, our sensorial limitations render imagination for sustainability transformations particularly challenging. We cannot see, touch, or smell objects, places, or creatures that could exist in alternative futures. Fiction and technology might expand this

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1. We use the term comprehensive to keep the definition concise while still indicating that from our perspective, social is intertwined with the ecological and includes the spiritual, cultural, economic, technological, and more.
Although the cognitive sciences are primarily concerned with the generative processes of imagination, the social sciences add at least two critical sets of questions regarding the nature of imagination and its role in sustainability transformations. First, how does the social, cultural, and political embeddedness of an individual’s imagination affect its content? Second, what is the relationship between cognitive imagination and social–ecological change?

Although the cognitive sciences treat imagination as a mental process, the inputs for the generation of ideas, values, scenes, and emotions in our mind are based on and influenced by our daily experiences of the social and natural worlds, including interactions with others, participation in institutions, and experiences of our embeddedness within the built and natural environment. Thus, ideas regarding the future are shaped by the social, physical, and ecological realities of today (Thagard, 2014; Levy and Godfrey-Smith, 2019). Sociologists have studied the societal imagination (Stoetzler and Yuval-Davis, 2002), which is conditioned, although not entirely determined, by social positioning. Personal relationships and networks, group memberships, political and economic institutions, or social norms are all external to the mind yet affect the “contours” of the imagination (Mische, 2009).

Political scientists and some futures scholars emphasize the importance of power and the potential to control and (de)mobilize imagination processes through existing structures, norms, and institutions, but they also show that the same imagination processes can, at times, break hegemonic views as the only possible reality (Anderson, 2016; Wapner and Elver, 2016), a version of Wynter’s (2006) epistemological rupture. In turn, this body of work highlights how even processes with the intention to envision shared futures become important—and understudied—sites of political influence and inequality (Vervoort and Gupta, 2018). At the same time, neither cognitive nor social scientists have paid sufficient attention to nature as a factor shaping individual and collective imagination. As Milkoreit (2017, p. 3) states, “Nature is not just a backdrop to social imagination and change; it actively shapes what can be and is imagined.” In short, one’s imagination cannot just be understood as one’s own.

One of the most interesting questions related to the role of imagination concerns its potential contribution to creating transformative change. As Stoetzler and Yuval-Davis (2002, p. 324) argue, “in order to change the reality of any specific society, the imagination or fantasy is a necessary resource,” that is, imagination provides the alternatives to reality that can motivate a reordering of the ways things currently exist. To understand the causal power of the imagination, it is important to connect the individual scale—my imaginations of my future and its consequences for my behavior—and the collective scale. How do individual future visions become shared and how do they affect collective behavior, normative, or institutional change? We recognize that treating the individual and collective as separate is problematic, for example, with a view toward the ways in which numerous worldviews and belief systems perceive individuals as always connected across generations in space and time (Scott, 2016). From an analytical perspective, the distinction can be useful, as it enables an exploration of the mechanisms that connect and constitute individuals and different collective groups. Thus, again, we posit that your imagination is never simply your own. The mental processes of an individual can contribute to a collective imagination process, and the vision of a collective can affect a person’s individual cognitive–emotional experience and actions.

An important component of the interplay between individual and collective imagination concerns the construction of identities, social groups, and the futures preferred by these groups (Anderson, 1983; Beck, 2011; Mitchell and Chaudhury, 2020). Further, if imagination is understood as the capacity to envision both the pathways into different kinds of futures and the associated identities of our own desired future selves or future communities, exercising the imagination becomes a source of transformative agency. More theoretical and empirical exploration of the contribution of cognitive and individual–collective future thinking to transformational agency is needed.

In sum, although scholarship has to some extent examined the individual-cognitive processes of imagination and extensively engaged in understanding the collective, social nature of imagination, the way that these two spheres of imagination are interdependent and interacting across...
multiple scales raises new questions. We seek to connect the growing understanding of cognitive dimensions of imagination, the sociological work on social interactions, and the political analyses of power and institutionalized authority in relationship to imagination’s role in transformations. Each of these is part of mentally and socially constructing reality and a key ingredient for transforming it. These different dimensions of imagination have relevance for the exercise of transformative agency, and they can have different causal effects on complex transformation processes.

3. Conceptualizing transformations to sustainable and just futures
Transformations toward sustainable and just futures are defined as fundamental shifts in the way authority, power, and resources are structured and flow in a particular social system (Moore and Tjörnbo, 2012; Avelino, 2017; Ware, 2020); the practices and processes that reflect and reproduce those structures (Westley et al., 2006; Haxeltine et al., 2017; Howaldt and Schwarz, 2017); the norms, values, and beliefs that underpin those structures and processes (Antadze and McGowan, 2017); and the way that all of these are connected to ecological systems across multiple scales (Westley et al., 2011; Olsson et al., 2017). This latter element of cross-scale, social–ecological dynamics is worth emphasizing. A change in only the social structures is insufficient. What matters for any sustainable and just transformation will be how a change restructures, reconnects, and remakes the meanings of relationships between people, and between people and the ecosystems in which they are embedded (Abson et al., 2017).

3.1. Processes of transformation
A number of theoretical perspectives suggest that transformations have multiple phases (Olsson et al., 2004; Loorbach et al., 2020), which can take place over extended time periods. A recent collection of historical cases shows that social transformations can range from at least 60 to 200 years (Westley et al., 2017), with contractions and expansions of actors and capacities at different points throughout the process (Moore, 2017; Olsson 2017). We hypothesize that imagination could be a necessary and beneficial capacity in one or multiple phases.

Recent scholarship is increasingly interested in deliberate transformations, seeking to support intentional, strategic efforts of communities and societies to guide social–ecological systems toward more sustainable and just futures (Moore et al., 2014; Pelling et al., 2015; Zier-vogel et al., 2016). Therefore, research has focused on the kinds of transformative agencies that would be required to try to deliberately navigate such change. Ideas of social, institutional, and normative entrepreneurship—as opposed to leadership—that collectively create a form of distributed systems entrepreneurship is argued as essential to transformative agency (Westley et al., 2013; Antadze and McGowan, 2017; Olsson, 2017). Regardless of the deliberate intent, transformations can never be predicted, “managed,” or entirely controlled by any specific group of actors. The future alternative states are often invisible and unknowable during a transformation (see, e.g., Sium et al., 2012). Imagining possible transformations and the diverse potential pathways toward them are key tasks.

Given that the desire for transformations is often predicated on the need to break away from problematic systems, the focus of transformations scholarship is often on disruption, or moments of punctuated change (e.g., Gel-cich et al., 2010), and novelty. At the same time, discussions of transformation for sustainable and just futures need to consider the role of continuity (Scott, 2016; Whyte, 2017). Maintaining or protecting specific system elements during a transformation can be as important as dismantling others as they can become building blocks for an alternative system (Andersson and Barthel, 2016; Andrachuk et al., 2018) and provide a minimum level of stability that is necessary to prevent systemic breakdown (e.g., collapse). Although continuity and memory are distinct concepts, we highlight memory as serving at least two important roles in transformation processes. First, as stated earlier, memory is a source material for imagination. In particular, memory can help form some of the important building blocks that will be recombined in novel ways during imagination processes that support transformations. Transformations are not about returning to some former state but rather using elements of that alternative prior state of life to combine with other elements that have emerged since (Schlüter and Herrfahrdt-Fahé, 2011), a form of braiding in the words of Jimmy et al. (2019), to create something else entirely with the help of memory.

Second, in any transformation, part of what gets transformed may be understanding and knowledge, given that learning and unlearning is a part of transformation processes. However, there may also be some continuity—not all memory (and knowledge) is reconstructed at a system level during a transformative process, and thus, some memory will also provide an important source of continuity and aid with sensemaking during disruptive moments (Whyte, 2018). In this way, memory—imagining the past—can be both a resource for generating novel ideas and for making those novel ideas coherent in the present (Andersson and Barthel, 2016).

Analysis of previous social transformations has demonstrated that any efforts to support transformations toward sustainability will be complex, contested, and carry no guarantee of success (Westley et al., 2017). From the outset, transformations involve a suite of challenging processes, and many transformations, even those moving toward equity and sustainability, can be, and have been, dangerous and violent (Moore et al., 2018). In the literature, this “dark side” of transformations is often overshadowed by the optimism and forward-looking hopefulness of those attempting to change a system (Blythe et al., 2018). But the link between conflict, transformation, and the imagination of different futures demands scrutiny. Transformations to a more sustainable and just future are not likely to arise from a single, unified collective vision.
3.2. Individual–collective dynamics within transformations

Transformations also involve microscale dynamics, such as those that generate the behaviors, beliefs and values, and psychology of individuals (O’Brien and Sygna, 2013). Recent work in environmental psychology, as well as in scholarship on sense of place, provides mounting evidence that humans’ connectedness to nature is critical to our individual psychological, spiritual, and physical well-being (Wells and Evans, 2003; Bowler et al., 2010; Masterson et al., 2019; Njwambe et al., 2019). It follows logically then that any significant change to a social–ecological system could affect specific aspects of human well-being if the magnitude of that change disturbs identity, meaning making, cultural practices, and relationships (Stedman, 2016; Masterson et al., 2017), causing psychological and emotional distress (Albrecht et al., 2007; Jacquet and Stedman, 2014; Cunsolo and Ellis, 2018; Marshall et al., 2019). The grief and distress associated with loss of place, whether due to displacement from development projects or through ecological degradation such as the loss of biodiversity or nature more generally, has been documented (Albrecht et al., 2007; Booth and Skelton, 2011; Tobias and Rich mond, 2014). However, Cunsolo and Ellis (2018) assert that this form of cultural and individual harm is not often publicly acknowledged.

This scholarship has two implications for transformations. First, deep, entangled attachments to a particular place could generate interest among certain individuals in transforming problematic and undesirable system dynamics, that is, those drivers and dynamics that might damage the place and the corresponding human relationships with it. Protecting these place attachments is critical to the very notions of sustainability and justice embedded in transformations scholarship. However, there is some evidence that the place attachments that can support adaptive efforts (Marshall and Stokes, 2014) can also present barriers to transformation (e.g., Marshall et al., 2014; Masterson et al., 2019). More needs to be understood about this phenomenon, but the connectedness to nature and place-based identity might become elevated in the face of precarious conditions (e.g., Njwambe et al., 2019) and thus serve as a counteracting force to transformations.

Second, the psychological and cognitive challenges of change in general, and particularly the significant change required for a transformation, are substantial. For instance, Gifford (2011) outlines at least seven categories of psychological barriers to mitigation and adaptation behaviors regarding climate change. There might be additional barriers to move beyond adaptation to transformative change. Further, when envisioning alternatives, people have a tendency to seek evidence for those alternatives that are consistent with prior knowledge and beliefs (Nicholls, 1999; Clayton et al., 2015). Consequently, preference is given to actions and approaches that are more adaptive than transformative, valuing familiarity over novelty, even when a more radical change would protect an individual’s psychological and physical well-being along with their community and the planet’s. Understanding whether and how these barriers can be overcome to move toward sustainability and justice, and what role imagination plays in such processes, remains a key question.

In sum, transformations to just and sustainable futures are multidimensional, multiphased, and multi-scalar processes that require changes in the quality of dominant social–ecological relationships. Individual and collective imagination might have a number of different functions during the different phases and at different scales during transformations. These include comprehending the present system state and its history, including its invisible components and dynamics in order to identify opportunities for decoupling existing systems and their components as well as parts that should be maintained. Imagination is also needed to identify potential future system states and to map multiple available paths toward these different and ultimately unknowable futures (Mathias et al., 2020).

Transformations involve both the breakdown of problematic system dynamics and the creation of an alternative system. However, the risk is that these processes disrupt existing social–ecological relationships that are valued and embedded in identity, cultural practice, and place attachments, creating trauma and grief. The question of how to reach sustainable and just futures through processes that are also sustainable and just demands attention and possibly creates a role for imagination before and during transformation processes.

Such imagination is the work of agents. Transformative agency is described as involving different forms of systems entrepreneurship and is distributed across scales and multiple agents, that is, it is collective. Yet, transformation processes can never be entirely controlled, and thus, the causal relationship between agency and transformation is difficult to ascertain. Hence, agency, causality, and the individual–collective relationship heavily shape our Special Feature.

4. Imagination for transformations to just and sustainable futures: Analytical lenses

Through our review of a diverse and quickly expanding set of literature, we begin to outline the different dimensions and roles that imagination can play in transformation. To advance the theoretical understanding of the intersection between imagination and transformation, we draw on three concepts from the literature to form an analytical framework: (1) agency, specifically investigating whether and how imagination affects agency throughout transformation processes, (2) causation, especially the extent to which imagination may be causally linked to transformation processes, and (3) individual–collective dynamics, exploring how imagination connects individuals with groups, and connects individuals and collectives with nature, and how those shape a transformation process. We believe these three concepts are interrelated. For example, the exertion of transformative agency can have causal effects that advance or obstruct transformational change and can create or change dynamics of individual–collective relationships. Similarly, individual–collective dynamics can have causal relevance for transformations. For the purpose of clarity and theory...
development, we have separated these three concepts in our analysis, leveraging the power of each to gain insight into the relationship between imagination and transformations.

In the following three sections (5–7), we describe each of these three concepts and consequently apply them as analytical lenses to the collection of Special Feature articles (see Table 1). In addition to the insights generated by the three lenses, two more themes emerged in the course of our analysis (Section 8). We discuss all five themes and offer them as building blocks of a larger theoretical framework that aims to advance the conceptualization of imagination as a potentially necessary capacity for transformations.

5. Transformative agency
Exercising agency to support the dynamics of transformation processes implies disrupting the dominant system, shifting the institutional contexts, resources, structures of power, routines, norms, and values toward alternatives (Westley et al., 2013; Olsson, 2017). In the context of large-scale and long-term transformation processes, agency will take multiple forms and be exercised by diverse actors in space and time (Westley et al., 2017). The strategies pursued by transformative agents might differ depending on the phases of the transformation process (Westley et al., 2013; Olsson, 2017). Correspondingly, the role of imagination to inform, enable, expand, direct, obstruct, or diminish agency is likely to change across these phases as actor constellations and alliances change over time (Moore, 2017).

The two basic functions of imagination—understanding the present and envisioning the future—provide two distinct perspectives regarding the relationship between imagination and agency. First, building on Norgaard (2017), we argue that the social–ecological imagination is necessary to understand our current social–ecological reality. This includes the invisible social structures and people–planet relationships that have contributed to the current systemic sustainability and justice issues. Second, agency to promote or object to a transformative initiative requires a specific temporal orientation—the desire to create or prevent a set of conditions that differ from the current state. As such, transformational agency enabled by imagination involves a generative capacity to envision possible, alternative futures. The temporal nature of agency is often "underutilized" in scholarship (Hitlin and Elder, 2007) but must be brought into focus when exploring agency in the multigenerational, multi-scalar processes of transformative change and in light of the diverse worldviews that treat the future as nonlinear (see, for instance, Hairston, 2016; Whyte, 2017). Emirbayer and Mische (1998, p. 962) describe "a temporarily embedded process of social engagement, informed by the past (…) but also oriented toward the future (as a "projective" capacity to imagine alternative possibilities) …." This combination means that agency would both help to "see" the patterns in the present, as well as to meaningfully connect the past to a possible alternative future (Jovchevitch and Hawlina, 2018).

Building on these two key perspectives of the literature, the contributors to this Special Feature advanced our understanding of the role of imagination in transformative agency in several ways. The analyses offer (1) an expanded and refined conception of imagination as an inherent component of transformative agency across temporal, spatial, and institutional scales, (2) an exploration of the diversity of agents involved in transformations, illuminating why it matters who imagines (power imbalances), and (3) an illumination of the role of emotions in the generation and suppression of transformational agency.

Drawing on the discussions of agency and temporal scales, Galafassi et al. (2018) develop a temporally structured understanding of agency that is similar to the one proposed by Emirbayer and Mische but centered on imagination. Galafassi et al. (2018, p. 2) argue that
“Imagination is...a generative impulse of life towards new desirable ways of being in the world,” in which the ways individuals envision their future generates motivations and action orientations in the present. From their perspective, it is through imagination that the future is made present, which allows for the development of a sense of self in relation to that future, creating a present sense of purpose and an ownership of the change. In this sense, imagination is a form of agency, and it enables agents to identify life goals and the actions or strategies that would support the pursuit of these future goals in the present.

Collectively, the contributions to this Special Feature illustrate the diversity of actors involved in transformation processes—and with it, the diverse sources of agency. Authors examine the strengths and weaknesses that various actors bring to the tasks of reimagining the present and imagining the future. Although not comprehensive in scope, this initial collection allows us to begin to answer a key question: Who are the agents of change and why does it matter who does the (re)imagining? Agents featured in this collection include scientists (sometimes in collaboration with artists), governments, nongovernmental organizations, Hollywood filmmakers, political leaders, and climate-fiction novelists. A key actor type missing in this list is industry (beyond the film and book production/consumer industry)—a gap that we hope will be filled with future work. Marzec (2018) and Pereira et al. (2019) alert us to the importance of potential absences in imagination processes, such as the absence of Indigenous peoples in the development of scenarios for the Millennium Ecosystem Assessment. Missing voices cannot influence what is imagined.

Further, Pigott (2018) and Milkoreit (2017) encourage us to think beyond human agents and consider the agentic power of stories for our imagination. Extending this argument, we could also explore the transformative agency of climate models, images, or components and dynamics of the environment, such as an ocean, a species, or a meandering jet stream, recognizing the nonhuman agency that shapes imagination.

This diversity of actors is important for at least two reasons. First, diversity is the foundation for considerations of inclusivity, which is emphasized in a number of the articles in this Special Feature. Second, diversity—as a property of a system—plays an important role in generating novelty. Novel ideas or imagined alternative futures result from the (re)combination of multiple “building blocks” (Westley et al., 2013; Andrichuk et al., 2018)—the more diversity in the source material or building blocks, the more numerous possible combinations and permutations exist for novel ideas in any given context. Indeed, Marzec (2018), Galafassi et al. (2018), and Pereira et al. (2019) make a strong argument for inclusive processes, both to address social inequities and to expand the perspectives informing future thinking and alternative ways of being. They argue that diversity will increase the quality and legitimacy of what is imagined and the range of possible futures that humans may move toward.

Having diverse sources of agency also raises issues of power. Power imbalances among the different participants of collective imagination processes affect what can and will be imagined. However, the articles in this collection also illuminate that power asymmetries not only matter regarding who is in the room, and how nature itself exerts agency, but also how the processes that are designed, facilitated, or led by agents (i.e., the methods of imagination) are themselves an exertion of power. The authors illustrate how the choices and facilitation of these imaginative exercises is political—it matters who can and does initiate or claim control of collective imagination processes. For example, some methods may build and expand imagination, some may constrain it or “lock into” a dominant, existing imaginary, while others simply focus on engaging with existing patterns of sensemaking (Milkoreit, 2017; Galafassi et al., 2018; Marzec, 2018; Pigott, 2018; Pereira et al., 2019).

This poses a dilemma then, in that participatory and coproduction processes of imagination can be thoughtfully designed in ways that address the power asymmetries that have historically dominated decision making for the future, or conversely, can be designed and used to resist changing power asymmetries, or even to imagine an enduring unsustainable or unjust path for the future. Thus, we argue that power and imagination are inseparable, and the disentanglement of this complex relationship is an important task for future research (Vervoort and Gupta, 2018).

None of the papers in this collection explore the potential of agents to use imagination in combination with power to obstruct transformation, although we suggest this is an artifact of the specific cases examined by authors rather than any indication that such obstruction does not exist. Pigott (2018) and Marzec (2018) do, however, point to the risk of reinforcing current systems and their problems in imagination processes rather than opening up pathways to truly novel futures. Additionally, Pigott (2018) offers an insightful analysis of a national government (Wales)—an actor with a special set of power, authority, and other resources—attempting to shape the national imagination of sustainability. This analysis shows both how the political interests of governmental agents place certain limitations on the futures they imagine and how the importance of individual psychological dynamics, especially fears of change, among agents with extraordinary structural power can affect what is imagined.

Beyond the debates of inclusiveness and power, multiple articles offer insights regarding the importance of emotions for the exercise of agency and as a catalyst for imagination (Milkoreit, 2017; Galafassi et al., 2018; Pigott, 2018; DaSilva, 2019; Pereira et al., 2019). Pigott (2018) suggests that feelings of apathy and surrender, whether created by too much dystopianism or too much utopianism, can diminish agency, while hope and anger can fuel it. Similarly, DaSilva (2019) distinguishes two “impulses” in Hollywood climate fiction, triggering either hope or fear, thereby creating a tension between aspiration and warning. Milkoreit (2017) adds examples of cli-fi authors using emotions as political strategies, contrasting one author hoping to mobilize change through alarmism and fear and another working to nurture the more fragile
versions of hope that exist. Despite the different strategies, both share the same aim: to motivate readers for change in the present. Ultimately, there is no single way to feel about the future that will guarantee movement toward sustainability and justice, but Milkoreit’s (2017) analysis reminds us that emotions are integral to individual and collective belief systems, including their representations of the future, and therefore are subject to rules of what Thagard (2006) calls hot (i.e., affective) coherence. Further research is needed to understand this link between imagination and emotion and its role in generating or suppressing transformative change.

6. Causation

Questions arise about the ways in which imagination may contribute to the kinds of changes associated with transformation, such as the alteration of authority and resources flows, definitions of roles and routines, changes in the norms, values, and beliefs underpinning a system, and the means by which all of those shape human–planet relationships. How does the cognitive and social exercise of imagination shape a transformed reality?

Determining causal links between imagination and transformative change in complex adaptive systems presents significant methodological challenges. Although advances continue to be made regarding the study of complex causality (Ferraro et al., 2019; Schlüter et al., 2019), current tools and approaches poorly match system properties like uncertainty, nonlinearity, and emergence. Neither imagination nor transformation can easily be reduced to cause–effect analyses or linear assumptions. A particular future vision, an event, or any other variable could lead to different outcomes in different contexts, but the reverse could also be true, wherein different variables lead to similar outcomes in different contexts (see Sugihara et al., 2012). Drawing on Byrne and Uprichard (2012), we assert that the effects of imagination—the ideas, images, symbols, and stories that are imagined—on transformation processes can be understood and analyzed as part of trajectories.

The papers in this Special Feature place the potential for causation directly with the transformative agents at the center of their analyses and the activities they perform, again demonstrating the interwovenness of agency and causation. All authors argue that the agents they study have the potential to change the future direction of the social system they are part of, but none of the papers actually attempt to track or provide evidence for a causal effect. This is not a failure since the authors did not set out to provide a causal analysis, but it indicates that devising research on the causal effects of imagination presents specific research design challenges that are beyond the scope of this Special Feature.

However, what the collection of papers does highlight is the need to consider how imagination connects an idea in the present with a future alternative. For instance, discussing the causal potential of scenario narratives developed by scientists for the Millennium Development Assessment, Marzec writes, “imagining fictions—that is, creating narratives—is the first step in bringing new realities into existence.” In his view, scenario narratives and the ideas they contain can enable, constitute, and create reality (Marzec, 2018, pp. 13–14). In fact, that is the intention of conducting scenario projections and precisely why the power of those involved is critiqued. Scientists involved in global scenario development are for better or worse engaged in the “purposeful formation of a different sociopolitical human future” (Marzec, 2018, p. 5).

Mangat and Dalby (2018) and Pigott (2018) focus specifically on the use of language, either metaphors or legislation. Mangat and Dalby (2018) warn of potentially undesirable causal effects of the use of a war metaphor in the fossil fuel divestment campaigns—a militarized response to climate change. Concerned that this specific linguistic device invites nationalistic and competitive approaches rather than global and cooperative ones, they argue that the way we imagine the nature of a problem matters for the kinds of realities we create, including the actors that feel called upon and the logics of action deployed. Pigott (2018) scrutinizes the kinds of ideas for the future contained in laws and policies of the Welsh government (e.g., the term resilience) because they matter for how they will be implemented. Based on this perspective, the specific terminology of negotiated, written, and voted-upon legislation is crucial since legal texts can contribute to the trajectory for a particular kind of change.

Milkoreit (2017) links the potential causal power of imagination to the structural and “star” power of individual agents—whether those are Hollywood actors creating films about climate change, or the authors of climate fiction. However, Milkoreit also cautions against overextending claims of causal links, challenging the existing evidence in scholarship, as well as providing examples where structural and institutional power can constrain the imagination and thus may be causally linked to the barriers that shape processes of transformation.

Finally, Galafassi et al. (2018) remind us that not only can ideas about the future have causal effects in the present, but using the imagination to unveil present realities in different ways can change a person’s or group’s perspective and open up previously hidden or ignored avenues for action, which in turn can lead toward different futures.

7. Individual–collective relationships

The relationship between individuals and social groups is of great interest for social scientists across multiple disciplines to understand, for example, the emergence of social identity groups, political behavior, or the adoption of new norms (e.g., Nyborg et al., 2016; Hawliński et al., 2020). Focusing on the imagination in transformation processes raises important questions about the nature and dynamics of individual–collective interactions. How do individuals share their imaginations (e.g., regarding alternative states) with others? How do groups—especially those too often oppressed or marginalized—communicate their collectively held values and future visions to (new) group members or to other groups? The former is important to enact and reinforce the group’s coherence and its social identity and is often embedded as a collective,
cultural practice itself, highlighting the blurred lines between the individual and collective. The latter is part of the politics of future making—contesting and resisting visions among groups, and potentially creating joint visions with other groups.

As these questions indicate, three distinct relationships and corresponding information flows between individuals and groups can be distinguished according to Milkoreit (2017): (1) those from an individual mind to another individual or a group—the revelation of what initially seems an internal, cognitive–emotional reality only; (2) those from a group to an individual—the process of receiving and absorbing ideas shared by a group; and (3) those between and among groups, including the communication between a specific group and the public at large.

Most papers in this Special Feature address the three relationships—the communicative links between a specific group or political actor (e.g., the FFD movement, the Welsh government, or scientists drafting the Millennium Ecosystem Assessment) and other groups or the public at large (e.g., the American public, all Welsh citizens, movie or theater audiences). DaSilva (2019) adds complexity to the analytic challenge of understanding how imagination becomes shared among different groups. Rather than conceiving a one-way flow of ideas, DaSilva describes a self-reinforcing feedback loop: Hollywood producers make movies that reflect a certain societal mood, which Pigott (2018) refers to as atmosphere, and once the movie hits the theaters, it strengthens this zeitgeist among its audiences.

The contributors also advance our understanding of the dynamic relationship and interdependence between individual and collective future thinking in at least two additional ways. First, they illuminate the diversity of communication forms available, especially to groups, to visions among groups, and potentially creating joint visions with other groups.

Concerning the first insight, we consider communication as activities that engage cognitive, emotional, and tactile levers to create information flows linking cognitive–individual with social, collective imagination processes. Communicators have to select or invent communication tools, techniques, and technologies that work at specific system scales, including social, ecological, spatial, and temporal scales. The means of communication might also change over the course of a multi-decadal transformation process. Some might disappear (e.g., the printed book), while novel technologies and media might enable new ways to communicate and imagine collectively (Anderson, 2016). Therefore, examining the roles for different forms of communication appears critical for understanding how to connect individual and collective imaginations.

For instance, our contributors help us understand how the use of different media engages multiple human senses in creating shared imagination experiences, for instance, through videos explaining laws (Pigott, 2018) or combinations of visualization and sound in theater performances or films (Galafassi et al., 2018; DaSilva, 2019). Pigott (2018) adds an important argument to the discussion of sensory experiences when stating “in addition to understanding imagination as a cognitive skill, . . . the notion of atmosphere invites us to understand imagination as something more collective, consisting of shared affects, emotions, moods, and tones which spread through and weave in and out of the tapestries of life” (p. 3). These conclusions remind us that although imagination tends to be associated with things not easily perceived by the senses, many of these communication techniques aim to specifically activate the senses.

Narrative and story stand out as critical for their role in creating a shared imagination (Girvan, 2017; Ingram et al., 2019; Wittmayer et al., 2019). They play a central role in cognitive (Patterson and Monroy, 1998; Woodiwiss, 2017), given the ways in which narrative aids in sensemaking and constructing coherence through a type of social–psychological infrastructure (Paschen and Ison, 2014), helping to simplify cognitive tasks. Storytelling becomes essential to articulating ideas that are imagined—those distinct from what is actually perceived or open to sensory and lived experience. However, storytelling and myths also have long cultural histories. Thus, analyses of narratives can shed some light on the imagined realities and futures that exist in the minds of individuals (i.e., storytellers), groups, and societies.

Across the Special Feature, the discussion on narrative and storytelling reveals an ongoing tension about the future in relation to transformation. As DaSilva (2018) shows, the future in sci-fi films is often dystopian, but in policy and practice, both Marzec (2018) and Pigott (2018) point to not only positive and utopian visions but even an overly light-hearted approach to representing an imagined future and the transformation process to move toward sustainability and justice. Earlier, we discussed the relationship between these forms of narrative and the emotions they may trigger and the likelihood it mobilizes agency. However, these articles also make central the point that although imagination is often associated with momentary departures from reality (Zittoun and Cerchia, 2013) or with creative forms of expression, narratives of imagination are also often shaped by bureaucratic policy processes, such as the Inter-governmental Panel on Biodiversity and Ecosystems Services (Pereira et al., 2018), fossil fuel divestment (Mangat and Dalby, 2018), the Millennium Assessment (Marzec, 2018), and national sustainability policy in Wales (Pigott, 2018). Together, these analyses illuminate a challenge—both overly optimistic and overly pessimistic imagined futures may evoke a similar effect, in that they feel too decoupled from the actual, collective present to enable people to feel connected to them. In doing so, this Special Feature both extends and reinforces previous critical scholarship of dystopian or utopian futures. As Pigott (2018) asserts, perhaps more important than constructing narratives of the unknown future are...
pathway narratives that help us focus more clearly on the steps required to move from where we are at—the present system—toward transformed futures.

8. Emerging themes: Intentional designs and distributed capacities

Beyond the insights generated by applying the analytical lenses of transformative agency, causation, and individual–collective, our analysis of the Special Feature articles revealed two additional themes: (1) the differences between intentionally designed engagement of the imagination and the everyday nature of imagination, which is difficult to bound and to define and (2) the uneven distribution of imagination.

8.1. Designed imagination processes versus everyday imagination

Although diverse processes designed specifically to build the collective imagination are important, imagination happens anywhere and everywhere. A number of articles in this collection focus on the intentional design of collective imagination processes, often with the expectation that the processes can support both the future-thinking capacity of the participants and cultivate the social interactions needed to strengthen collective imagination.

These methods and others explored elsewhere, such as backcasting (Robinson, 2003), sci-fi prototyping (Merrie et al., 2018), participatory theater (Heras and Tàbara, 2016; Brown et al., 2017), games and simulations (Magnus et al., 2019; Rosa and Sweeney, 2019; Vervoort, 2019), along with virtual reality (VR), and augmented reality technologies, are all emerging areas of study across various disciplines, especially for addressing sustainability challenges. We conclude that these arts-based and technology-supported efforts ensure that there are opportunities for imagining “from the inside,” as Kind and Kung (2016) describe. That is, the scholarship in this area has begun to successfully show the effectiveness of these methods to provide an experiential act of collective imagining that can shift the content of what is imagined. However, the processes also create an openness to the idea that imagining is an action and capacity that is critically important to sustainability. The work of authors such as Galafassi et al. (2018) and Pereira et al. (2019) reveal how the arts-based approaches serve as “ruptures” that pause the momentum of the everyday, even briefly, to both see the present and the possibility that an alternative can exist (Wynter, 2006; Zittoun and Cerchia, 2013).

As Marzec (2018) and Pereira et al. (2019) show, these embodied and experiential methods are increasingly applied in processes that have historically been dominated by scientific rationales. Reinforcing the criticism of the hegemony of Western scientific thought, especially the central role of integrated assessment models in scientific advice for global environmental governance, the authors challenge such dominant approaches by demonstrating the value and potential contribution of more diverse types of meaning making for exploring possible futures. The authors do not claim that these novel methods should replace science-based approaches; rather, they present these as complementary, so as to ensure that the quantitative and qualitative, objective and subjective, embodied and experienced, the generalized, and the context-specific are all considered in ways that no longer perpetuate the power of those who have typically dominated.

There are several similarities between the methods explored here with more standard approaches to public participation in decision making and increasingly popular processes for knowledge coproduction, which are also attempts to address issues of inequality and sustainability in the present (e.g., Rayers et al., 2015; Norström et al., 2020). Future thinking can be an explicit goal of such processes or an implicit effect.

However, based on the full suite of articles in this Special Feature and the analysis here, we reiterate that imagination occurs far beyond participatory or coproduction approaches. Imagination may be invoked, constructed, or infused through numerous social, political, economic, cultural, and spiritual processes, including but not limited to the acts of reading novels (Milkoireit, 2017; O’Neill, 2018), engaging in ceremony and rituals, visiting the movie theater (DaSilva, 2019), examining reports by government agencies (Pigott, 2018), seeing marketing ads, or hearing presidential and nation-state representative speeches (Jasanoff and Kim, 2009). There is constant “future making” going on, and this may be more likely to increase in times of instability. Further research needs to examine not just the deliberately designed processes but the ways in which these processes amplify or dampen the everyday imagination and how this may ultimately shape transformations.

8.2. Imagination as an unevenly distributed capacity

In this Special Issue, we have adopted an interdisciplinary definition of imagination as multi-scalar processes, which recognizes and integrates the neural, cognitive–emotional, social, technological, and ecological dimensions. What follows from this understanding and the multiple contributions to this collection is the recognition that imagination for transformations is a capacity that can exist across these scales, similar to transformative capacities identified elsewhere (Marshall et al., 2012; Wolfram, 2016; Moore et al., 2018). The capacity of imagination exists within any social–ecological system, individually and collectively, woven among the human and nonhuman. Importantly, like any capacity, imagination is not necessarily distributed equally among the components of a system nor is it homogeneous within different actors or communities. It requires and depends on a multitude of factors, including the availability and access to certain material and ideational resources, structural conditions, historical roots and path dependencies, the state of technological development, and more.

This unevenness expresses itself in at least two distinct ways. First, imagination could be an existing but unused or underused capacity, that is, a latent resource. Some actors or institutions might be good at accessing this internal resource, so they can deliberately activate their imagination in response to circumstances. Others might need
support to surface and engage their imagination. As multiple papers demonstrate, specific processes can be designed to activate the imagination (Galafassi et al., 2018; Marzec, 2018; Pereira et al., 2019), providing participants with the cues, inputs (e.g., knowledge, images, sounds), materials, environments, and tasks that can bring imagination to life.

Second, the capacity to imagine the present or the future might be distributed unevenly (even in the latent form) among different agents and groups as a result of historical processes and system dynamics. However, this type of unevenness may or may not follow the well-known patterns of inequality present in societies. Therefore, accounting for this type of unevenness requires careful efforts to create equity and initiatives to strengthen imagination capacity.

Each of these dimensions of the unevenness of imagination capacity presents specific challenges for the design of imagination processes and for the understanding of the daily politics of imagination. As discussed earlier, for example, Marzec (2018) and Pereira et al. (2019) show that many imagination processes are not necessarily designed for inclusivity. Process designs must account for inclusiveness, existing inequities among participants, and the uneven distribution of imaginative capacity among them. For instance, designing a process that better recognizes the asymmetrical power among members of a group may not recognize that imagination is distributed in entirely different ways than power.

Thus, these articles point to the need to understand the distributional nature of imagination as a capacity, so we can better understand how it is interacting with or shaping future-making processes. The findings here highlight the need to be better attuned to the ways in which a greater balance and strengthening can be created, how dormant forms of this capacity can be activated, and how to generate new capacity to imagine the yet-unimaginable.

9. Conclusion

Urgent calls regarding the need for transformation hold a lot of hope that whatever transformations do unfold will lead to more sustainable and more just futures. However, although many of these calls are clear about what aspects of the existing system need to be transformed, less clear is how such transformations actually can happen and what an alternative system involves. To some extent, this is unknowable. This then raises important issues with regard to imagination: What is the potential of imagination to contribute to transformations?

Our goal in this editorial was to lay the foundations for a rich, inter- and transdisciplinary research agenda on imagination and transformations to sustainability. We have brought vast bodies of research into conversation with each other and proposed a novel, interdisciplinary approach to understanding the imagination as interdependent cognitive and social processes. Based on our review of the literature, we have put forward an emerging theoretical framework to study the multiple linkages between imagination and transformation.

The collection of articles in this Special Feature takes us some theoretical distance down the path of understanding the ways in which imagination serves as a capacity of transformative agency. Analyses reveal the ways that individual cognition and emotion mixes with power and the dynamics of social structures to shape what can even possibly be imagined in the first place. Through these results, we observe that imagination can make causal contributions to transformative processes and their trajectories. The articles assembled also highlight the different kinds of techniques and future-making processes that can potentially link individual cognitive processes with larger scale social, political, economic, and cultural processes involved in transformative change. In many cases, these newer techniques and processes were layered with older ways of thinking about the future rather than replacing them (e.g., adding arts-based approaches to thinking through climate change scenarios created through scientific modeling).

The findings also point us toward several research avenues for the future. First, although imagination is often associated with creativity and a type of cognitive freedom from rational thought and reality, the discussion of power, equity, and diversity reminds us of the ways in which imagination is often constrained. Both the freeing, transcendent act, and its present constraints are constant aspects of imagination, posing important questions for what kind of future is possible.

Stemming from that, it is clear that who imagines our future, and what kinds of processes and inputs are used matters greatly to whether a transformation moves us toward addressing sustainability and justice. The articles here provide thoughtful examples of how to design such processes in ways that those processes themselves serve as models of how to begin rethinking, reconnecting, and restructuring our futures, as Abson et al. (2017) have described as needed. Yet, how many of these processes, for how many issues, in how many places will these be needed, and how can this be achieved at multiple scales remains an enduring concern.

Although we adopted definitions of imagination and transformation that recognized the multi-scale nature of both, it remains unclear at what scales different kinds of imagination processes work. As just one example, there is no clear evidence that can answer whether arts-based approaches are suitable for national-scale transformations or only some other scale? Do certain approaches work better for transformations of specific aspects of a system, or are some most helpful when identifying current aspects of a system that need to be dismantled rather than imagining a completely different alternative? Are there other methods still to be generated that will be more helpful than others? More exploration and testing remain an opportunity.

Future efforts aimed at addressing the uneven distribution of imagination capacities within groups and societies face significant challenges. Much of the work assembled here implies that any attempt to strengthen imagination capacity is already shaping what can possibly
be imagined and thus often reinforces the power held by those trying to strengthen and redistribute.

Our definition of imagination for transformation—the interdependent cognitive and social processes that create representations of present and possible future states of the world that can inform public deliberation, policy, decision making, and behavior from the individual to the global scale—provides a strong foundation to study the processes that may address the ongoing need to imagine the social–ecological present and its alternatives for the future. Ultimately, we hope it might enable us to foster and (re)distribute imagination capacity in communities and societies that pursue transformations to more just and sustainable futures.

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