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Sustainable lifestyles: towards a relational approach

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Abstract
The concept of sustainable lifestyles is said to have reached the limits of its usefulness. As commonly understood, it impedes an effective response to our increasingly complex world, and the associated societal challenges. In this context, the emerging paradigm of relationality might offer a way forward to renew our current understanding and approach. We explore this possibility in this study. First, we systematize if, and how, the current dominant social paradigm represents a barrier to sustainable lifestyles. Second, we analyze how a relational approach could help to overcome these barriers. On the basis of our findings, we develop a Relational Lifestyle Framework (RLF). Our aim is to advance the current knowledge by illustrating how sustainable lifestyles are a manifestation of identified patterns of thinking, being, and acting that are embedded in today's "socioecological" realities. The RLF revitalizes the field of sustainable lifestyle change, as it offers a new understanding for further reflection, and provides new directions for policy and transformation research.

Keywords Systems thinking · Eco-justice · Relational ontology · Paradigms · Relationality · Inner-outer transformation

Introduction

Sustainable lifestyles are of vital importance for social and ecological transformation towards sustainability (IPCC 2014; IGES 2019; Akenji and Chen 2016; Gilby et al. 2019). Sustainable lifestyles make reference to the possibility that human and other life can flourish on the planet forever (Ehrenfeld 2008). However, major changes are necessary to achieve this goal, as lifestyles are said to be difficult to alter. Moreover, even if there is a willingness to live sustainably, many people fail to make the necessary changes (Mont and Power 2010; Van Vliet et al. 2005).

It is increasingly understood that sustainable lifestyles are not a simple matter of changing habits and behaviors. Instead, they require deep, systemic changes that presuppose new ways of living, communicating, feeling, and thinking (Gilby et al. 2019; Bengtsson and Akenji 2010, Lorek 2010; Rijnhout and Lorek 2012; Gifford et al. 2018; Mao et al. 2019).

Nonetheless, the term 'sustainable lifestyles' is commonly used interchangeably with 'behavioral change', to refer to pro-ecological, frugal, altruistic, and equitable behaviors in all areas of life, including diet, energy use, mobility, or political orientation and engagement (Corral-Verdugo 2012; DeYoung 1993; Schultz 2001; Rijnhout and Lorek 2012; IGES 2019). Moreover, common sustainable lifestyle frameworks separate the personal from the structural and the cultural dimension and/or address them hierarchically (e.g., Akenji and Chen 2016). Although it is understood that behavior is not separate from its context, sustainable lifestyles are often treated as a linear problem in which misbehavior can be fixed. In addition, they are often framed as individual endeavors, and their potential is thus marginalized due to a lack of influence and scale (Paech 2012; WBGU 2011). These misconceptions, we will argue, overlook the possibility of driving deep,

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systemic changes towards a flourishing future, as they are based on an outdated paradigm that is also reflected in the current scientific approaches.

Dominant social paradigms underlie deep, systemic structures, mechanisms and changes (Meadows 1999; Wamsler et al. 2018; Kagan 2010; Ives et al. 2019; Fischer and Riechers 2019) and can thus be both a barrier to or driver of sustainable lifestyles. They not only influence us personally (e.g., via our motivation, values, attitudes, psychological make-up), but also shape our structures (e.g., economic, infrastructural, institutional) and cultural contexts and associations (e.g., narrative frames and cultural norms) (Akenji and Chen 2016; Gilby et al. 2019; Gifford 2011; Schösler and Hedlund de Witt 2012; Shove et al. 2012; Sorin 2010; Lakoff 2014; Wahl 2016; Escobar 2017; Orr 2002).

Thomas Kuhn (1996 [1962]) gave the term 'paradigm' its contemporary meaning, defining it as a set of practices that provide model problems and solutions for a community of researchers. On this basis, Pirages and Ehrlich (1974:23) wrote that paradigms are "… the socially relevant part of a total culture. Different societies have different dominant social paradigms."

Hence, political, economic, and social systems, as well as the tools we use (i.e., electronic devices, vehicles, and machinery), are a reflection of society's dominant paradigm (Wahl 2016; Orr 2002). Accordingly, lifestyles are particularly interesting to investigate in regards to paradigms, because—as we will explore in this article—they are a manifestation of each of these aspects.

Although we know that dominant social paradigms can be a barrier to, or a driver of sustainable lifestyles, the relationship between them has not been sufficiently investigated. The current theoretical efforts can be divided into psychologically-grounded, culturally-grounded, or structurally-grounded approaches. Psychologically-grounded approaches theorize causal relations between inner worlds and behaviors. Examples include the Theory of Planned Behavior (Ajzen 1991) and its extension, the reasoned-action approach, which offers an integrative framework to predict and change human social behavior (Fishbein and Ajzen 2010). Other examples are the Value Belief Norm Theory (Stern and Dietz 1994), the Needs-Opportunities-Ability model (Gatersleben and Vlek 1998; OECD 2002) and the New Environmental Paradigm (Dunlap 2008). Culturally-grounded approaches focus on social norms and behaviors. Examples include narrative frames and the communication of cultural norms (Nisbet and Mooney 2007), and social marketing (Thaler and Sunstein 2008). Structurally-grounded approaches theorize about how (infra-)structural measures cause behavior change (Akenji and Chen 2016). Examples include the provision of car sharing services, the availability of organic and fair trade foods and goods, or renewable energy. Yet, none of these approaches investigate the underlying paradigm and its relation to sustainable lifestyles.

The Integrative Worldview Framework (Hedlund-de Witt 2012), which comes closest to addressing the relationship between paradigm and lifestyles, focuses on worldviews. Hedlund Dewitt draws the distinction between worldviews and paradigm as follows: "While a paradigm tends to define what is valid and what is not for the whole of the ideological constellation of a given time and place, the worldview concept, in contrast, potentially aims to explicate and acknowledge the existence of different viewpoints" (Hedlund-de Witt 2012:20). This approach therefore addresses worldviews, which may differ for each individual (Pirages and Ehrlich 1974), in contrast to the notion of the paradigm as elaborated here, which addresses the "total culture" (Pirages and Ehrlich 1974:23).

Against this background, this article aims to explore the theoretical linkage between paradigms and sustainable lifestyles by showing how the current dominant social paradigm, which we refer to as a mechanistic paradigm, may hinder sustainable lifestyles. We will then discuss how an emerging paradigm, which we refer to as a relational paradigm, may offer more effective pathways toward understanding and achieving sustainable lifestyles.

Accordingly, our study is based on a three-step methodology: First, we systematize the existing literature to identify if, and how, the mechanistic paradigm correlates with barriers to sustainable lifestyles (The mechanistic paradigm and its implications for sustainable lifestyles). Second, we analyze how a relational paradigm can help overcome common barriers by exploring and systematizing relational patterns (How a relational paradigm can help overcome common barriers to sustainable lifestyles). Based on the results, we then develop and discuss a conceptual framework that delineates a relational approach to sustainable lifestyles (Discussion). The resultant Relational Lifestyle Framework (RLF) underlines that sustainable lifestyles are a manifestation of patterns of thinking, being, and acting that are embedded in socioecological realities. It reframes sustainable lifestyle change and argues that relational lifestyles are a more comprehensive framing. It advances the current knowledge and revitalizes the field of sustainable lifestyle change by opening new policy pathways, offering a new frame for reflection, and giving directions for future transformation research and practice.

The mechanistic paradigm and its implications for sustainable lifestyles

In this section, we analyze how the dominant social paradigm may hinder sustainable lifestyles. We begin with a brief overview of its characteristics (What is the dominant

social paradigm) and then exemplify how it might foster or hamper sustainable lifestyles (How does the mechanistic paradigm hinder sustainable lifestyles?).

What is the dominant social paradigm?

The dominant social paradigm, which structures society's beliefs and perceptions of the modern world (Kilbourne et al. 2002), can also be referred to as the mechanistic paradigm. It is considered to be endemic to Western and industrialized civilization (Kilbourne et al. 2002). As the name suggests, the basic idea is that the world functions as a machine (Peitgen et al. 1994). It assumes that if one has full knowledge of the exact state of a given object at a point in time, and knows the interactions informing that state, then its future state could be reasonably determined as a result of prediction. This assumes that the act of observation itself can be independent of the factors considered to influence phenomena. The mechanistic paradigm is rooted in modernity, emerging out of the Scientific Revolution (14–sixteenth centuries), the Renaissance (14–seventeenth centuries), and the Enlightenment (starting in the eighteenth century). Modernism offered a secular understanding of the world in which individuals were understood as individualistic, materialistic, and competitive (Peat 2002; Lent 2017). One of its outcomes was the conquest of nature (Swilling 2019). Although postmodernism questions and critiques modernity, it fails to confront the systemic nature and root causes of the current challenges, due to its "relativism and its antipathy to integrated knowledge and meta-level understanding" (Bhaskar et al. 2016:2). The ideas of modernity therefore continue to dominate in many parts of the world (Nicholson and Dupré, 2018).

The mechanistic paradigm is characterized by rationalism, reductionism, empiricism, dualism, and determinism—approaches which are said to be inadequate to address the complex systemic challenges of sustainability (Capra and Luisi 2014; Corral-Verdugo 2012; Escobar 2017; Haraway 2016; O'Brien 2020; Wahl 2016). Three common patterns that are endemic to this way of understanding the world have been identified (Redclift and Sage 1994; Rees 1999; Capra and Luisi 2014):

- Pattern 1: Humans are separate from and above nature.
- Pattern 2: Humans are able to control nature.
- Pattern 3: Nature is a machine, and can be known and addressed by reducing it to its parts

In the following, we exemplify how these three patterns hinder sustainable lifestyles.

How does the mechanistic paradigm hinder sustainable lifestyles?

In the following, we exemplify six requirements for supporting sustainable lifestyle approaches, together with policies and practices, and point out how a mechanistic paradigm might impact these.

Sustainable lifestyle policies and practices require motivation (Akenji and Chen 2016, 15). The dualistic framing of humans and nature as two separate aspects of reality (pattern 1) presents humans as distinctly different from the non-human world. Hence, there is little motivation to preserve the nonhuman (Du Plessis 2012; Schultz 2001). Research on the 'connectedness to nature scale', for example, suggests that the perception of a connection to the more-than-human world is predictive of the motivation to engage in responsible environmental behavior (Mayer and McPherson 2004).

Sustainable lifestyle policies and practices require a perception of behavioral control (Fishbein and Ajzen 2010). Understanding oneself as separate from the larger world (pattern 1) can result in a sense that individual actions are insignificant, and hence one might not even try to change, as it does not seem to matter (O'Brien 2020). This sense of insignificance and meaninglessness is a common symptom of postmodernity and is said to result from the separation between the individual and the greater whole (Freinacht 2017; Alexander 2010).

Sustainable lifestyle policies and practices require sufficiency (Hickel 2020; Paech 2012). Although sufficiency, which can be described as a reduction in consumption, is considered to be the least desirable way forward (Folkers and Paech 2020), many studies have shown that economic growth cannot be totally decoupled from ecological impacts; sufficiency should, therefore, supplant growth as an overarching economic goal (Raworth 2018). However, the idea that humans are able to control nature, and that nature is a machine that can be known by reducing it to its parts (patterns 2 and 3) evokes a hierarchy of power, leading to a mentality of 'me versus' instead of 'me and'. It therefore fosters competition rather than co-creation (Capra and Luisi 2014). When individual existence is based on competition, a sustainable lifestyle is associated with scarcity, renunciation, and constraints, along with feelings of being regulated and limitations on individual freedom (Verlie 2017).

Sustainable lifestyle policies and practices require deep, systematic change (Lorek 2010). The idea that humans are able to control nature (pattern 2), and that nature is a machine that can be known by reducing it to its parts (pattern 3) means that there is a strong reliance on business-as-usual technological fixes that emphasize consistency (changing one mode of development for another more sustainable

one) and efficiency (IPCC 2014; Schäpke and Rauschmayer 2014). The idea here is that through better technology, nature can be controlled ad infinitum. Climate engineering is one example. Climate engineering tries to control climate change using new technologies without addressing its underlying causes. Sustainable lifestyle policies and practices that focus on changing technology, without questioning the underlying patterns are unable to create systemic change. They merely support the status quo (Gilby et al. 2019) and therefore do not create circumstances that support sustainable lifestyles.

Sustainable lifestyle policies and practices require valuing personal and planetary wellbeing. When humans are thought to be separate from nature (pattern 1), personal health and social and ecological health appear unrelated. For example, recent theories point to the possible loss of a connection to people and places, and an overarching narrative, which may result in addiction, depression, and a decrease in personal wellbeing (Hari 2019; Schaef 1988; Alexander 2010). The lack of a connection fosters a tendency to care for personal health first and foremost, with no regard for any social and environmental consequences (Verlie 2017; Sonu and Snaza 2015). There is insufficient consideration of how to merge planetary boundaries with personal and societal wellbeing (Gilby et al. 2019; Büchs and Koch 2019). Movements, such as Degrowth (Folkers and Paech 2020), Minimalism (e.g., Fields Millburn and Nicodemus 2011), and Voluntary Simplicity (e.g., Elgin 1977; Shaw and Newholm 2002) emphasize the personal freedom and wellbeing that comes with living a life of less consumption, and link sustainable development with notions of quality of life. Yet, the connection between quality of life and reduced material consumption still runs counter to mainstream ideas within the current paradigm (Gilby et al. 2019).

Sustainable lifestyle policies and practices require valuing social and ecological justice (Klein 2014; Walsh et al. 2020a, b; Swilling 2019). The separation of humans from nature (pattern 1) often encompasses a separation between the individual and the collective, contributing to both social and ecological injustice. Although their inseparability is increasingly discussed and recognized by sustainability experts, they are mostly thought of as different phenomena without due consideration to their underlying and interrelated systemic and historical conditions (Schönach 2016; Mercure et al. 2016).

How a relational paradigm can help overcome common barriers to sustainable lifestyles

The relational paradigm represents a shift from a mechanistic understanding of the world to a holistic, interconnected, living systems understanding (e.g., Capra 1997; Kumar 2002; Raskin et al. 2002). It is not a new paradigm,[1] but rather a rediscovery, by scholars of the western, industrialized world, of lines of thinking that can be found in Eastern mysticism and religious traditions, in the work of Western thinkers such as Baruch Spinoza (Naess 1977) and Alfred North Whitehead (1978), as well as in deep ecology (e.g., Naess 1977), ecofeminism (e.g., Plumwood 1993), and Indigenous philosophies (e.g., Salmon 2000). It is reinforced by recent scientific discoveries, such as quantum physics and ecology (as pointed out by Walsh et al. 2020a, b).

Moreover, there is a growing body of sustainability science literature that addresses relational approaches with respect to their potential for sustainability transformations. Illustrations include relational ontologies as leverage points (West et al. 2020), relational values for pro-environmental behaviors and wellbeing (Thiermann and Sheet 2020; Jax et al. 2018; Helne and Hirvilammi 2015; Schulz and Martin-Ortega 2018) or relational epistemologies for ecosystems research (Hertz et al. 2020; Mancilla Garcia et al. 2020a, b) and sociotechnical change (Chilvers and Longhurst 2015).

At the same time, there are communities that are based on a relational paradigm or way of living. Notably, many indigenous cultures have a longstanding history of engaging in knowledge production practices that emphasize more-than-human relational ontologies (Todd 2016). For instance, the Kogi, an indigenous ethnic group in northern Colombia, acknowledge that everything is interconnected, and live according to this understanding (Buchholz 2019). Another example is the philosophy found in sub-Saharan Africa, in which the two most important concepts are Ubuntu and Ukama. Ubuntu refers to relational humanness, and Ukama means the relatedness of everything (Murove 2009). Similarly, the Latin American philosophy of Buen Vivir refers to the right way of living, or Good Living, and relationality is one of the four principles that defines this way of living and being (Akosta 2015).

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[1] We acknowledge that all of the authors of this study come from the western, industrialized part of the world and hence have a limited understanding of cultures in which the dominant social paradigm differs. This article particularly addresses the problems that result from the dominant social paradigm in western industrialized societies, and does not presuppose that everyone equally contributes to associated sustainability challenges (such as high carbon footprints).

The following Sects (Pattern I: from separation to interconnection, Pattern II: from human agency to intra-action with the more-than-human, Pattern III: from individuals to dividuals, Pattern IV: from control to emergence, Pattern V: from mind-body dualism to embodiment, Pattern VI: from individual well-being to relational well-being, Pattern VII: from meaninglessness to meaningfulness) analyze how a relational paradigm could help overcome the barriers to sustainable lifestyles identified above (The mechanistic paradigm and its implications for sustainable lifestyles). We identify seven key patterns based on an extensive literature review by Walsh et al. (2020a, b), which analyzes the relational paradigm in terms of its ontological, epistemological, and ethical dimensions. We then discuss how the identified patterns may influence sustainable lifestyles by drawing on examples of how they affect policies and practices.

Pattern I: from separation to interconnection

The relational paradigm considers that humans and nature are linked. It views the world as an interconnected, complex, and adaptive socio–ecological system that is constantly in flux (Walsh et al. 2020a, b). Humans are a part of nature and co-create with the more-than-human world (Abram 2010) instead of merely using nature for their benefit. According to Spretnak:

> "all entities in the natural world, including us, are thoroughly relational beings of great complexity, who are both composed of and nested within contextual networks of dynamics and reciprocal relationships. We are made entirely of relationships, as is the whole of the natural world" (Spretnak 2011:4).

The interconnection between humans and the more-than-human world implies that the divide between nature and culture is socially and historically constructed. This has led to what has been called a postnatural ontology of the Anthropocene (Küpers 2020), also referred to as 'nature-culture' (Haraway 2003). From this perspective, nature and culture, or social and ecological, are not two separate interacting systems, but rather one autopoietic (self-maintaining and reproducing) system, in which humans are one participant among many others. Feeling and understanding the connection to the more-than-human world might lead to caring more for the general wellbeing of the whole system and marginalized groups within that system (Plessis 2012), since one part cannot be healthy if the whole is not healthy. This highlights that various forms of social and ecological injustice are interrelated. It is, therefore, necessary to align human developmental models with justice frameworks, and the healthy development of natural systems, instead of equating human development with economic and technological progress (Plessis 2012; Pirages and Ehrlich 1974).

A further consequence of seeing oneself as interconnected with both humans and nonhumans is that it may foster empowerment. Although sustainable lifestyles are contextualized as part of a sustainable future (WBGU 2011; Buenstorf and Cordes 2008; World Watch Institute 2008), they are often marginalized as they are considered to be an inefficient driver for sustainability transformations. "The notion of people as active agents of change towards sustainability is by no means widely accepted and conflicts with some of the current, dominant belief systems and worldviews" (Wamsler et al. 2020:234). When the individual is seen as just that, the person remains isolated from the rest of the world, and sustainable actions seem insignificant and insufficient (O'Brien 2020; Wahl 2016).

However, when one sees oneself as an inherent and equal part of the world, personal lifestyle choices are not a private act, but instead may produce unexpected social dynamics (Draper 2013; O'Brien 2020). As any human is always part of a system that he or she influences and that is influenced by the person, the concept of sustainable lifestyles needs to move away from the idea of being an individual endeavor towards having systematic relevance. For example, a common discussion when trying to live a sustainable lifestyle is whether social issues matter in the face of climate change, based on the argument that the ecological foundation matters more than the social. Others argue that the root cause lies in economic or other systems and structures. Yet, understanding the relational nature of things, that the social and the ecological are not separate from each other, and addressing the relation between these aspects across personal, collective and system levels, is important (Walker et al. 2015; Smartt Gullion 2018). From this perspective, sustainable lifestyles are not either a social or an ecological endeavor, but "socioecological".

Pattern II: from human agency to intra-action with the more-than-human

The physicist–philosopher Karen Barad (2007) takes the idea of interconnection a step further and argues that agency is not possessed by individual things or beings but emerges through relationships. Her approach, which is referred to as 'agential realism', is derived from understanding the inseparability of subjects and objects, and recognizes the ways humans invariably participate in the nonhuman world. By dissolving the subject-object dichotomy, the phenomena of unsustainability, as manifested in climate change for example, is not merely human-induced, but can be understood as co-produced by carbon and humans (as well as other more-than-human forces and entities) (Verlie 2017). Together, these constitute entanglements of human and nonhuman materiality. This entanglement results in what Barad refers to as intra-action (Barad 2007). We become-with carbon by

being affected by carbon's agency in less tangible and measurable ways (Haraway 2016).

Clearly, living a sustainable lifestyle includes sustainable actions, such as reducing one's carbon footprint, but it does not end there. The relational paradigm acknowledges that because we are always intra-acting with the world, our influence is much broader. At the same time, we cannot fully predetermine or control our actions. We can, therefore, also create unanticipated consequences (diffractions) with the world, rather than upon the world (Haraway 2016; Verlie 2017; Barad 2007). For example, a simple climate action such as recycling can have unanticipated consequences, as Verlie (2017) describes. The latter author points out how one of her students started recycling to live a more sustainable lifestyle, but her determination made her increasingly aggressive towards her housemates who did not share her dedication. So-called 'climate killjoy subjectivity' (killing joy through the way people engage with the climate crisis) can be the outcome. This illustrates the influence and limitations of human agency and decenters the human, acknowledging that sustainable lifestyles are co-produced with other beings, systems, and forces (Pickering 1995; Latour 2005; Barad 2007; Abram 2010; Bennett 2010).

This recontextualization of the human as part of, rather than as dominating the human-Earth system is expressed in Küpers' (2020) desire to rename the Anthropocene (meaning the 'human epoch') as the Ecocene, which decenters the human and acknowledges a relational approach. Decentering the human and attending to what we might be able to intra-act and become-with increases our capacities to respond to unsustainability (O'Brien 2016). Instead of working upon the world, humans work with the world and foster the capacity to respond to unsustainability in previously unthought ways. Sustainable lifestyles are, in this understanding, no longer approached from a normative viewpoint, based on exclusive human agency (as follows from human exceptionalism); rather, they follow from the perspective that we are a species living in conjunction with our kin, intra-acting with other agents, instead of controlling them (Verlie 2017).

Barad (2007) argues for the inseparability of ethics (acting), ontology (being), and epistemology (knowing) as a tri-partite constellation, also referred to as ethico-onto-epistemology, that does not presuppose subject-object and nature-culture binaries (Barad 2007; Escobar 2017; Kassel et al. 2016; Walsh et al. 2020a, b). We use the following definitions (based on Walsh et al. 2020a, b): ontologies describe what is taken to be real; epistemologies describe how we come to know the world; and ethics describe what is right and wrong. Sustainable lifestyles that are based on a relational paradigm thus demand ethical, ontological, and epistemological transformations.

Pattern III: from individuals to dividuals

Identities come into being "through relationships which are ever changing and constituted at multiple scales" (Neely and Nguse 2015:141). Humans are and become-with their environment (Faber and Stephenson 2011), and the environment constitutes part of the mind (Clark and Chalmers 1998). Gregory Bateson saw the idea of a separate individual as a root cause of our multiple crises and argued that humans are essentially symbiotic with their environment (Bateson 2002). To facilitate a shift in perspective that helps to understand oneself as being and becoming through relationships, individuals can be conceived of as dividuals (Wahl 2016).

Moreover, identities and the boundaries between them are sociomaterially and performatively reconfigured. They can be understood as superpositionalities: emerging "through the ongoing interference of natural cultural waves (such as gender and climate change); superpositionalities are momentarily articulable sociomaterial relational locations which are both situated and dynamic" (Verlie 2017:12). The concept of superpositionality implies that economic, social, physiological, emotional, or ecological positionalities result in dynamically configured power hierarchies (Barad 2007; Haraway 2016; Verlie 2017). These hierarchies cannot be erased but are instead constantly reconfigured through intra-action. The concept of intersectionality applies this perspective to the burgeoning literature on intersectional identity politics (Verlie 2017). It implies not only the social and political context, but also the historical context, as well as the unique experiences of an individual.

Understanding that dividuals are superpositionalities helps us attune to how we are all a "wave of possibility" (O'Brien 2020:26) informed by dominant sociomaterial (Verlie 2017) or socioecological (see Pattern I: from separation to interconnection) configurations of power. This may offer an even stronger frame for empowerment towards sustainable action (O'Brien 2016). When moving towards a sustainable lifestyle, seeing oneself as a dividual explains why sometimes, despite one's best intentions, actions fail. The dividual that attempts to make the change is subject to the constraints of their environment. This frame also better-addresses injustices, and the fact that they have emerged from multilayered, systemic, environmental, and institutionalized influences. It therefore removes the blame from the individual and shifts it towards a personal and collective endeavor to overcome injustices. Research shows that approaches that focus less on the individual, and more on the collective, group and mutual support make change more likely (Darnton 2008; Sustainable Consumption Roundtable 2006; McLoughlin et al. 2019). Collective approaches

to injustice are therefore a key component for sustainable lifestyles, whilst at the same time they support individual capacities and agency for transformation (cf. Pattern II: from human agency to intra-action with the more-than-human).

By perceiving oneself as a dividual, relational values emerge that are conducive to a sustainable lifestyle. Values define what leading a good life means (Hedlund-de Witt 2012). Relational values are increasingly studied in the context of sustainability (e.g. Klain et al. 2017; Thiermann and Sheet 2020; Jax et al. 2018; Helne and Hirvilammi 2015; Schulz and Martin-Ortega 2018), and this shift illustrates that valuing the more-than-human world only for its functionality rather than its intrinsic worth, may lead to over-exploitation. In simple terms, it is, for example, easy to cut down a tree when considering only its monetary as opposed to its intrinsic value.

Pattern IV: from control to emergence

Intra-action results in emerging phenomena that can be reinterpreted as a materio-culture or a socio-nature (Arias-Maldonado 2015). Emergence is a process by which a whole becomes greater than the sum of its parts. New and often unpredictable properties of the whole emerge out of the intra-actions of its individual elements and are irreducible to them. A molecule, a cell, a human being, a community, and the planet can each be understood as an emergent phenomenon (Wahl 2016). These living systems are not static configurations of components; they are rather continual flows of matter and energy whose form is maintained over time.

On the one hand, this perspective links a living system closely to metabolic and developmental processes. On the other hand, it raises the question of whether life itself is an emergent phenomenon. Maturana and Varela (1987) refer to life as structural couplings that create autopoiesis, defined as the self-making by which one brings forth a world. From this point of view a system is not static, but instead is constituted through patterns of relationships and interactions that emerge. The latter do not emerge randomly, but are based on structural couplings that stabilize over time. Synergetic relationships, for example, create new system properties through cooperative interactions. The process of emergence shapes sustainable lifestyles, for instance if we consider phenomena such as rebound or spillover effects. Rebound effects, for example, show that energy efficiency in one area may lead to increased energy use in another area. Spillover effects show that improving one area, such as eating vegan food, may lead to improvements in another area, such as only purchasing organic food. These phenomena emerge from a complex, dynamic process that is uneven and contingent, meaning that what unfolds cannot be fully controlled (Küpers 2020). Hence, developing an understanding of the phenomenon of emergence also helps to overcome the belief that humans are meant to dominate and control the nonhuman world, and to understand why we should always consider how and why (human and nonhuman) agents are affected and influenced by an individual decision (Swilling 2019). From the perspective of a mechanistic paradigm, the agent who takes sustainable action is presumed to be an autonomous, independent entity that acts upon the world rather than one that acts and emerges with it (Dürbeck et al. 2015; Verlie 2017). From a relational perspective, humans and unsustainability do not pre-exist, but are co-emergent. This offers a broader context for understanding and advancing individual sustainable actions.

An example that illustrates this point is meat consumption. Consuming meat can harm our own health, animals, and the environment. Therefore, the interpretation might be that a sustainable lifestyle involves not eating any meat, independent of the context and any alternative ways to produce and consume food. However, how we become-with these animals needs to be considered (Haraway 2003). The question then becomes: what would a sustainable lifestyle look like that decenters the human and recognizes nonhuman agency? The answer is not a clear-cut, one-size-fits-all response (as is often given by sustainable lifestyles informed by a mechanistic paradigm). It is rather the ability to learn to listen and understand nonhuman agents, and to create unanticipated, creative, context-specific, different actions (diffractions) with these agents (Verlie 2017).

Pattern V: from mind–body dualism to embodiment

Ever since Descartes observed, "I think therefore I am," the mind and body have been considered as separate entities (Hedlund-de Witt 2012; Lange 2018). The mind is understood as observing the world, independent of the body and the context. In the mid-twentieth century, philosophers like Edmund Husserl and Maurice Merleau-Ponty pointed out that the self, including the mind, cannot exist in an abstract sense (Sterling 2003). Instead, it is derived from the experience of phenomena, and experience fundamentally depends on our body and our emotions. The field of constructivist developmental psychology, for example, conceptualizes individuals as constructing knowledge through their interaction with the world (e.g., Kohlberg 1984; Loevinger 1977). The body is the starting point of experience (Pelluchon 2019; Toadvine 2019). Merleau-Ponty's phenomenological approach views sensing and perceiving as not merely confined to the realm of matter and ideas, but as having expressive qualities (Küpers 2014). Living, embodied beings are constantly exchanging with the environment, continually co-creating together (Küpers 2020). Barad (2007) supports this notion that objectivity is contextual and embodied. She emphasizes that lived and embodied experience are crucial

to addressing complex sustainability challenges (Barad 2007; O'Brien 2016).

Through embodied awareness, humans can learn to acknowledge their relations to other human and nonhuman agents through relearning to sense, listen, perceive, and respond in caring ways (Küpers 2020). Care for the nonhuman, in return, has been shown to increase personal wellbeing (Jax et al. 2018). When the body is understood as the starting point of experience, inter-being becomes apparent, because nourishment of the whole being connects the person's body with other bodies (air, food, sunlight, etc.) (Pelluchon 2019). Seeing the world as nourishment implies that "we insist on the conditions of existence that are at once biological, social, and environmental, ceasing to separate man from nature" (Pelluchon 2019:2). This helps articulate an ecology that emerges from the experience of the human condition, which offers a little-explored path to taking sustainable action (Pelluchon 2019). It implies an ethics that focuses on the self as constituted by its relations to other beings, in which care for others becomes care for oneself (Groenhout 2004).

Understanding embodiment as a form of knowing the world sets it apart from the dominant form of knowing-that, which Vervaeke refers to as propositional knowing (Vervaeke 2013). Propositional knowing is the knowing that is found in making conceptual maps. Although helpful, over-reliance on such maps can be misleading as they reduce reality (i.e., the map is not the territory). According to the systems theorist Nicholas Taleb, phenomenological knowledge is more likely to be anti-fragile than propositional knowledge (Taleb 2013). This does not imply that propositional knowledge should be abandoned, however. Instead, if it is enriched through phenomenological knowledge, it opens up space for more creative and applicable ideas to emerge.

For example, reducing carbon emissions can be a challenge for individuals. Here, it is helpful to rely on propositional knowledge that points out the increase in atmospheric carbon, and its consequences. Nevertheless, we are likely to be more willing to act if we also experience the effects of a rise in carbon emissions, in the form of, for example, climate hazards, climate grief, or climate anxiety. Allowing and combining different forms of knowledge and associated emotions can, therefore, be a more efficient catalyst for sustainable action.

Pattern VI: from individual well-being to relational well-being

The mechanistic paradigm focuses on the wellbeing of the individual as a part that is disconnected from the greater whole. As noted above, the result is that sustainable living is often associated with a decrease in wellbeing due to it being framed around negative consequences such as discomfort,

inconvenience, and sacrifice (Vertugo 2012). Yet research shows that the opposite is often true. Many scholars show that sustainable lifestyles are closely linked to wellbeing (Ericson 2014; Brown and Kasser 2005; Amel et al. 2009). They are increasingly highlighting how individual wellbeing can mutually benefit ecological and collective wellbeing, rather than being incompatible with it (e.g., Brown and Kasser 2005; Jacob et al 2009).

For example, human wellbeing is closely related to two factors: a sense of autonomy and a sense of belonging. Both are equally important (Hüther 2013). This is supported by research showing that health and wellbeing are strongly dependent on social foundations and the associated social paradigm (Aknin et al. 2019; Helliwell et al. 2017). For example, poor social relationships are linked with a mortality risk that is similar to tobacco and alcohol use, and have a more significant impact on wellbeing than physical inactivity and obesity. Similarly, environmental factors play a key role in developing and regulating the immune system, gene expression, and brain function (Gallon 2020).

Bacteria and other gut microorganisms influence physiological processes, but they also affect our psychological wellbeing (Lorimer 2020; Spretnak 2011). Researchers have investigated the importance of intestinal flora. From the moment we are born, we are populated by billions of living things. Bacteria colonize our skin and the interior of our body, and interact with us physically and psychologically. Studies show that the composition of the bacteria in our intestines, our so-called microbiome, influences how we feel, and our characteristics. And, vice versa, our moods have a significant influence on our intestinal flora (e.g., Tasnim et al. 2017; Spretnak 2011).

Social and environmental factors then underpin personal wellbeing, as it emerges through interactions. Recent studies have therefore shifted the focus from subjective to relational wellbeing (e.g., Jax et al. 2018; White 2015). A sustainable lifestyle based on a relational paradigm recognizes that personal health and wellbeing are interconnected to social and ecological wellbeing. Health issues are then not merely thought of as a personal matter, but instead become a socio-ecological one. If, for example, we suffer from phosphorus deficiency, the solution may not be to take supplements, instead it might require exploring soil health, and a shift toward regenerative agriculture.

Pattern VII: from meaninglessness to meaningfulness

A lack of meaning can lead to unsustainable behaviors such as compulsive consumption and is thus key to understand sustainable lifestyles (Hari 2019; Zerach 2016). Some authors refer to the root cause of our current multiple crises as a meaning crisis (e.g., Schmachtenberger 2019; Vervaeke

2019). Merleau-Ponty's analysis of sense-making explains why meaning-making matters for a sense of wellbeing. The former term is closely associated with meaning-making, and is often used interchangeably. Even simple organisms make sense of the world by transforming it into an environment with salience, meaning, and value (Thompson and Stapleton 2008). If sense-making is an inherent part of each autonomous being, not being able to make sense of the world can decrease wellbeing. This is acknowledged in research that refers to eudaemonic, rather than hedonic wellbeing, which considers that a sense of meaning is an essential constituent of wellbeing in general (Stone and Mackie 2013). In the context of sustainable lifestyles, a shift from hedonic wellbeing (focused on subjective feelings) to eudaemonic wellbeing (focused on meaning) might also lead to a shift from more to less resource-intensive consumption patterns (Brown and Kasser 2005).

Two centuries ago, Nietzsche pointed out that modernity led to a sense of meaninglessness. Today, various philosophical and sociological analyses have explored the connection between meaninglessness and psychological disorders (e.g., Hari 2019; Alexander 2010; O'Brien 2016). These analyses point out that the experience of meaninglessness can result from various factors, such as a lack of embodiment through displacement (Alexander 2010), a loss of connection to others (humans and nonhumans) (Hari 2019), or neglecting the metaphysical (O'Brien 2020).

An underlying thread is that the mechanistic paradigm cannot fully explain subjective experience and the subject's relation to the greater whole, with negative consequences for our sustainable lifestyle approaches. In other words: the established frame does not capture the full picture.

As we lack an overarching frame to make sense of the world, we find what some call a war on sense-making, in which individuals try to impose their own frame onto the world (Vervaeke 2013). A collective frame or narrative that reflects multiple truths, while at the same time offering an overarching perspective might be a key sustainability challenge (e.g., Wahl 2016; Lent 2017; Freinacht 2019). The relational paradigm helps to provide a collective frame by acknowledging the importance of individual autonomy and the person's interconnection to the greater whole, while overcoming the dualism of subjectivity and objectivity. It gives meaning by enhancing the integration between the individual's subjective experience and actions toward sustainability and relating them to the world at large. This can be especially important for sustainability pioneers who may feel that their actions are insignificant. Moreover, it fosters a broader sense of self by engaging emotional, symbolic, and more contextual understandings of sustainability (Lange 2019). As O'Brien observes, a relational paradigm widens the frame and "introduces meaning into what might otherwise be considered a meaningless world" (O'Brien 2016:7).

A relational paradigm may thus contribute to a sense of meaning for the individual in general and explain, more broadly, why, sustainable lifestyles matter.

Discussion

In the previous section, we presented seven patterns of a relational paradigm, and how each one might contribute to overcome challenges of sustainable lifestyles. We do not see these seven patterns to be an exhaustive list, but rather an exemplification of the importance of moving towards a relational approach. Building on these insights, in this section, we discuss the possible implications of changing our understanding of sustainable lifestyles, and propose a framing that lays the foundation for further research and operationalization. In this context, we briefly address the epistemological challenges that we faced during the research process.

Towards a relational approach to sustainable lifestyles: the relational lifestyle framework

By adopting a relational paradigm to investigate sustainable lifestyles, we draw upon Haraway's idea of diffraction. Diffraction creates something new by looking at it through a different lens. Haraway (1997:14) first articulated the notion as a metaphor for inquiry and a critical method, "where inference patterns can make a difference in how meanings are made and lived".

On this basis, the knowledge that emerges from our work highlights that sustainable lifestyles are co-constituted by ethico-onto-epistemologies and socioecological realities. Four dimensions, namely epistemology, ethics, ontology (described in Pattern II: from human agency to intra-action with the more-than-human), and socioecology (described in Pattern I: from separation to interconnection and Pattern III: from individuals to dividuals) are viewed through a new lens. These dimensions capture the intra-action, mutual dependence, and co-constituency that dissolve the binaries of inner and outer, personal and social, or natural and cultural. Positionalities are, then, not represented as something 'out there' or 'external', but instead as an inherent, constitutive part of various phenomena (see Pattern V: from mind-body dualism to embodiment). They are constituted in relation to each other, indicating that changes in one might change the other (see Pattern IV: from control to emergence): wellbeing in one dimension relates to wellbeing in other dimensions (see Pattern VI: from individual wellbeing to relational well-being). Such a new understanding gives meaning to sustainable lifestyles (see Pattern VII: from meaninglessness to meaningfulness), as it captures a sense of co-creation and flow between the different dimensions,

and shows that all four dimensions are subject to an ongoing, nonhierarchical, nonlinear, dynamic process of intra-action.

Accordingly, we propose to refer to sustainable lifestyles as relational lifestyles. Why? Because both the language and the frames we use are closely related to paradigms (Ives et al. 2019; Lakoff 2014). As Smartt Gullion (2018:29) points out, "Paradigms by definition determine how we frame reality", and, as Ives et al. (2019) note, language can be seen as an expression and reinforcement of paradigms. The term 'sustainability science' implies the pursuit of maintenance. Our study shows that the term 'sustainable lifestyles' is both outdated and inaccurate; while it is enough to sustain the status quo, it is insufficient to move beyond and support sustainable transformation (e.g., Wahl 2016). Sustaining the status quo does not give a sense of direction or orientation.

Moreover, the term 'sustainable lifestyles' originates in mechanical ontologies that characterize a lifestyle with reference to fixed properties, and supports a type of thinking that focuses on the stability of entities and systems. As shown in our study, this hinders a flourishing future. In contrast, the term 'relating' points to a deeper desire, as it appeals to a shared sense of belonging. It moves away from merely answering living-how (sustainably) questions, and marks a shift towards living-with as an epistemological, ethical, and ontological task that is composed of not just new lifestyles, but new conceptions of what it means to live well. In the following, we refer to the proposed new understanding and framework as the Relational Lifestyle Framework (RLF).

Epistemological challenges

Although our initial intention was to develop a relational framework as a practical tool that is supported by a figure, because a growing number of scholars are calling for the use of relational frameworks in the social and natural sciences, as there is little rigorous, in-depth and/ or detailed advice regarding how empirical research can be conducted (Mannion 2019; Smartt Gullion 2018), we decided to abandon this goal during the research process. One reason was that the relational paradigm questions the linear model of causality, and therefore causations can rather be seen as probabilities in which certain characteristics relate to a change in another characteristic (Smartt Gullion 2018). These intertwined entities make it difficult to identify clear cause-and-effect relationships, and the idea that a specific tool can be used to lead to relational lifestyles becomes questionable. Additionally, as Latour points out, "tools are never 'mere' tools ready to be applied: they always modify the goals you had in mind" (Latour 2005:143). By offering a practical tool or figure, we risked offering a simplistic conceptualization that narrows one's understanding (Mancilla Garcia et al. 2020a). Moreover, relational epistemologies question the idea that tools can be used to represent reality without

acknowledging the entanglement of the researcher who is co-creating the knowledge (e.g. Latour 2005).

We therefore suggest that the proposed RLF should not be seen as a tool with specific prescriptions and instructions, but instead as a proposition that "triggers conditions of emergence" (Springgay 2015:78). Rather than generating data, it aims to construct new propositional knowledge (see also Pattern V: from mind-body dualism to embodiment). As Barad (2007:91) points out, "practices of knowing are specific material engagements that participate in (re)configuring the world", and the understanding of sustainable lifestyles that is created has material consequences (Barad 2007) that can improve related policies and practice. The RLF then allows effects that would not have been obtained by other frameworks (Latour 2005). It is not a representation of a complex reality, but an enactment of it (Latour 2005). Thus, the RLF offers a more encompassing framing that can help to better-cope with the complexity of sustainable lifestyles. While it is beyond the scope of this article to describe how to cultivate a relational paradigm in different settings and contexts, the RLF represents a starting point for changing our conversations, discourses, and approaches to support relational lifestyles through research, policy and practice.

Conclusion

Sustainable lifestyle concepts that are grounded in a mechanistic paradigm are no longer useful, and are preventing an effective response to our complex and dynamic world. We argue that our novel relational framing is a new conceptual approach that has the potential to transform research, policy, and practice.

The proposed RLF scales in depth, rather than breadth. It encompasses people's inner worlds, which is critical for sustainable lifestyles and transformation (Gilby et al. 2019; Wamsler et al. 2021). At the same time, it recognizes the need to scale up and out, as it acknowledges the importance of both inner and outer dimensions of transformation. In this respect, it contributes to the branch of transition studies that "posit[s] a profound cultural, economic, and political transformation of dominant institutions and practices" (Escobar 2015:454), rather than the branch that narrowly focuses on socio-technical (e.g., Grin et al. 2010), and techno-industrial (e.g., Perez 2016) transitions. The former focuses on post-development, non-neoliberal, post/noncapitalist, biocentric, and postextractivist futures (Swilling 2019), and is aligned with approaches such as commoning (Bollier and Helfrich 2015) and degrowth (D'Alisa et al. 2015).

It is important to note that the relational paradigm is not a simple substitute for the mechanistic paradigm; rather it should be understood as a container for a new story to

emerge. A mechanistic approach may still be useful, especially when considering domains with a clear objective, and quantitative goals, such as carbon emission reductions. Understanding intra-action and carbon's agency on our actions should not stand in the way, or function as an excuse for an excessive carbon footprint. Nor should it misdirect responsibility, or be an excuse for inaction. Instead, our framing opens up new opportunities for creative solutions to emerge that address existing challenges. As Capra and Luisi (2014:79) note, "the emphasis on relationships, qualities, and processes does not mean that objects, quantities, and structures are no longer important."

In sum, our proposed RLF translates the relational paradigm into a comprehensive understanding of lifestyles. It helps to conceptualize multiscalar lifestyle patterns, and to overcome the distinction between inner and outer or micro, meso, and macro registers of experience (Smartt Guillon 2018). Lifestyles then are not only concerned with individual behavior but instead are a manifestation of identified patterns of thinking, being, and acting that are embedded in today's "socioecological" realities. We acknowledge that it will take some time to recognize the benefits, as we are all immersed in the current social paradigm. However, it is a starting point that may help to ignite a new discourse. It can thus contribute to the transformation of lifestyles, which is required for a just socioecological transition towards a caring and flourishing society.

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