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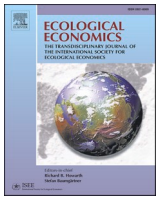

Navigating sustainable futures: The role of terminal and instrumental values

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ABSTRACT

Values have been discussed both in relation to the normative character of Ecological Economics and, albeit implicitly, in conceptions of human beings. Nevertheless, a conceptualisation of individually-held values remains underdeveloped. Scholars who do engage on a conceptual level tend to focus on the values of nature in the context of ecosystem services, with less emphasis on: (a) more generally-held values, (b) the psychological mechanisms for value formation and (c) how this understanding can be leveraged to achieve a sustainable future. In this paper, we revisit Milton Rokeach's concept of instrumental and terminal values, and draw upon it to stress the importance of both desirable end states and the means to achieve the goals endorsed by Ecological Economics. Considering these concepts with respect to the emerging literature on inner transformations for sustainability, we adopt a deliberative inside-out perspective on value change. Our conceptualisation of human values and value change provides scholars with new tools to understand and study different dimensions that help to engage with the transformation towards sustainability from a human level, behavioural perspective.

1. Introduction

The ultimate goal of Ecological Economics (EE) is sustainability (Costanza, 1989), defined as "justice with respect to future generations…[including] future generations of other species" (Costanza, 1997, p. 8). This principle implies that humans can flourish and cultures develop, but only within planetary boundaries (Rockström et al., 2009, 2023; Steffen et al., 2015).

EE evokes notions of inter- and intragenerational justice, care for the environment and other species, and limiting our individual wants for the greater good (Daly, 1992); hence, it takes a normative approach to how humans *ought* to behave. It gives "humans a special place in the system because they are responsible for understanding their role in the larger system for managing it for Sustainability" (Costanza, 1997, p. 3), and assumes a reflective human being who can change their priorities and act accordingly. This view fosters a notion that humans respect nature, and engage politically to uphold principles of shared justice and societal wellbeing (Becker, 2006; Faber et al., 2002; Siebenhüner, 2000), which is implicitly grounded in a set of values that shape their behaviour.

There is ample, robust evidence of the positive influence of values that focus on care for others and nature on pro-environmental behaviours, social behaviours, and support for climate policies (Bretter et al., 2022, Bretter et al., 2023a, 2023b; Bretter and Schulz, 2023, 2024; Corner et al., 2014). Some meta-analyses suggest that values are one of, if not the most important predictor of belief in human-made climate change (Hornsey et al., 2016; Poortinga et al., 2019), and recent reports such as The European Commission's *Values and Identities – A Policy-maker's Guide* (Scharfbillig et al., 2021) underline growing awareness of the role of values in policy processes.

Therefore, values ought to play a crucial role in EE. However, while (often implicitly) acknowledging their importance in behaviours that are aligned with sustainability goals, few authors have engaged with the concept (Jager et al., 2000; Murtaza, 2011; Nyborg, 2000; Siebenhüner, 2000; Söderbaum, 1999; Spash, 2002). On the one hand, growing interest in systematisation has led to a potpourri of terms, ranging from worldviews and beliefs to characteristics, traits and ideologies. On the other hand, ecological economists who investigate ecosystem services (ESS) seek to clarify concepts when referring to different types of values (Kenter, 2016; Kenter et al., 2019; Pascual et al., 2023; Raymond et al., 2019). While early studies took an individual and instrumental approach to the values of nature (Costanza et al., 1997), the focus has shifted to shared social, cultural and relational values. However, the field

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continues to pay little attention to transcendental, individually-held values, and how they may be changed and mobilised for sustainable transformations.

Here, we draw upon social psychology, a building block of behavioural economics (Barberis, 2018; Kahneman, 2003), to trace the origin of values, and create a conceptual framework to better-understand societal transformations. Previous attempts to integrate behavioural economics into EE have focused on the role of nudging and boosting in the context of issues such as energy justice and conservation (Andor and Fels, 2018; DellaValle and Sareen, 2020), framing (Carlsson et al., 2011; Collet et al., 2023), norms and social preferences (Belaïd and Flambard, 2024), and the limitations of attempting to understand individual decisions from a rational actor perspective (Venkatachalam, 2008). We contribute to the growing field of behavioural-ecological economics by shedding light on values—a critical heuristic that motivates human behaviours (Kahneman, 2003).

In particular, we provide a thorough, psychologically-grounded conceptualisation of individually-held values and value change. We revisit Rokeach's (1973) conceptualisation of values as terminal (representing desired end-states) and instrumental (the means to achieve desired end-states and goals). In line with the dynamic and normative view of EE, we adopt insights and perspectives from the emerging literature on inner transformations for sustainability, to highlight the relevance of our conceptualisation to contemporary research in EE.

Inner transformation research posits that the current poly-crisis originates from a disconnection with our inner worlds, encompassing, among others, our values and their translation into actions (Ives et al., 2023; Wamsler et al., 2021). Hence, developing the capacity to reflect, articulate, and align actions with sustainable values becomes imperative. Building on these concepts, we advocate for an inside-out approach to value change, and argue that individuals and groups must be empowered to cultivate the capacities necessary for reprioritising and enacting their values at both individual and institutional levels (Wamsler et al., 2021).

We make three contributions to the field. First, our conceptualisation of individually-held values, consisting of instrumental and terminal values, reshapes our understanding of values as referring to both end-states and means. This distinction allows scholars and practitioners to focus on how to engage people in articulating and mobilising around shared visions of sustainable futures, suggests different ways to achieve this, and highlights the interplay between end-states and means. Second, by combining psychological mechanisms with insights from inner transformation research, we demonstrate that value change must be understood from an integrated inner-outer perspective in which environmental and external cues interact with deliberate, internal processes. Third, we add to the growing literature on behavioural EE by introducing individually-held values as a critical heuristic that motivates (sustainable) behaviours and intentions.

In the following sections, we give a broad overview of the concept of values in different contexts. It is, however, important to point out that this is by no means a complete mapping, nor a systematic review of the entire EE literature on the topic. Instead, our approach is more like a scoping review, in that we explore a broad landscape that encompasses values in EE, social psychology and sustainable transformations (Arksey and O'Malley, 2005; cf. Grant and Booth, 2009). We search a purposeful selection of relevant databases (such as Scopus, Web of Science, Google Scholar, and the journal *Ecological Economics*) using key terms (such as "personal values", "transformation", and "value change"), and iteratively refine key concepts (partly via regular author meetings and expert consultations). Insights from our selected fields of scholarly works were synthesised to inform our theoretical discussions.

In the remainder of this paper, we first examine the concepts of values and value change found in EE, and trace their origins in social psychology. We then integrate these insights into findings from inner transformation research to create a more comprehensive understanding of a behavioural approach to EE. Finally, we discuss the main implications, and propose an agenda to foster fruitful future research.

2. Values in ecological economics

EE research has discussed values in three contexts. First, they have played a central role in philosophical discussions of economics' research, differences between mainstream and EE, and various EE schools of thought (Bina and Vaz, 2011; Pelletier, 2010; Söderbaum, 1999, 2015; Spash, 2002, 2012). Second, they have featured in deliberations of the role of human behaviour in achieving sustainability goals (cf. Jager et al., 2000; Murtaza, 2011; Nyborg, 2000; Siebenhüner, 2000; Söderbaum, 1999; Spash, 2012). Third, different definitions and typologies have featured prominently in ESS valuation research (IPBES, 2022; Jax et al., 2013; Kenter et al., 2015; Pascual et al., 2023; Raymond et al., 2019). This section focuses on the latter two approaches – human behaviours and ESS – which are more closely aligned with the aims of the article.

2.1. Values for ecosystem services

The emphasis on human care for nature and human flourishing within planetary limits that is found in EE has led to extensive research on ESS, and the values of nature. While early work on ESS focused on instrumental and economic value, albeit including indirect benefits (Costanza et al., 1997), there has been a general shift away from this human-nature dichotomy (Jax et al., 2013; Naess, 1989, 2008; Spash, 2013). Influenced by Deep Ecology, ecological economists emphasise the intrinsic value of all living beings and ecosystems; they explore the values associated with nature on a deeper level, thereby challenging the prevalent instrumental and anthropocentric views (Naess, 1989, 2008). Related debates have led to a distinction between Deep and Shallow EE, with the former giving more emphasis to social justice, poverty, ethical treatment of non-human entities, and democratic decision-making processes. Consistently, Jax et al. (2013) introduced fundamental and eudemonistic values to ESS. The latter are seen as a normative value frame that outlines how humans ought to see the inherent value in nature and non-human beings, grounded in a perspective focused on human needs. This notion of eudemonistic and fundamental values has been applied to other fields, such as energy systems (e.g., Gantioler et al., 2023).

Several conceptualisations of values in ESS have expanded on these insights. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2022, see also Pascual et al., 2023) developed a typology of 'values of nature' that distinguishes five distinct, but interrelated concepts: worldviews, knowledge systems, broad values, specific values, and value indicators. These views, systems, values and indicators relate to four human-nature relationships: living from, living in, living with, and living as nature. Worldviews can be anthropocentric (prioritising people), ecocentric (emphasising nature's inherent value), pluricentric (stressing the human-nature relationship), or cosmocentric (linking ecocentric and pluricentric views). Knowledge systems are embedded within them, understood as "bodies of knowledge, practices and beliefs" (IPBES, 2022, p. 18). Both worldviews and knowledge systems give rise to guiding principles and life goals, termed 'broad values', which refer to concepts like justice, responsibility, prosperity or harmony with nature. These broad values underpin others that can be instrumental (a means to an end), intrinsic (inherently worthy) or relational (meaningful, reciprocal). Lastly, value indicators are quantitative and qualitative ways of capturing the importance/value of nature to people in monetary, biophysical or sociocultural terms.

Another stream of the ESS literature is mainly concerned with social values. Social values are defined as "overarching principles […] pertaining to a common good or society as a whole and values that become shared through processes of socialisation, including deliberation and internationalisation" (Kenter et al., 2019, p. 1445). In turn, there are

three dimensions that relate to three types of values: i) transcendental, ii) contextual and iii) value-indicators (Kenter et al., 2015). This understanding closely resembles IPBES definitions of broad values, specific values, and value indicators. Drawing on Rokeach (1973), Schwartz (1992), and Schwartz and Bilsky (1987), transcendental values are seen as beliefs about desirable end states or behaviours that are independent of context, and are used to justify behaviours and judge phenomena (Kenter et al., 2015, 2019). Contextual values are "opinions about worth and importance, which are dependent on object value and hence contextual and "attitudinal", while value indicators are used to measure how important something is in both monetary and non-monetary terms (Kenter et al., 2015, p. 89).

With the exception of Kenter et al. (2019), who refer to mechanisms such as priming (cf. Bardi and Goodwin, 2011), few authors engage with the underlying mechanisms that elicit value change. Shared and collectively held values are said to co-evolve through exposure to laws, norms, traditions and societal institutions such as technology, knowledge, organisations or environmental aspects (Kenter et al., 2015; Murtaza, 2011). Kendal and Raymond (2019) and Kenter et al. (2019) draw on influential research in social psychology on the topic of individual value change, and underline the influence of age, major life events and broader societal changes, in addition to awareness-raising and mindfulness.

In conclusion, most of the literature in the domain focuses either on values related to a specific phenomenon (i.e., ESS) or those that are relevant to the human-nature relationship. As Raymond et al. (2019, p. 1174) admit, this has led to the situation where "the ecosystem services literature focuses almost exclusively on values of nature, largely omitting consideration of our deeper held values in relation to it". Although the IPBES (2022) typology refers to broad values, and Kenter et al. (2015) allude to transcendental values by focusing on context-specific values for ESS, some key properties that differentiate values from other orientations and attitudes are lost, as are more detailed understandings of the relationship between values and opinions, and values and sustainable behaviours from an individual perspective. It is therefore important to explore how ecological economists have attempted to engage with values from a broader perspective.

2.2. Values and sustainable behaviour

A common feature of work on human behaviour in EE is the denunciation of the *homo economicus* as a useful model of behaviour (Becker, 2006; Faber et al., 2002; Gintis, 2000; Jager et al., 2000; Nyborg, 2000; Siebenhüner, 2000; Söderbaum, 1999). This has resulted in various – sometimes explicit, other times implicit – conceptualisations of values that characterise human beings and influence their behaviour in line with the goal of sustainability. In general, authors conceptualise human beings as concerned with caring for other humans and species, both now and in the future. Siebenhüner (2000), Faber et al. (2002) and Becker (2006), in their respective conceptions of the *homo sustinens*, *homo politicus* and *homo ecologicus,* only implicitly refer to values when describing human beings as respecting and being sympathetic towards nature, and seeking what is best for society.

Nyborg (2000), however, differentiates between altruistic and non-use values. Building on Arrow (1951), humans are understood as both *homo economicus*, who strive to fulfil their preferences, and as *homo politicus*, who are committed to shared responsibility. The context decides which of the two will take precedence. While moving beyond the one-dimensional concept of the *homo economicus*, this integration of values into human behaviour and preferences remains limited. First, it treats individual preferences as exogenous, rather than being shaped by the person's position within society. Second, it treats all humans as a homogeneous group that suffers from a Jekyll and Hyde syndrome, switching between pure self-interest and pure altruism from one moment to the next.

In line with Nyborg (2000), both Siebenhüner (2000) and Jager et al. (2000) explicitly note the role of values in human behaviour. For instance, they refer to individual or competitive social value orientations. In both studies, the authors draw on psychology to develop an alternative to the *homo economicus* model. Nevertheless, and despite acknowledging the importance of values, they neither thoroughly explain nor integrate the concept into their conceptions of the human being. Siebenhüner (2000) argues that humans are protective of others by nature, have moral responsibility, and experience freedom through self-determination, thus again evoking values of caring for others and nature. As with Nyborg (2000), the conception of humans and their values remains grounded in homogeneity.

Reflecting on these different conceptions of human beings and human behaviour, Faber et al. (2002) present the concept of the *homo politicus*. Drawing on political philosophy, they argue that individuals ought to strive for political justice, understood as generally accepted principles that guide the distribution of goods, positions and chances. By conceiving the *homo politicus* as an individual in a political position who requires power to change things, the authors implicitly refer to values of power and achievement as *instruments* to attain sustainability. Importantly, not only do Faber et al. (2002, p. 329) argue that "every human being is not only *homo economicus* but also *homo politicus*", they admit that this concept should be seen as a Weberian *Idealtypus* in that, realistically, "one does not observe human beings who completely correspond to these concepts". The interesting admission that "one will find only traces of their characteristics in real human beings" (Faber et al., 2002, p. 329) suggests a degree of heterogeneity, on the one hand, and the presence of different kinds of values within each human, on the other.

Becker (2006) also draws on philosophy and virtue ethics to develop his *homo ecologicus*. Here, humans are characterised by: i) sympathy and respect for nature, ii) creativity drawn from nature, and iii) a human-nature relationship grounded in personal experience. This view of the human-nature relationship closely resembles Pascual et al.'s (2023) proposed nature typology valuation for the IPBES.

Although the authors cited above refer to values, they do not engage with the concept. There are two exceptions: Murtaza (2011) and Söderbaum (1999). Murtaza (2011, p. 578) defines values as "the priority attached to different motivations". Drawing on Norgaard (1995) and Gramsci (1959), who develop the notion that societal values are shaped by the dominant classes, values are treated at the aggregate level, and reflect the dominant values of a given society. However, like the aforementioned scholars, this fails to appreciate human heterogeneity. Based on Maslow (1970) and, to a lesser extent, Gleitman and Gross (2004) and Kohn (1990), Murtaza (2011) divides values into four categories: self-centred motivation, relational, cognitive, and meta. He concludes that "the self-centred motivations account for the bulk of the exclusive use of scarce resources, and their excessive pursuit can hence undermine the ability of other people, societies, species and generations even to meet their basic needs" (p. 579).

Söderbaum (1999) arguably engages with the notion of individual-level values most thoroughly, albeit loosely. He briefly defines values as "ideas about end-states and means" (p. 163) – although he refers to them as being the same as ideologies. Drawing on a limited number of references, he illustrates egoistic vs other-related or community-oriented ideological orientations, or egoistic and altruistic motives. Crucially, and unlike other authors, he highlights the importance of this understanding in challenging the homogeneity present in concepts of human behaviour in economics when writing:

> "If ideological orientation is regarded as important, then the assumptions about homogeneity of professional groups (farmers,

bureaucrats) of public choice theory no longer necessarily holds." (Söderbaum, 1999, p. 169)

Given EE's overarching aim of human flourishing within planetary limits, Sen's (1979) capability approach[1] offers another normative perspective of valued ends and means. The approach starts from the perspective of human needs, and seeks to identify 'capabilities' (means) for particular 'functionings' (ends) necessary for wellbeing. Capabilities are conceptualised as real freedoms to reach ends, whether these be needs or individual "goals, objectives, and commitments" (Sen, 2013, p. 6). He goes on to argue that a sole focus on need fulfilment might undermine freedoms through "an understandable fear of authoritarianism" (p. 10), and considers that it is essential to sustain the fulfilment of freedoms by eliciting consent for the necessary changes. He thus implicitly refers to both individual and social values when writing that sustainability "has to be integrated with the sustainability of freedoms'", which "is also a related 'social choice' problem in determining the priorities between different kinds of freedoms" (p. 10). By discussing different means to achieving wellbeing within planetary boundaries, from coercion to reasoning through democratic participation, from individual property rights to communal resources, he relates to values and calls for "broader concerns of social psychology, particularly the psychology of sharing and social freedom" to better understand the role of "valuational changes" (p. 18). Indeed, as we will argue later, social psychology and its engagement with the concepts of values and value change is an important avenue for grasping people's desire to share with others, and appreciate the inherent values of nature.

To conclude, values play a crucial role in EE. Over the past three decades, scholars have engaged with values implicitly and explicitly by evoking normative values related to caring for other humans and other beings, and greater unity between humans and the environment. Despite this engagement, the literature remains limited in three ways. First, and with the exception of work on ESS valuation, the concept of individually-held values remains underdeveloped. Second, the focus on a particular application of values comes at the cost of a more thorough engagement with individual transcendental values. The focus on sustainability as both an end goal, and as a means to reach this goal, requires a concept of values that can differentiate between outcomes and ways to achieve outcomes. Lastly, while the normative stance of (deep) EE calls for values that focus on care for others, respect for all beings, democratic principles, and an understanding of how this change is to be achieved (through agential and structural ways), it requires further engagement. To bridge these limitations, and in line with Sen's (2013) call, we outline an understanding of values and value change based on social psychology.

3. Social psychology and the forgotten conceptualisation of values

The study of human values has a long tradition in social psychology. While early work examined what makes us desire some things more than others, arguably the earliest systematic conceptualisation was proposed by Milton Rokeach. Rokeach (1973) defined values as beliefs by which a person acts by preference. Like all beliefs, they comprise three dimensions: cognitive (e.g., desiring something), affective (e.g., being emotionally for or against something), and behavioural (e.g., when activated, values lead to certain actions). They are shaped by one's upbringing, education and important life events (Rokeach, 1973). Accordingly, and in contrast to the traditional view of economists, different individuals can have different values. They can attribute more importance to one value than another, meaning that, for example, some are more altruistic, while others are more individualistic.

This definition of values differs from the aforementioned IPBES (2022) conceptualisation, and is more aligned with what Kenter et al. (2015) call 'transcendental' values. We recall that the former defines 'broad values' as "moral guiding principles […] often embedded in a society's institutions (i.e., informal social conventions and norms, and formal legal rules)" (Kenter et al., 2015, p. 26). Hence, according to the IPBES (2022), values seem to have a morally-grounded social practice component, while Rokeach (1973) argues that they are rooted within individuals, albeit shaped by social interactions. While values are sometimes confused with constructs such as social and moral norms, it is important to state that they should be seen as distinct. Value-belief-norm theory (Stern et al., 1999) posits that they are to be understood as preceding, and giving rise to particular norms (Lind et al., 2015), be they social or moral. While such norms clearly influence behaviour and individual choices, individual values are ultimately the primary influence; thus, values and norms do not conflict at the theoretical level. Kenter et al. (2015, p. 89) define transcendental values as "guiding principles that transcend specific situations". Although the latter authors do not explicitly conceptualise values as beliefs, their understanding closely resembles Rokeach's (1973) definition.

It is generally agreed that values that are important to an individual are integrated into a *value system* and are ordered (Rokeach, 1973; Schwartz, 2012). More important values exert more influence on cognition, affect and behaviour compared to others that are less important.

Rokeach (1973) argues that there are two distinct types of values. *Terminal* values denote beliefs regarding a desirable end state, that is, the state that ought to be achieved. *Instrumental* values refer to beliefs regarding a desired mode of conduct, that is, how to achieve that end state. Hence, there is a difference between desiring sustainability, for example, as an end state (e.g., meeting social needs within planetary limits) and desiring sustainability as a means of conduct (e.g., conducting an action in a sustainable manner). While the former refers to an (ideal) status in perhaps distant times, the latter refers to preferred actions that can be conducted immediately. Terminal and instrumental values differ in terms of abstractness—the former is more abstract than the latter. This difference is crucial for our conceptualisation of value change, as discussed later.

Schwartz's theory is undoubtedly the most-cited theory of values, and most widely applied in scholarly research. Schwartz (1992), together with his colleagues, largely adopted Rokeach's definition (Rokeach, 1973). According to Schwartz (1992, p. 4), values are "(1) concepts or beliefs, (2) pertaining to desirable end states or behaviours, (3) transcending specific situations, (4) guiding selection or evaluation of behaviour and events, and (5) ordered by relative importance". This definition places less importance on the distinction between terminal and instrumental values. In earlier work, Schwartz and Bilsky (1987) provided empirical evidence of the distinction between terminal and instrumental values. Yet, in his later work, Schwartz (1992) proposed that values are rather to be understood as beliefs regarding "desirable end states or behaviours", without explicitly examining whether and how these differ.

Neglecting the distinction between terminal and instrumental values does, however, significantly affect how scholars apply (and have applied) value theory. For example, based on Schwartz's definition, De Groot and Steg (2007, 2008) conceptualised biospheric, altruistic and egoistic values. Although many scholars have successfully used their measure, each of these constructs comprises terminal and instrumental values. For example, the altruistic construct comprises items such as "equality" and "a world at peace", which describe a desired end-state (and are thus more abstract), while also including items such as "helpful", which refers to a desired mode of conduct (and is thus less abstract). Similarly, biospheric values include items such as "unity with nature", a desired end-state, while also including items such as "preventing pollution" and "protecting the environment"; both of these are more

[1] Here we focus on Sen's (1979) capability approach. However, we acknowledge the existence of diverging views regarding capabilities (e.g., Nussbaum, 2000; Fleurbaey, 2002).

likely to describe a desired mode of conduct (and are less abstract than "unity with nature"). Therefore, by adopting Schwartz's definition, scholars have confounded terminal and instrumental types of values. We argue that, at best, this conceptual ambiguity neglects different levels of abstractness, and, at worst, prevents more fruitful and informative research.

Therefore, we argue for a new (but old) concept of values, and define them as beliefs that influence the preferred actions of a person. In particular, we not that preferences can differ in the level of abstractness: they can either relate to desired end-states (high abstractness; terminal values) or desired modes of conduct (low abstractness; instrumental values). We argue that scholars must make this distinction explicit when examining values, and their implications for cognition, affect and behaviour. This reconceptualisation will not only provide more clarity, but will also lead to more fruitful research by offering a coherent analytical framework for the (re)examination of new (and old) research questions. For example, rather than examining how 'values' relate to environmental behaviours such as intentions to reduce food waste or use public transport, as in previous research (Bretter et al., 2023a, 2023b), we encourage scholars to differentiate between terminal and instrumental values. They could also explore how instrumental and terminal values relate to polarisation, and determine the relationship between them, on the one hand, and conflict between different identities, on the other. Such questions, combined with the notion of instrumental and terminal values, will foster integrative and fruitful EE research.

3.1. Value systems and value change

Values have historically been treated as relatively stable (e.g., Lindsay and Knox, 1984), implying that individual differences in other variables (e.g., demographics) can predict outcomes such as environmental behaviours (Bardi et al., 2009). However, if this were true, sustained societal, social and behavioural change would be highly unlikely (see below for more discussion; Rokeach, 1973), and the anti-deterministic stance of EE would be undermined (Daly and Farley, 2011). Some scholars find support for their argument that human values may change naturally from one generation to the next due to a change in affluence (Inglehart and Baker, 2000) or political socialisation (Cotgrove and Duff, 1981). Others believe that values can be actively influenced via a process of self-confrontation (Grube et al., 1994).

While these empirical findings are important, we must first conceptualise value change. Specifically, we recall that individuals hold multiple values. When examining value change, Rokeach (1973) posited that while the value system is relatively stable over time, the relative importance of values within the system may change. He conceptualised this as value change: a reordering of priorities of different values within a stable value system.

Rokeach's (1973) conceptualisation is aligned with what Bardi and Goodwin (2011) refer to as rank-order changes in values (i.e. intra-individual changes). Rank-order changes have received relatively little attention in scholarly debate. In one study, Milfont et al. (2016) found that self-transcendent (and self-enhancement) values seem relatively stable over time. Another study, in contrast, showed that self-transcendent and conservation values increased over a period of eight years (Vecchione et al., 2016).

Bardi and Goodwin (2011) refer to another form of value change: mean-level changes. This refers to changes in the mean importance of a given value across individuals (Bardi et al., 2009), and the idea has received more scholarly attention than the notion of rank-order changes. For example, Inglehart and Baker (2000) found that over several generations, economic development increased participatory values (e.g., altruism). Similarly, Gouveia et al. (2015) analysed a large cross-sectional sample of Brazilians, and found that normative values were more important for older than younger individuals. Finally, Lönnqvist et al. (2011) examined mean-level changes in a longitudinal study of migrants, and found that universalism values increased after migration. Here, however, we are more interested in rank-order (i.e., intra-individual) value change.

It is important to differentiate between initial and long-term value change. Bardi and Goodwin (2011) argue that external events may trigger the initial process of value change. The authors posit that external events, or cues, can either subconsciously prime particular values, or consciously raise the awareness of the individual, who then challenges the existing order. The subconscious or automatic route to value change builds on the relationship between environmental primes and their association with values. For instance, an individual may associate different languages with different values. Hearing a certain language activates the related values, resulting in considerations and behaviours associated with those values (Bardi and Goodwin, 2011). On the other hand, the subconscious route includes an awareness of one's values, for instance, by "making people elaborate on the reasons for their values" (Bardi and Goodwin, 2011, p. 275). Newspaper articles, social media, educational programmes or discussions with parents or peers can challenge an individual's values, and result in change.

While a single event may be enough to trigger long-lasting value change, if it is strong enough, in general, change is the outcome of repeated challenges or priming in the same direction (Bardi and Goodwin, 2011). The latter authors argue that five underlying mechanisms facilitate value change: priming, adaptation, identification, consistency maintenance, and direct persuasion. Repeated priming through language that evokes more individual or collectively-focused values can occur unintentionally in a new environment, or be targeted institutionally through the media or education (Gardner et al., 1999).

Adaptation relates to life changes that may induce value change, as these changes go hand-in-hand with environmental cues. Life changes initiate conscious and unconscious processes of value change. For example, students starting a new life at a university must adapt to the new environment. If the person is to maintain their existing values, they must become more aware of these values, increasing the likelihood of thinking about them. Over time, this might cause the individual to rethink the importance of particular values, and reorder them. Or, as Bardi and Goodwin (2011, p. 278), with reference to earlier work by Schwartz and Bardi (1997), put it, "people are likely to downgrade the importance of values that cannot be pursued, and they are likely to endorse values that are encouraged in their social environment".

Identification, the third underlying mechanism of value change, is closely related to adaptation, and refers to social groups. Gecas (2000) proposes that individuals internalise important social identities as values. Therefore, as they become part of different social groups, their values may align with the group's predominant values (Bardi and Goodwin, 2011).

The fourth mechanism, consistency maintenance, relates to and builds on adaptation. A challenge to an individual's values often results in cognitive dissonance (Festinger, 1957). Cognitive dissonance describes an inconsistency in the individual's self-view. On the one hand, Rokeach (1968, 1973) found that people are likely to change their values to resolve these inconsistencies. On the other hand, if challenging the value is perceived as a threat, there can be resistance, which impedes value change. To return to our example of education, the individual, when confronted with taught and elicited values that challenge his or her personal values has three options to resolve this inconsistency. Either they change their values to adapt to the new environment, they try to maintain and advocate for their existing values, or they can decide to leave the environment.

Direct persuasion is the fifth mechanism (Chatard and Selimbegovic, 2007). This mechanism induces change through the conscious route, by challenging individuals to think about their values. A prime example is the effect of economics and business studies on students' values, which emphasise self-enhancement, and pay little attention to transcendence or pro-social values (Krishnan, 2008). This challenge often starts on the first day, when students are told to override social or egalitarian concerns, and instead act as an economically rational entity in a so-called

'ultimatum' game. The message is: take as much as you can, and offer as little as possible to your peer. By repeatedly evoking these notions of individualism (economics) education can elicit long-term value change. Similarly, media channels, both conventional newspapers and social media, allow this mechanism to function. By repeatedly using particular language (priming), in combination with particular arguments on a given topic, individuals are encouraged to consider their beliefs.

Despite the existence of these mechanisms, scholarly debate has, so far, failed to distinguish between terminal and instrumental values when examining value change. In practice, the assumption is that both types change equally. However, psychological research provides strong evidence that this may not be the case. Both construal-level theory (Trope and Liberman, 2010) and action-identification theory (Vallacher and Wegner, 1987) suggest that an object's abstractness is fundamentally related to how individuals process information related to it, and how they act. Objects with a higher level of abstraction tend to be broader and less specific (e.g., living in a sustainable society; Trope and Liberman, 2010), thus making them more central to the individual's self-concept, and less likely to change (Vallacher and Wegner, 1987). If we take the example of an individual who wants to live in a sustainable society (i.e., high-level abstract; terminal values), this person may hold several instrumental values (less abstract) that determine how they contribute to creating a sustainable society, such as not owning a car or wasting less food. Depending on the context, the individual may choose one instrumental value over another, while the terminal value remains constant regardless of their choice. Given their inherent abstractness, terminal values are less likely to change than less-abstract instrumental values.

The difference in abstractness between terminal and instrumental values may also inform our understanding of the mechanisms primarily responsible for changing each value type. Usually, priming, consistency maintenance and persuasion mechanisms are based on information provision. However, recent research has demonstrated that providing information, including nudges and reframing, may be insufficient to create long-lasting behaviour change (Bernauer and McGrath, 2016; Hagmann et al., 2019; Maier et al., 2022), potentially because information is provided with low abstractness. Accordingly, information-based mechanisms are unlikely to change terminal values, and are more likely to change instrumental values (i.e., beliefs regarding the means of conduct). Adaptation and identification, in contrast, are often intertwined with relatively long-term life changes, such as moving to a new city (adaptation) and the related new social contacts and groups that individuals encounter (identification). These changes in individual circumstances go along with repeated, reoccurring stimuli, and they may be able to change terminal and instrumental values. Therefore, we can see that some of the value change mechanisms proposed by Bardi and Goodwin (2011) are more relevant to changing instrumental values, while others may be sufficiently strong to change both terminal and instrumental values. However, it is important to note that these mechanisms often require the individual to (sub)consciously reflect on their values, and reorder them within their value system, if deemed necessary.

4. Transformation research and value change

While social psychology has produced a wealth of valuable insights, for it to be relevant to EE, these insights must be incorporated into a theory of deliberative transformative change. Unlike traditional social psychology research, transformation research is less concerned with testing models' predictive or explanatory power, and instead focuses on how to deliberately leverage transformative change (Abson et al., 2017; Chan et al., 2020; Ives et al., 2023). This shift in emphasis is central for considering the complexity of societal challenges, and the need to foster just and sustainable futures. By adopting this transformative perspective, we argue that a more comprehensive understanding of how values evolve and influence societal transformations towards sustainability can be attained.

Values have been conceptualised as an integral component of the personal sphere of transformation (Fazey et al., 2018; Horcea-Milcu et al., 2023; O'Brien, 2018). The model of the three spheres of transformation posits that it is an intertwined process of change within the inner personal, the political (comprising systems) and the practical sphere (encompassing behaviours and technical responses) (O'Brien, 2018; O'Brien and Sygna, 2013). A significant contribution of this model is that it links the inner, personal sphere (of which values form part) to practical and political spheres as a theory of change.

As in social psychology research on values, individuals are analytical focal points that are central to driving social and political change. However, the field of inner transformation actively seeks to link inner and outer dimensions across sectors and levels, including individual, collective and system levels by emphasising the need to analyse their *interlinkages* (Wamsler et al., 2021; Ives et al., 2023). We argue that this integrative, dynamic inner-outer perspective adds a vital component that is relevant to advancing our understanding of the role of values in achieving the twin goals of a just and sustainable future. Many other theories and methodologies concerning behavioural change stem from reductionist principles. However, they only test the explanatory power of individuals' value orientation in relation to lifestyle choices (such as consumption practices). An *inner* transformation approach would instead seek to explore how such values co-emerge and are reinforced by groups, societies, cultures and organisational structures, and how they can be addressed across sectors and scales to support *deliberative* transformative change (Ives et al., 2023; Wamsler et al., 2023).

This perspective emphasises an inside-out view of change (Ives et al., 2020). It does not advocate for changing individuals' values as such; instead, it seeks ways to empower people to become change agents (Wamsler et al., 2021). Bentz et al. (2022) warn against this 'fix-it' and 'fix-others' mentality, as this risks co-opting the concept of transformation and maintaining a business-as-usual approach that relies on technical solutions and individual behaviour changes, while neglecting systemic factors and the root causes of current sustainability crises (cf. Blythe et al., 2018). Instead, the transformation perspective suggests an integrative inner-outer approach that supports creating spaces and conditions conducive to nurturing a culture of inner growth, mutual aid and connection, while seriously considering underlying power dynamics and biases (Wamsler et al., 2021). It thus overlaps with, and can be said to deepen the conscious or effortful route to value change proposed by Bardi and Goodwin (2011). As we will argue, adopting this inside-out view of value change provides some important pointers to future research.

Among the authors who have explored values for sustainability transformations, Horcea-Milcu et al. (2023) stand out as particularly noteworthy, as they have made a comprehensive effort to engage with the topic (see also Horcea-Milcu, 2022; Horcea-Milcu et al., 2023). They propose four modes of engaging with values for transformation: enabling, including, shifting and reflecting. While our focus and theoretical foundations may differ, we identify several synergies with this approach. *Enabling* assumes that people already hold values conducive to sustainability, but they might be deprioritised and, hence, not acted upon. Removing the barriers to doing this, partly via capacity building and empowering their agency, as we will argue below, might be one way to achieve rank-order changes. *Including* refers to actions to overcome the marginalisation of certain values towards greater plurality. *Shifting* assumes that currently dominant values are misaligned with pathways towards sustainability, which is an obstacle given the adaptation mechanism outlined in the previous section (i.e., individuals tend to diminish the significance of values that are unattainable, and are inclined to support values that are promoted in their social surroundings). Lastly, *reflecting* entails critical reflection and deliberation about the values underpinning decision-making processes. Here, Horcea-Milcu et al. (2023) consider institutional, community and individual levels. They adopt the term 'value literacy', referring to the ability to understand, articulate, and navigate different values, particularly in the

context of decision-making and societal considerations. More broadly, it refers to being aware of one's values, recognising the values of others, and understanding the broader implications of these values in various situations (cf. Satterfield, 2001).

All of these modes consider that people can be empowered to reflect, reprioritise and ultimately act upon their values for more sustainable actions and behaviours. The value change mechanisms predominantly discussed in social psychology also neatly map onto them. Specifically, as discussed in the previous section, value change often relies on people (sub)consciously reflecting on their existing values and reprioritising them, if necessary. A lens through which one can understand how this process can be nurtured across individual, collective and system levels is explained in the inner-outer transformation model developed by Wamsler et al. (2021) and the associated five clusters of so-called transformative capacities. These are:

1. **Awareness**: The ability to approach situations and one's thoughts and feelings with openness and acceptance, including qualities such as presence, self-awareness, self-reflection and openness to change.
2. **Connection**: Involves seeing and meeting oneself, others, and the world with care and empathy, encompassing qualities like compassion, kindness, gratitude, and integrity.
3. **Insight**: The ability to gain a broader understanding of oneself, others, and the world by considering different perspectives. Includes qualities such as active hope, relational awareness, diverse ways of knowing, and humility.
4. **Purpose**: Involves navigating the world based on the activation and reflectivity of values, a sense of purpose, and what is important. Closely related to finding and collaborating around intention, responsibility, future orientation, and meaning-making with consideration for equity, solidarity, and reciprocity.
5. **Agency**: Refers to understanding one's role in the world and having the intention and courage to act, including qualities like empowerment and collaboration (Wamsler et al., 2021).

While these transformative capacities are not exclusively focused on values, they can be seen as integral to navigating its terrain. Awareness is crucial for individuals to recognise the (mis)alignment of their values with sustainability goals. The capacity for connection, emphasising care and empathy, builds relationships that support sustainable values through compassion, kindness, and gratitude. Insight enables a nuanced and plural understanding of values. Purpose-driven navigation of the world, activated and reflective of values, fosters a commitment to long-term collective wellbeing. Finally, the capacity for agency empowers individuals to actively contribute to sustainability transformations. Thus, all five capacities tie into broader social and societal processes, and can be nurtured throughout an individual's life through measures at individual, collective and system levels (Wamsler et al., 2021, 2022b, 2023).

As discussed in the previous section, mechanisms such as repeated priming and measures to encourage value adaptation and identification require supporting structures (e.g., education programmes and media campaigns). To address this issue, we draw on the integrative transformative climate mainstreaming approach developed by Wamsler and Osberg (2022). Recognising a current individual-society disconnect in sustainability transformation research, Horcea-Milcu et al. (2023) emphasise distinguishing the levels engaged with values-based interventions to enhance their transformative potential. As discussed earlier, the three spheres approach contends that rather than viewing these levels in isolation, it is crucial to acknowledge their interdependencies (O'Brien and Sygna, 2013). The integrated climate mainstreaming framework developed by Wamsler and Osberg (2022) serves as a comprehensive tool for achieving this integration, blending mainstreaming theory with an integrative inner-outer transformation process.

Mainstreaming, a well-established approach endorsed by various international policy frameworks, including the Paris Agreement and Agenda 2030, offers a systematic roadmap for integrating climate change considerations across sectors and levels (Wamsler and Osberg, 2022). It emphasises the need to address and interlink all mainstreaming levels to achieve transformation. This involves combining short-term responses with long-term strategies for enhancing climate resilience, and linking top-down and bottom-up approaches (Wamsler and Osberg, 2022). Local-level change must align with systemic and cultural shifts, ultimately institutionalising climate change mitigation and adaptation until integration becomes standard practice. Mechanisms and structures for education and learning are essential for fostering cultural change within institutions and society, particularly concerning capacities and values. Tools employed in this framework are rooted in systems thinking and social learning theories, supplemented by methods for risk and project management, monitoring and evaluation (Wamsler and Osberg, 2022).

The integrative inner-outer transformation process embeds values into its heuristics, actions and approaches, addressing all three spheres (Wamsler and Osberg, 2022). The approach underscores the connection between personal and societal transformation, recognising that enduring change requires the integration of human capacities and values for strategic actions. The conscious full spectrum approach proposed by Sharma (2017) provides a three-step pedagogy that can be applied within this context for sourcing transformative capacities, designing for impact, and practising and implementing new processes. Drawing upon "systems thinking, personal development, social neuroscience, applied psychology and leadership", it incorporates concepts such as "mindfulness-based stress reduction, non-violent communication and different project planning tools" (Wamsler and Osberg, 2022, p. 5).

Acknowledging that including individual and collective beliefs, values and paradigms is crucial for mainstreaming climate considerations, the presented framework guards against perpetuating an apolitical stance and instead address the internal root causes of the problem and "technocratic patterns of control", as highlighted by Scoville-Simonds et al. (2020, p. 3). Finally, it spans considerations for being ("nurturing internal potential"), thinking/knowing ("sourcing […] potential to design change") and acting ("practising and implementing new processes") (Wamsler and Osberg, 2022, p. 10), linking back to the five transformative capacities mentioned earlier (Wamsler et al., 2021).

Considering the framework, when thinking about individual transcendental value change, it becomes imperative not to view the individual in isolation, but to consider how the individual level is interdependent with, for example, institutional and organisational levels. This entails surfacing the values implicit in organisational and institutional measures and work, and being reflexive about how these promote certain terminal and instrumental values in what is sought to be achieved and through what means.

5. An integrated framework

In this paper, we call for integrating the social psychology of values into EE. Contrary to dismissive arguments in previous work on values in ESS (Kenter et al., 2015), we argue that it is important to differentiate between instrumental and terminal values. The dynamic interplay between them influences notions around sustainable futures and how to get there. In this section, we summarise and outline some central implications of our argument, provide a model for value change (Fig. 1), discuss implications for policy and future research, and present some limitations.

5.1. A new conceptualisation of value change for sustainability transformations

Our reconceptualization of values has three main implications:

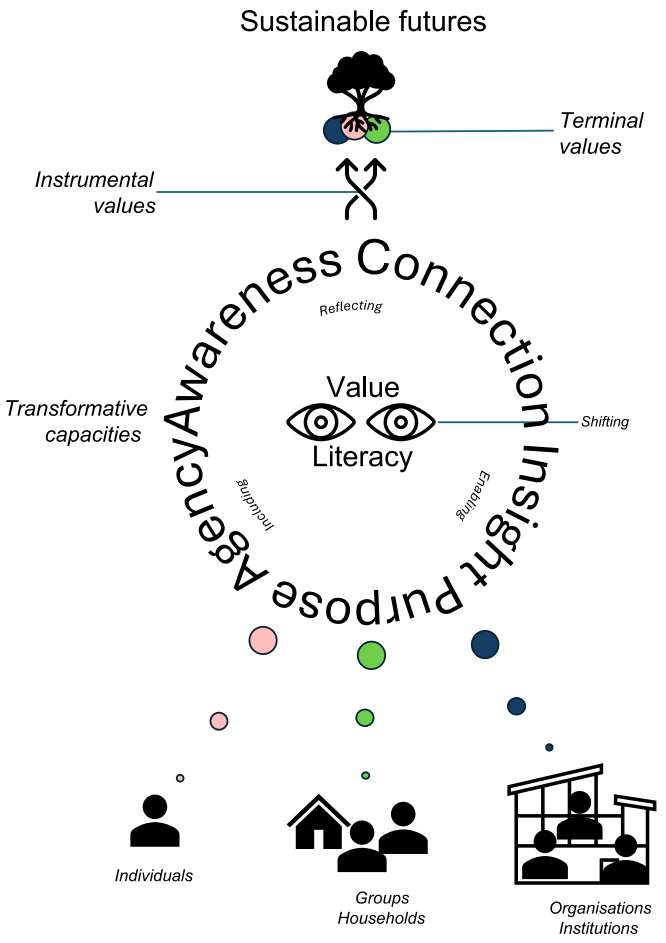

Fig. 1. Model for developing transformative value literacy. By nurturing transformative capacities, individuals, groups/ households and organisations/ institutions can better-articulate and consolidate various instrumental and terminal values for common sustainable futures.

1. Instrumental and terminal values are distinct, and have decisive implications for how different individuals, groups and organisations understand possible and desirable sustainable futures, and the ways and strategies to reach them.
2. However, there can be congruences and incongruences between the two, creating potentials for both synergies and conflict.
3. Developing value literacy through transformative capacities can empower individuals and organisations to align their actions with values conducive to sustainable and just futures. This inside-out approach is crucial for instigating enduring value change and fostering reflexive agency among actors, to actively shape the direction of sustainability efforts.

Terminal values, representing desired end-states, play a crucial role in shaping visions of sustainable futures. Values relating to care for other beings and people may lead to visions where humans coexist in line with nature, and where there is more equality to meet everyone's needs. On the contrary, values emphasising possessive individualism or hedonism are more likely to be associated with (ab)using natural resources (De Groot and Steg, 2008; Moon et al., 2023) and increased inequality (Almås et al., 2020; Dutta and Sobel, 2023) since when people attribute higher importance to these values, individual needs tend to trump collective ones. In EE, desired end-states, terminal values, are well articulated (Costanza, 2020). The definition of sustainability as the ultimate goal, conceived of as intergenerational justice that ensures human life and flourishing as long as it does not erode biodiversity and the functioning of ecological life (Costanza, 1997, 2020), undoubtedly relates to the former examples of terminal values.

Instrumental values influence the means and strategies employed to achieve sustainability goals on individual and institutional levels. For example, while a good life within planetary boundaries for all contributes to a desired vision of the future, means and strategies interact with instrumental values to shape the preferred ways of transforming towards a sustainable future. This interplay can give rise to competing visions. For example, an emphasis on solidarity and equality may lead to inclusive, collaborative and democratically decided alternatives, as advocated in the post-growth/degrowth literature (Asara et al., 2013; Buch-Hansen and Nesterova, 2023; Fitzpatrick et al., 2022; Hausknost, 2017). Engaging communities and stakeholders in co-creation, fostering cultural diversity, participatory decision-making and inclusivity in sustainable initiatives all pertain to underlying instrumental values. On the contrary, some may share the vision and the goal, but may either favour decision-making by the intellectual, economic and political elite, or advocate for militant action that tolerates some form of violence for the greater good (Malm, 2021; Prinz, 2023). As such, instrumental values can extend to policy processes; examples include the weight that is given to transparency, accountability and participation, as governments and organisations embed them in regulations and frameworks to steer desired changes.

Navigating this terrain, and seeking to shift the current dominant value paradigm to a more regenerative one requires tools for reflecting on values and change (Ives et al., 2023; Wamsler et al., 2022a). Fig. 1 illustrates how the deliberate transformation of value systems towards sustainable futures, facilitated by developing value literacy, can be achieved by cultivating transformative capacities (Horcea-Milcu et al., 2023; Wamsler et al., 2021). These trainable capacities empower individuals to reflect, enable, include and ultimately shift their orientation by bringing underlying values to the forefront, engaging in thoughtful reflection, reorienting their perspectives and, ultimately, taking actions aligned with values that foster a sustainable and just future. In contrast to the limited longevity of nudging and information-centric approaches for instigating enduring value change (Bernauer and McGrath, 2016; Hagmann et al., 2019; Maier et al., 2022), this inside-out approach emerges as an essential fundament for approaching long-term value change. Developing and nurturing both instrumental and terminal value literacy can help people and organisations transcend the mere aspiration for sustainability into a deeper understanding of what that sustainable future truly entails. From this informed perspective, actors can develop reflexive agency, enabling them to contribute to, and shape the direction of the desired sustainable future actively and collectively.

5.2. Policy implications

Our findings have two main policy implications. First, the distinction between terminal and instrumental values provides an important insight into how to craft policies that are better-aligned with the values of different interest groups, and how to build coalitions. By understanding the instrumental and terminal values that motivate specific actions, policymakers can tailor interventions so that they are better-aligned with the motivations of different stakeholders. Second, shifting the dominant value paradigm towards a more regenerative one, via the development of value literacy, requires tools and education for deep reflection. The mainstreaming approach proposed by Wamsler and Osberg (2022) provides important guidance in this respect.

Diverse instrumental and terminal values can coexist. The resulting synergy can lead to innovative and holistic approaches to addressing complex challenges. For instance, individuals may agree on strategies such as technological innovation, community engagement or policy advocacy, despite having distinct ideas about the ultimate objectives. However, different terminal values can also lead to collaboration challenges, resource allocation dilemmas and potential conflicts. Effective communication, negotiation and thoughtful resource management become critical policy issues for harnessing the positive aspects of

diverse values, while navigating differences. While this interplay of diversity introduces challenges, it also offers opportunities for policy innovation. Embracing and navigating the complexities of diverse values is central to addressing the complex nature of sustainability transformations (Pascual et al., 2023), and will be an important avenue for future EE research.

If we recognise that enduring change in values requires consistent and repeated support in the same direction, partly through the five mechanisms identified by Bardi and Goodwin (2011) (repeated priming, adaptation, identification, consistency maintenance and direct persuasion, see above), it becomes evident that isolated interventions will fall short. To address this, we advocate for the adoption of the integrated climate mainstreaming framework proposed by Wamsler and Osberg (2022). This approach offers a comprehensive strategy to promote value change at both individual and institutional levels, and recognises the interdependence between them. Educational and training programs, including economics education (cf. Krishnan, 2008), should engage in a more detailed examination of the values they convey, organisations and businesses need to attentively consider the values they cultivate both internally and externally through their operations, and policies must articulate a clearer stance on the types of terminal and instrumental values they advocate.

5.3. Limitations and future research

In the context of research, acknowledging and understanding the diversity of instrumental and terminal values are important in advancing the field. Researchers might explore how various combinations influence decision-making, behaviour, collaborative efforts and the overall success of sustainability initiatives. Embracing a transdisciplinary approach that considers individual and institutional dimensions, with a dynamic understanding of instrumental and terminal values, can contribute to more nuanced and actionable insights. Exploring the creation and articulation of shared terminal values and their role in mobilising members of groups or coalitions is another promising pathway for future research. Furthermore, research should not only focus on identifying and analysing values, but also explore strategies for facilitating constructive dialogue and collaboration among individuals and organisations with divergent values.

At the same time, it is important to acknowledge that, considering this Special Issue's focus on behavioural economics, we explore the concept of human values mainly from an individualistic, social-psychology perspective. For this reason, we do not discuss normative value theories rooted in moral philosophy and other ethical doctrines, such as those put forward by Bunge (1989), in detail. Due to the focus of this Special Issue, we do not attempt to conduct a systematic review to identify the breadth and depth of the available literature. Instead, we examine the existence of values in EE, trace the origin of values to the social-psychological literature, and utilise the transformation literature to form a comprehensive framework of values and value change that facilitates our transition to a sustainable future. Therefore, we cannot exclude the possibility that we have overlooked the work of some scholars in these fields. We encourage future research to conduct a more systematic review of values in EE and related fields to further our understanding of issues such as the mechanisms of long-term value change, the impact of (and on) institutions, strategies for collaborating and aligning values, methodological innovations, interdisciplinary approaches, and the integration of values into sustainability policies.

Moreover, we encourage researchers to conduct rigorous empirical research on value change, particularly the conditions under which individuals change their values towards more self-transcendent orientations, and how to create long-lasting change. Given that the success of methods such as nudging in fostering pro-environmental behaviour is debatable (Hagmann et al., 2019), value change seems a more promising avenue to achieving the long-lasting shift neeeded to facilitate societal transformations towards sustainable futures. This can be done using different methodologies. For example, scholars should make use of longitudinal household datasets such as the Longitudinal Internet studies for the Social Sciences (LISS) or Living in Australia: The Household, Income and Labour Dynamics in Australia (HILDA), which will allow conclusions to be drawn based on large and representative samples over long periods of time. On the other hand, it may be fruitful to use qualitative methods such as biographical interviews to gain a deeper understanding of the triggers and underlying processes of value change. Lastly, mixed-method approaches such as SenseMaker, used by Wamsler et al. (2022b) (cf. Van der Merwe et al., 2019) offer a novel way to combine richer insights with representative data.

CRediT authorship contribution statement

Gustav Osberg: Writing – review & editing, Writing – original draft, Conceptualization. **Felix Schulz:** Writing – review & editing, Writing – original draft, Conceptualization. **Christian Bretter:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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References

Abson, D.J., Fischer, J., Leventon, J., Newig, J., Schomerus, T., Vilsmaier, U., von Wehrden, H., Abernethy, P., Ives, C.D., Jager, N.W., Lang, D.J., 2017. Leverage points for sustainability transformation. Ambio 46 (1), 30–39. https://doi.org/10.1007/s13280-016-0800-y.

Almås, I., Cappelen, A.W., Tungodden, B., 2020. Cutthroat capitalism versus cuddly socialism: are Americans more meritocratic and efficiency-seeking than Scandinavians? J. Polit. Econ. https://doi.org/10.1086/705551.

Andor, M.A., Fels, K.M., 2018. Behavioral economics and energy conservation – a systematic review of non-price interventions and their causal effects. Ecol. Econ. 148, 178–210. https://doi.org/10.1016/j.ecolecon.2018.01.018.

Arksey, H., O'Malley, L., 2005. Scoping studies: towards a methodological framework. Int. J. Soc. Res. Methodol. 8 (1), 19–32. https://doi.org/10.1080/1364557032000119616.

Arrow, K., 1951. Social Choice and Individual Values. John Wiley & Sons.

Asara, V., Profumi, E., Kallis, G., 2013. Degrowth, democracy and autonomy. Environ. Values 22 (2). https://doi.org/10.3197/096327113X13581561725239.

Barberis, N., 2018. Richard Thaler and the rise of behavioral economics. Scand. J. Econ. 120 (3) https://doi.org/10.1111/sjoe.12313.

Bardi, A., Goodwin, R., 2011. The dual route to value change: individual processes and cultural moderators. J. Cross-Cult. Psychol. 42 (2), 271–287. https://doi.org/10.1177/0022022110396916.

Bardi, A., Lee, J.A., Hofmann-Towfigh, N., Soutar, G., 2009. The structure of Intraindividual value change. J. Pers. Soc. Psychol. 97 (5), 913–929. https://doi.org/10.1037/a0016617.

Becker, C., 2006. The human actor in ecological economics: philosophical approach and research perspectives. Ecol. Econ. 60 (1) https://doi.org/10.1016/j.ecolecon.2005.12.016.

Belaïd, F., Flambard, V., 2024. Ecological-behavioral economics: impact of information on energy-renovation decision through third-party investing. Ecol. Econ. 221, 108196 https://doi.org/10.1016/j.ecolecon.2024.108196.

Bentz, J., O'Brien, K., Scoville-Simonds, M., 2022. Beyond "blah blah blah": exploring the "how" of transformation. Sustain. Sci. 17 (2), 497–506. https://doi.org/10.1007/s11625-022-01123-0.

Bernauer, T., McGrath, L.F., 2016. Simple reframing unlikely to boost public support for climate policy. Nat. Clim. Chang. 6 (7), 680–683. https://doi.org/10.1038/nclimate2948.
Bina, O., Vaz, S.G., 2011. Humans, environment and economies: from vicious relationships to virtuous responsibility. Ecol. Econ. 72, 170–178. https://doi.org/10.1016/j.ecolecon.2011.09.029.
Blythe, J., Silver, J., Evans, L., Armitage, D., Bennett, N.J., Moore, M.-L., Morrison, T.H., Brown, K., 2018. The dark side of transformation: latent risks in contemporary sustainability discourse. Antipode 50 (5), 1206–1223. https://doi.org/10.1111/anti.12405.
Bretter, C., Schulz, F., 2023. Why focusing on "climate change denial" is counterproductive. Proc. Natl. Acad. Sci. 120 (10) https://doi.org/10.1073/pnas.2217716120 e2217716120–e2217716120.
Bretter, C., Schulz, F., 2024. Public support for decarbonization policies in the UK: exploring regional variations and policy instruments. Clim. Pol. 24 (1), 117–137. https://doi.org/10.1080/14693062.2023.2273302.
Bretter, C., Unsworth, K.L., Russell, S.V., Quested, T.E., Doriza, A., Kaptan, G., 2022. Don't put all your eggs in one basket: testing an integrative model of household food waste. Resour. Conserv. Recycl. 185 (October), 106442. https://doi.org/10.1016/j.resconrec.2022.106442.
Bretter, C., Unsworth, K.L., Kaptan, G., Russell, S.V., 2023a. It is just wrong: moral foundations and food waste. J. Environ. Psychol. 88, 102021 https://doi.org/10.1016/j.jenvp.2023.102021.
Bretter, C., Unsworth, K.L., Russell, S.V., Quested, T.E., Kaptan, G., Doriza, A., 2023b. Food waste interventions: experimental evidence of the effectiveness of environmental messages. J. Clean. Prod. 414, 137596. https://doi.org/10.1016/j.jclepro.2023.137596.
Buch-Hansen, H., Nesterova, I., 2023. Less and more: Conceptualising degrowth transformations. Ecol. Econ. 205, 107731 https://doi.org/10.1016/j.ecolecon.2022.107731.
Bunge, M., 1989. Treatise on Basic Philosophy. Springer, Netherlands.
Carlsson, F., Kataria, M., Lampi, E., Löfgren, Å., Sterner, T., 2011. Is fairness blind? —the effect of framing on preferences for effort-sharing rules. Ecol. Econ. 70 (8), 1529–1535. https://doi.org/10.1016/j.ecolecon.2011.03.015.
Chan, K.M.A., Boyd, D.R., Gould, R.K., Jetzkowitz, J., Liu, J., Muraca, B., Naidoo, R., Olmsted, P., Satterfield, T., Selomane, O., Singh, G.G., Sumaila, R., Ngo, H.T., Boedhihartono, A.K., Agard, J., de Aguiar, A.P.D., Armenteras, D., Balint, L., Barrington-Leigh, C., Brondízio, E.S., 2020. Levers and leverage points for pathways to sustainability. People Nat. 2 (3), 693–717. https://doi.org/10.1002/pan3.10124.
Chatard, A., Selimbegovic, L., 2007. The impact of higher education on egalitarian attitudes and values: contextual and cultural determinants. Soc. Personal. Psychol. Compass 1 (1). https://doi.org/10.1111/j.1751-9004.2007.00024.x.
Collet, C., Gastineau, P., Chèze, B., Mahieu, P.-A., Martinez, F., 2023. Combining economics and psychology: does CO 2 framing strengthen pro-environmental behaviors? Ecol. Econ. 214, 107984 https://doi.org/10.1016/j.ecolecon.2023.107984.
Corner, A., Markowitz, E., Pidgeon, N., 2014. Public engagement with climate change: the role of human values. WIREs Clim. Change 5 (3). https://doi.org/10.1002/wcc.269. Article 3.
Costanza, R., 1989. What is ecological economics? Ecol. Econ. 1 (1) https://doi.org/10.1016/0921-8009(89)90020-7.
Costanza, R., 1997. Frontiers in Ecological Economics: Transdisciplinary Essays by Robert Costanza. Edward Elgar Publishing.
Costanza, R., 2020. Ecological economics in 2049: getting beyond the argument culture to the world we all want. Ecol. Econ. 168, 106484 https://doi.org/10.1016/j.ecolecon.2019.106484.
Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R.V., Paruelo, J., Raskin, R.G., Sutton, P., van den Belt, M., 1997. The value of the world's ecosystem services and natural capital. Nature 387 (6630), 253–260. https://doi.org/10.1038/387253a0.
Cotgrove, S., Duff, A., 1981. Environmentalism, values, and social change. Br. J. Sociol. 32 (1), 92–110.
Daly, H.E., 1992. Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable. Ecol. Econ. 6 (3) https://doi.org/10.1016/0921-8009(92)90024-M.
Daly, H.E., Farley, J., 2011. Ecological Economics: Principles and Applications. Island Press.
De Groot, J.I.M., Steg, L., 2007. Value orientations and environmental beliefs in five countries: validity of an instrument to measure egoistic, altruistic and biospheric value orientations. J. Cross-Cult. Psychol. 38 (3), 318–332. https://doi.org/10.1177/0022022107300278.
De Groot, J.I.M., Steg, L., 2008. Value orientations to explain beliefs related to environmental significant behavior: how to measure egoistic, altruistic, and Biospheric value orientations. Environ. Behav. 40 (3) https://doi.org/10.1177/0013916506297831. Article 3.
DellaValle, N., Sareen, S., 2020. Nudging and boosting for equity? Towards a behavioural economics of energy justice. Energy Res. Soc. Sci. 68, 101589 https://doi.org/10.1016/j.erss.2020.101589.
Dutta, N., Sobel, R.S., 2023. Trust and attitudes toward income inequality: does individualism matter? Eur. J. Polit. Econ. 78, 102351 https://doi.org/10.1016/j.ejpoleco.2022.102351.
Faber, M., Petersen, T., Schiller, J., 2002. Homo oeconomicus and homo politicus in ecological economics. Ecol. Econ. 40 (3) https://doi.org/10.1016/S0921-8009(01)00279-8.
Fazey, I., Moug, P., Allen, S., Beckmann, K., Blackwood, D., Bonaventura, M., Burnett, K., Danson, M., Falconer, R., Gagnon, A.S., Harkness, R., Hodgson, A., Holm, L., Irvine, K.N., Low, R., Lyon, C., Moss, A., Moran, C., Naylor, L., Wolstenholme, R., 2018. Transformation in a changing climate: a research agenda. Clim. Dev. 10 (3), 197–217. https://doi.org/10.1080/17565529.2017.1301864.
Festinger, L., 1957. A Theory of Cognitive Dissonance. Stanford University Press.
Fitzpatrick, N., Parrique, T., Cosme, I., 2022. Exploring degrowth policy proposals: a systematic mapping with thematic synthesis. J. Clean. Prod. 365, 132764 https://doi.org/10.1016/j.jclepro.2022.132764.
Fleurbaey, M., 2002. Development, capabilities and freedom. Stud. Comp. Int. Dev. 37, 71–77.
Gantioler, S., Balest, J., Tomasi, S., Voltolini, F., DellaValle, N., 2023. Transformative disruptiveness or transition? Revealing digitalization and deep decarbonization pathways in the Italian smart electricity meter roll-out. Energy Res. Soc. Sci. 106, 103309 https://doi.org/10.1016/j.erss.2023.103309.
Gardner, W.L., Gabriel, S., Lee, A.Y., 1999. "I" value freedom, but "we" value relationships: self-construal priming mirrors cultural differences in judgment. Psychol. Sci. 10 (4) https://doi.org/10.1111/1467-9280.00162. Article 4.
Gecas, V., 2000. Value identities, self motives, and social movements. In: Stryker, S., Owens, T.J., White, R.W. (Eds.), Self, Identity, and Social Movements. University of Minnesota Press, pp. 93–109.
Gintis, H., 2000. Beyond Homo economicus: evidence from experimental economics. Ecol. Econ. 35 (3) https://doi.org/10.1016/S0921-8009(00)00216-0.
Gleitman, H., Gross, J., 2004. Psychology: Eighth International Student Edition. Norton & Company.
Gouveia, V.V., Vione, K.C., Milfont, T.L., Fischer, R., 2015. Patterns of value change during the life span: some evidence from a functional approach to values. Personal. Soc. Psychol. Bull. 41 (9), 1276–1290. https://doi.org/10.1177/0146167215594189.
Gramsci, A., 1959. The Modern Prince and Other Writings. International Publishers.
Grant, M.J., Booth, A., 2009. A typology of reviews: an analysis of 14 review types and associated methodologies. Health Inf. Libr. J. 26 (2), 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x.
Grube, J.W., Mayton, D.M., Ball-Rokeach, S.J., 1994. Inducing change in values, attitudes, and behaviors: belief system theory and the method of value self-confrontation. J. Soc. Issues 50 (4), 153–173. https://doi.org/10.1111/j.1540-4560.1994.tb01202.x.
Hagmann, D., Ho, E.H., Loewenstein, G., 2019. Nudging out support for a carbon tax. Nat. Clim. Chang. 9 (6), 484–489. https://doi.org/10.1038/s41558-019-0474-0.
Hausknost, D., 2017. Degrowth and democracy. In: Spash, C. (Ed.), Routledge Handbook of Ecological Economics. Routledge.
Horcea-Milcu, A.-I., 2022. Values as leverage points for sustainability transformation: two pathways for transformation research. Curr. Opin. Environ. Sustain. 57, 101205 https://doi.org/10.1016/j.cosust.2022.101205.
Horcea-Milcu, A.-I., Koessler, A.-K., Martin, A., Rode, J., Soares, T.M., 2023. Modes of mobilizing values for sustainability transformation. Curr. Opin. Environ. Sustain. 64, 101357 https://doi.org/10.1016/j.cosust.2023.101357.
Hornsey, M.J., Harris, E.A., Bain, P.G., Fielding, K.S., 2016. Meta-analyses of the determinants and outcomes of belief in climate change. Nat. Clim. Chang. 6 (6) https://doi.org/10.1038/nclimate2943.
Inglehart, R., Baker, W.E., 2000. Modernization, cultural change, and the persistence of traditional values. Am. Sociol. Rev. 65 (1), 19–51. https://doi.org/10.2307/2657288.
IPBES, 2022. In: Pascual, U., Balvanera, P., Christie, M., Baptiste, B., González-Jiménez, D., Anderson, C.B., Athayde, S., Barton, D.N., Chaplin-Kramer, R., Jacobs, S., Kelemen, E., Kumar, R., Lazos, E., Martin, A., Mwampamba, T.H., Nakangu, B., O'Farrell, P., Raymond, C.M., Subramanian, S.M., Termansen, M., Van Noordwijk, M., Vatn, A. (Eds.), Summary for Policymakers of the Methodological Assessment Report on the Diverse Values and Valuation of Nature of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. IPBES secretariat, Bonn, Germany. https://doi.org/10.5281/zenodo.6522392.
Ives, C.D., Freeth, R., Fischer, J., 2020. Inside-out sustainability: the neglect of inner worlds. Ambio 49 (1), 208–217. https://doi.org/10.1007/s13280-019-01187-w.
Ives, C.D., Schäpke, N., Woiwode, C., Wamsler, C., 2023. IMAGINE sustainability: integrated inner-outer transformation in research, education and practice. Sustain. Sci. 18 (6), 2777–2786. https://doi.org/10.1007/s11625-023-01368-3.
Jager, W., Janssen, M.A., De Vries, H.J.M., De Greef, J., Vlek, C.A.J., 2000. Behaviour in commons dilemmas: Homo economicus and Homo psychologicus in an ecological-economic model. Ecol. Econ. 35 (3) https://doi.org/10.1016/S0921-8009(00)00220-2.
Jax, K., Barton, D.N., Chan, K.M.A., De Groot, R., Doyle, U., Eser, U., Görg, C., Gómez-Baggethun, E., Griewald, Y., Haber, W., Haines-Young, R., Heink, U., Jahn, T., Joosten, H., Kerschbaumer, L., Korn, H., Luck, G.W., Matzdorf, B., Muraca, B., Wichmann, S., 2013. Ecosystem services and ethics. Ecol. Econ. 93, 260–268. https://doi.org/10.1016/j.ecolecon.2013.06.008.
Kahneman, D., 2003. Maps of bounded rationality: psychology for behavioral economics. Am. Econ. Rev. 93 (5), 1449–1475. https://doi.org/10.1257/000282803322655392.
Kendal, D., Raymond, C.M., 2019. Understanding pathways to shifting people's values over time in the context of social–ecological systems. Sustain. Sci. 14 (5), 1333–1342. https://doi.org/10.1007/s11625-018-0648-0.
Kenter, J.O., 2016. Editorial: shared, plural and cultural values. Ecosyst. Serv. 21, 175–183. https://doi.org/10.1016/j.ecoser.2016.10.010.
Kenter, J.O., O'Brien, L., Hockley, N., Ravenscroft, N., Fazey, I., Irvine, K.N., Reed, M.S., Christie, M., Brady, E., Bryce, R., Church, A., Cooper, N., Davies, A., Evely, A., Everard, M., Fish, R., Fisher, J.A., Jobstvogt, N., Molloy, C., Williams, S., 2015. What are shared and social values of ecosystems? Ecol. Econ. 111, 86–99. https://doi.org/10.1016/j.ecolecon.2015.01.006.

Kenter, J.O., Raymond, C.M., van Riper, C.J., Azzopardi, E., Brear, M.R., Calcagni, F., Christie, I., Christie, M., Fordham, A., Gould, R.K., Ives, C.D., Hejnowicz, A.P., Gunton, R., Horcea-Milcu, A.-I., Kendal, D., Kronenberg, J., Massenberg, J.R., O'Connor, S., Ravenscroft, N., Thankappan, S., 2019. Loving the mess: navigating diversity and conflict in social values for sustainability. Sustain. Sci. 14 (5), 1439–1461. https://doi.org/10.1007/s11625-019-00726-4.

Kohn, A., 1990. The Brighter Side of Human Nature: Altruism and Empathy in Everyday Life. Basic Books.

Krishnan, V.R., 2008. Impact of MBA education on students' values: two longitudinal studies. J. Bus. Ethics 83 (2). https://doi.org/10.1007/s10551-007-9614-y.

Lind, H.B., Nordfjærn, T., Jørgensen, S.H., Rundmo, T., 2015. The value-belief-norm theory, personal norms and sustainable travel mode choice in urban areas. J. Environ. Psychol. 44, 119–125. https://doi.org/10.1016/j.jenvp.2015.06.001.

Lindsay, P., Knox, W.E., 1984. Continuity and change in work values among Young adults: a longitudinal study. Am. J. Sociol. 89 (4), 918–931. https://doi.org/10.1086/227950.

Lönnqvist, J.E., Jasinskaja-Lahti, I., Verkasalo, M., 2011. Personal values before and after migration: a longitudinal case study on value change in ingrian-finnish migrants. Soc. Psychol. Personal. Sci. 2 (6), 584–591. https://doi.org/10.1177/1948550611402362.

Maier, M., Bartoš, F., Stanley, T.D., Shanks, D.R., Harris, A.J.L., Wagenmakers, E.-J., 2022. No evidence for nudging after adjusting for publication bias. Proc. Natl. Acad. Sci. 119 (31), e2200300119 https://doi.org/10.1073/pnas.2200300119.

Malm, A., 2021. How to Blow up a Pipeline. Verso.

Maslow, A., 1970. Motivation and Personality. Harper & Row.

Milfont, T.L., Milojev, P., Sibley, C.G., 2016. Values stability and change in adulthood: a 3-year longitudinal study of rank-order stability and mean-level differences. Personal. Soc. Psychol. Bull. 42 (5), 572–588. https://doi.org/10.1177/0146167216639245.

Moon, K.-K., Lee, S.-H., Jeong, S.Y., 2023. Examining the relationship between individualism and pro-environmental behavior: the moderating role of social cohesion. Behav. Sci. 13 (8) https://doi.org/10.3390/bs13080661.

Murtaza, N., 2011. Pursuing self-interest or self-actualization? From capitalism to a steady-state, wisdom economy. Ecol. Econ. 70 (4) https://doi.org/10.1016/j.ecolecon.2010.10.012. Article 4.

Naess, A., 1989. Ecology, Community and Lifestyle. Cambridge University Press, Cambridge.

Naess, A., 2008. The shallow and the deep, long-range ecology movement. A summary. In: Attfield, R. (Ed.), The Ethics of the Environment. Routledge.

Norgaard, R., 1995. Development Betrayed: The End of Progress and a Coevolutonary Revisioning of the Future. Routledge.

Nussbaum, M., 2000. Women and Human Development: The Capabilities Approach. Cambridge University Press.

Nyborg, K., 2000. Homo Economicus and Homo Politicus: interpretation and aggregation of environmental values. J. Econ. Behav. Organ. 42 (3) https://doi.org/10.1016/S0167-2681(00)00091-3.

O'Brien, K., 2018. Is the 1.5°C target possible? Exploring the three spheres of transformation. Curr. Opin. Environ. Sustain. 31, 153–160. https://doi.org/10.1016/j.cosust.2018.04.010.

O'Brien, K., Sygna, L., 2013. Responding to climate change: the three spheres of transformation. In: Proceedings of the Conference Transformation in a Changing Climate, pp. 16–23.

Pascual, U., Balvanera, P., Anderson, C.B., Chaplin-Kramer, R., Christie, M., González-Jiménez, D., Martin, A., Raymond, C.M., Termansen, M., Vatn, A., Athayde, S., Baptiste, B., Barton, D.N., Jacobs, S., Kelemen, E., Kumar, R., Lazos, E., Mwampamba, T.H., Nakangu, B., Zent, E., 2023. Diverse values of nature for sustainability. Nature 620 (7975). https://doi.org/10.1038/s41586-023-06406-9.

Pelletier, N., 2010. Environmental sustainability as the first principle of distributive justice: towards an ecological communitarian normative foundation for ecological economics. Ecol. Econ. 69 (10) https://doi.org/10.1016/j.ecolecon.2010.04.001.

Poortinga, W., Whitmarsh, L., Steg, L., Böhm, G., Fisher, S., 2019. Climate change perceptions and their individual-level determinants: a cross-European analysis. Glob. Environ. Chang. 55, 25–35. https://doi.org/10.1016/j.gloenvcha.2019.01.007.

Prinz, A., 2023. An ecological dictatorship to save the planet? The political economics of climate dictatorship and climate clubs. SSRN Scholar. Pap. 4498228 https://doi.org/10.2139/ssrn.4498228.

Raymond, C.M., Kenter, J.O., van Riper, C.J., Rawluk, A., Kendal, D., 2019. Editorial overview: theoretical traditions in social values for sustainability. Sustain. Sci. 14 (5), 1173–1185. https://doi.org/10.1007/s11625-019-00723-7.

Rockström, J., Steffen, W., Noone, K., Persson, Å., Chapin, F.S., Lambin, E.F., Lenton, T. M., Scheffer, M., Folke, C., Schellnhuber, H.J., Nykvist, B., De Wit, C.A., Hughes, T., Van Der Leeuw, S., Rodhe, H., Sörlin, S., Snyder, P.K., Costanza, R., Svedin, U., Foley, J.A., 2009. A safe operating space for humanity. Nature 461 (7263), 472–475. https://doi.org/10.1038/461472a.

Rockström, J., Gupta, J., Qin, D., Lade, S.J., Abrams, J.F., Andersen, L.S., Armstrong McKay, D.I., Bai, X., Bala, G., Bunn, S.E., Ciobanu, D., DeClerck, F., Ebi, K., Gifford, L., Gordon, C., Hasan, S., Kanie, N., Lenton, T.M., Loriani, S., Zhang, X., 2023. Safe and just earth system boundaries. Nature 619 (7968), 102–111. https://doi.org/10.1038/s41586-023-06083-8.

Rokeach, M., 1968. Beliefs, Attitudes, and Values: A Theory of Organization and Change. Jossey-Bass.

Rokeach, M., 1973. The Nature of Human Values. Free Press.

Satterfield, T., 2001. In search of value literacy: suggestions for the elicitation of environmental values. Environ. Values 10 (3), 331–359. https://doi.org/10.3197/096327101129340868.

Scharfbillig, M., Smillie, L., Mair, D., Sienkiewicz, M., Keimer, J., Pinho Dos Santos, R., Vinagreiro Alves, H., Vecchione, E., Scheunemann, L., 2021. Values and Identities: A policymaker's Guide. Publications Office of the European Union.

Schwartz, S.H., 1992. Universals in the content and structure of values: theoretical advances and empirical tests in 20 countries. Adv. Exp. Soc. Psychol. 25, 1–65. https://doi.org/10.1016/S0065-2601(08)60281-6.

Schwartz, S.H., 2012. An overview of the Schwartz theory of basic values. Online Read. Psychol. Cult. 2 (1) https://doi.org/10.9707/2307-0919.1116.

Schwartz, S.H., Bardi, A., 1997. Influences of adaptation to communist rule on value priorities in Eastern Europe. Polit. Psychol. 18 (2) https://doi.org/10.1111/0162-895X.00062.

Schwartz, S.H., Bilsky, W., 1987. Toward a universal psychological structure of human values. J. Pers. Soc. Psychol. 53 (3), 550–562. https://doi.org/10.1037/0022-3514.53.3.550.

Scoville-Simonds, M., Jamali, H., Hufty, M., 2020. The hazards of mainstreaming: climate change adaptation politics in three dimensions. World Dev. 125, 104683 https://doi.org/10.1016/j.worlddev.2019.104683.

Sen, A., 1979. Equality of what?. In: McMurrin S Tanner Lectures on Human Values, vol. 1. Cambridge University Press.

Sen, A., 2013. The ends and means of sustainability. J. Human Dev. Capabilit. 14 (1), 6–20. https://doi.org/10.1080/19452829.2012.747492.

Sharma, M., 2017. Radical Transformational Leadership: Strategic Action for Change Agents. North Atlantic Books.

Siebenhüner, B., 2000. Homo sustinens—towards a new conception of humans for sustainability. Ecol. Econ. 32, 15–25.

Söderbaum, P., 1999. Values, ideology and politics in ecological economics. Ecol. Econ. 28 (2), Article 2. https://doi.org/10.1016/S0921-8009(98)00139-6.

Söderbaum, P., 2015. Varieties of ecological economics: do we need a more open and radical version of ecological economics? Ecol. Econ. 119, 420–423. https://doi.org/10.1016/j.ecolecon.2015.09.007.

Spash, C., 2002. Loading the dice?: Values, opinions and ethics. In: Spash, C. (Ed.), Greenhouse Economics. Routledge.

Spash, C., 2012. New foundations for ecological economics. Ecol. Econ. 77, 36–47. https://doi.org/10.1016/j.ecolecon.2012.02.004.

Spash, C.L., 2013. The shallow or the deep ecological economics movement? Ecol. Econ. 93, 351–362. https://doi.org/10.1016/j.ecolecon.2013.05.016.

Steffen, W., Richardson, K., Rockström, J., Cornell, S.E., Fetzer, I., Bennett, E.M., Biggs, R., Carpenter, S.R., De Vries, W., De Wit, C.A., Folke, C., Gerten, D., Heinke, J., Mace, G.M., Persson, L.M., Ramanathan, V., Reyers, B., Sörlin, S., 2015. Planetary boundaries: guiding human development on a changing planet. Science 347 (6223), 1259855. https://doi.org/10.1126/science.1259855.

Stern, P.C., Dietz, T., Abel, T., Guagnano, G.A., Kalof, L., 1999. A value-belief-norm theory of support for social movements: the case of environmentalism. Hum. Ecol. Rev. 6 (2), 81–97.

Trope, Y., Liberman, N., 2010. Construal-level theory of psychological distance. Psychol. Rev. 117 (2), 440–463. https://doi.org/10.1037/a0018963.

Vallacher, R.R., Wegner, D.M., 1987. What do people think they're doing.? Action identification and human behavior. Psychol. Rev. 94 (1), 3–15.

Van der Merwe, S.E., Biggs, R., Preiser, R., Cunningham, C., Snowden, D.J., O'Brien, K., Jenal, M., Vosloo, M., Blignaut, S., Goh, Z., 2019. Making sense of complexity: using SenseMaker as a research tool. Systems 7 (2). https://doi.org/10.3390/systems7020025.

Vecchione, M., Schwartz, S., Alessandri, G., Döring, A.K., Castellani, V., Caprara, M.G., 2016. Stability and change of basic personal values in early adulthood: an 8-year longitudinal study. J. Res. Pers. 63, 111–122. https://doi.org/10.1016/j.jrp.2016.06.002.

Venkatachalam, L., 2008. Behavioral economics for environmental policy. Ecol. Econ. 67 (4), 640–645. https://doi.org/10.1016/j.ecolecon.2008.01.018.

Wamsler, C., Osberg, G., 2022. Transformative climate policy mainstreaming: engaging the political and the personal. Glob. Sustain. 5, e13 https://doi.org/10.1017/sus.2022.11.

Wamsler, C., Osberg, G., Osika, W., Hendersson, H., Mundaca, L., 2021. Linking internal and external transformation for sustainability and climate action: towards a new research and policy agenda. Glob. Environ. Chang. 71, 102373 https://doi.org/10.1016/j.gloenvcha.2021.102373.

Wamsler, C., Bristow, J., Cooper, K., Steidle, G., Taggart, S., Søvold, L., Bockler, L., Oliver, T.H., Legrand, T., 2022a. Theoretical foundations report: Research and evidence for the potential of consciousness approaches and practices to unlock sustainability and systems transformation. Report of the UNDP Conscious Food Systems Alliance (CoFSA). United Nations Development Programme UNDP. United Nations Development Programme (UNDP). https://www.contemplative-sustainable-futures.com/_files/ugd/4cc31e_143f3bc24f2c43ad94316cd50fbb8e4a.pdf.

Wamsler, C., Osberg, G., Panagiotou, A., Smith, B., Stanbridge, P., Osika, W., Mundaca, L., 2022b. Meaning-making in a context of climate change: supporting agency and political engagement. Clim. Pol. 0 (0), 1–16. https://doi.org/10.1080/14693062.2022.2121254.

Wamsler, C., Osberg, G., Janss, J., Stephan, L., 2023. Revolutionising sustainability leadership and education: addressing the human dimension to support flourishing, culture and system transformation. Clim. Chang. 177 (1), 4. https://doi.org/10.1007/s10584-023-03636-8.