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The (re)production of health in climate change

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To date, health in the context of climate change has mainly been considered from a biomedical perspective, whose pathogenic focus on health risks has primarily promoted curative and/or behavioral problem-solving strategies. This article therefore examines health in climate change from a perspective of Urban Public Health and political science, which has received less attention so far. The aim is to address existing constructions of health in climate change and their implications for dealing with the climate crisis, in particular regarding the design of urban environments. In doing so, it adopts a regulation-theoretical approach that allows for a theoretically grounded analysis of health in climate change, taking the triangle of nature, society and the individual as the object of research and revealing the significance of existing constructions of health—understood as a social relation—and its (re)production in climate change. This theoretical approach is extended to aspects of different spatial forms and the productions of space in social relations. The theoretical foundation makes it possible to recognize that there are understandings of health in climate change discourse that largely exclude the causes of climate change and thus make its treatment selective. As a result, broad socio-ecological transformation processes are obstructed, while the structural causes of climate change are preserved and stabilized despite their crisis character. An understanding of health that also sees health as a resource in a salutogenic sense and that strengthens the promotion of health by means of structural changes is being pushed into background. Positioning climate change as a public health issue requires a shift from curative, individual and behavioral interventions toward a focus on structural health promotion, especially through the development of health-promoting, just and climate-friendly urban environments. It also means that health must once again become more of a political issue and that existing boundaries between the private and public spheres must be questioned.

KEYWORDS

Urban Public Health, urban health promotion, societal relation with nature, regulation theory, socio-ecological transformation, climate change, political ecology, urban environments

1 Background and objectives

As early as 2008, Frumkin et al. (2008) drew attention to the fact that climate change is a public health issue. However, it was not until 2015 that the idea that the implementation of comprehensive climate action (both mitigation and adaptation) could also be the greatest opportunity to promote global health came to the fore (Watts et al., 2015). Since then, the link between climate change and health has received increasing attention. However, there is still a massive gap between the knowledge of the (health) impacts of climate change and the implementation of the necessary measures, as seen in the failure to meet self-imposed climate targets.

This article explores possible explanations for this dilemma by taking a closer look at constructions of health in climate change and their implications for dealing with the climate crisis. To this end, it adopts a political science perspective that has received only little attention to date and draws on regulation-theoretical approaches to bring the socially organized treatment and understanding of health in climate change into the focus of research. This allows us to analyse understandings of health and its (re)production as part of social relations and social domination.

The impacts of climate change on health are an important and significant topic with comprehensive scientific evidence. However, these publications rarely address possible reasons for the failure to achieve climate targets, even though there is much evidence about the consequences of climate change for health. Our work therefore addresses the question of why the implementation of climate targets is progressing so slowly despite the knowledge of the health effects of climate change. Consequently, the analysis of climate change cannot be limited to the relationship between the individual and society. It must be extended to include the component of nature, insofar as the climate crisis is a crisis of "dominant forms of appropriation of nature as they have emerged since the development of industrial capitalism" (Brand, 2011, own translation). The article thus follows the findings of political ecology and political economy, which highlight the inherent crisis of capitalist economies and associated modes of living as a structural cause of ecological crises (Biro, 2011; Brand and Wissen, 2011, 2013; Gottschlich et al., 2022). It is the economic foundations, i.e., the patterns of production, distribution and consumption, and the necessary opportunities for disproportionate access to nature (as a resource and sink) and labor, as well as the constant spatial and social externalization of ecological and social costs, that lead to this inherent vulnerability to crisis. However, given the observed global generalization of such economic forms and modes of living, the possibilities for externalization are finite (Lessenich, 2018; Brand and Wissen, 2021). Therefore, comprehensive socio-ecological transformations with generalizable alternatives are needed. Against this background, it is clear that the ecological crisis and climate change are characterized by a complex interweaving of spatial and social dimensions. Social processes always have a spatial component in that they create and shape spaces, and spatial forms as well as social relations are inscribed in concrete spaces, while conversely concrete spaces, spatial forms and spatial processes affect and influence the social (Kessl and Reutlinger, 2022). Transformation processes toward sustainable development and climate neutrality thus take place as both social and spatial processes, are contested in both respects and are mutually dependent. The question is what role specific spatial forms play in a social relation—in this case, health in climate change—and what their implications are for dealing with the climate crisis. For this reason, in what follows we will analyse understandings of health and its (re)production, taking into account different spatial forms and the production of space, as this reveals specific effects on strategies for dealing with climate change and, in a broader sense, on the reproduction of capitalistically organized societies and their structures of power and domination within the triangle of relations between the individual, society and nature.

By considering the spatial components of health, this article is situated within the research field of Urban Public Health. An expanded understanding of health, which also understands health as a resource in a salutogenic sense and strengthens health promotion through socio-spatial structural changes, can contribute to the creation of socio-ecological alternatives. So far, however, health in the context of climate change has been viewed primarily from a biomedical perspective, with a pathogenic focus on health risks and the promotion of primarily curative and/or behavioral problem-solving strategies. This, it is argued, further stabilizes existing capitalist economic forms and modes of living, despite their inherent crisis-proneness, and largely excludes them as a cause of the climate crisis, thus inhibiting comprehensive socio-ecological transformations.

In order to examine this in more detail, a theoretical foundation is provided below, which conceptualizes health as part of societal relations with nature—understood as a social relation—and then embeds it in a regulation-theoretical approach, which makes the factors for stabilization processes of capitalist systems the object of research. These theoretical considerations then serve as a basis for the analysis of understandings of health in climate change. Instead of collecting our own data, we will build on existing insights from regulation theory. These will be linked to research findings on the construction of health. This leads to new implications for the issue of climate change and health and for the addressing of the climate crisis. Such a perspective thus attempts to make visible the interface between public health and socio-ecological research, which has been little illuminated to date.

2 Theoretical foundation

2.1 Societal relations with nature

The social relation that is focused here in the field of climate change and health is the *societal relation with nature*. The term societal relation with nature refers to the dialectical constellation of nature, society and the individual (Becker and Jahn, 2006). The idea of societal relations with nature is based on the intellectual work of Theodor W. Adorno and Max Horkheimer and their jointly written *Dialectic of Enlightenment* (Horkheimer and Adorno, 2002 [1944]). In this, they describe the duality of nature and society within modern capitalist societies as the emancipatory project of the Enlightenment and the resulting rationalism as the great project of modernity: "Enlightenment's program was the disenchantment of the world. It wanted to dispel myths, to overthrow fantasy with knowledge" (Horkheimer and Adorno, 2002 [1944], p. 1). The emergence of bourgeois society [with the Middle Class as ruling class (Marx and Engels, 1987 [1852])] is thus linked to the constitutive differentiation from nature, which is not an ontological difference but a historical rupture (Görg, 2003, 2004). This process of differentiation is characteristic of the Enlightenment and liberalism. Despite the promise of freedom, it produces in the course of history structures of domination between society, the individual and nature, caused by the necessity of material exchange with nature. This perspective highlights the social science dimension of the ecological crisis/climate change

and shows that the analysis and treatment of this problem area is not exclusively a task of the natural sciences. Rather, through the dialectic described above, the ecological crisis/climate change is linked to the concrete constitution and structure of society and its relations of power and domination.

Domination occurs in three ways: domination of nature, social domination and domination of the subject, through which the mediating relationship between society, the individual and nature is constituted. The emergence of the subject and the associated social self-understanding with the human being at its center—as the most important achievement of the Enlightenment and humanism—is only possible through the demarcation from nature. This demarcation is an expression of the domination of nature, and the subjectivisation of the Enlightenment is part of the staging of the human being as an instance of power (Görg, 2003, 2011). The societal relation with nature in bourgeois society is characterized by a technically rational reason, which, in connection with social domination, becomes instrumental reason.

Instrumental reason refers to the rationality/efficiency-driven end-means relationship that aims to dominate and control nature and society (Horkheimer and Adorno, 2002 [1944]). Knowledge is used as a means to an end in order to manipulate nature and organize social structures. Mastering nature is thus done from a rational standpoint, valuing nature according to its functions as resource or sink. At the same time, domination takes place within the subject by internalizing this rationality, which serves as an instrument for asserting oneself against external nature. In other words, "the world that is perceived and experienced in terms of its controllability corresponds to a subject that is in control and feels itself to be confirmed by successful self-control" (Wiggershaus, 1996, p. 9, own translation). Mastering the outer nature by a subject mastering its inner nature thus becomes the "formula for constellating the human civilizing process" (Wiggershaus, 1996, p. 10, own translation). It is through this process of self-suppression that the subject becomes the bearer of social domination. Social domination is therefore mediated by the relation with nature and characterized by "the distance from things which the ruler attains by means of the ruled" (Horkheimer and Adorno, 2002 [1944], p. 9). In other words, social domination and social order are mediated through forms of domination of and access to nature.

The concrete shaping of societal relations with nature as a constitutive moment of domination is not a continuous process, but is characterized by crisis-like developments, ruptures and discontinuities (Brand and Wissen, 2011, 2013), which are contingent as part of other social relations. Metabolism with nature takes place through production and labor, science and technology, culture and politics, and social perceptions and interpretations (Brand and Görg, 2022). The ecological crisis with climate change thus becomes a crisis of currently prevailing societal relations with nature and their (re)formation.

2.2 (Public) health in the societal relations with nature

The understanding and treatment of health plays an important role in the shaping of societal relations with nature within the dominant triangle of the individual, society and nature. Even the definition of public health and private health is relevant in this context. The term public health refers to health as a component of public life, i.e., affecting society in general and accessible to all; beyond private and individual health. This means public health is always political: "Public health always touches on issues of state power and explicit and largely implicit power" (Labisch, 2018, p. 29, own translation). The conception of health places the human body in society and mediates the order of the individual and society, so that biological aspects of human existence are placed in social action and practices.

> "The term 'public health' defines the biologically interpreted foundations of the actions of social forms of consolidation above individuals and their primary living communities. Even more than individual health, public health is socially constructed and organised in a way that is specifically appropriate to civilisation. Concepts of health—whether individual or public—are concepts of order and therefore contain explicit and, above all, implicit instructions for behaviour." (Labisch, 2018, p. 45, own translation)

The way in which health is constructed and understood in a society determines the placement of the individual in society and thus the order of society by means of social domination. Even the identification of health risks and strategies for their defense and avoidance depend on a society's respective organs of perception, possibilities for intervention, goals and purposes, and fears. Public health is linked to the societal constitution as well as to the formation and design of modern statehood (Labisch and Woelk, 2006). In its spatial dimension, the materiality of the human body is the link between physical environments/nature and the social production and appropriation of these environments (Belina, 2013). At the same time, the body is a site of inscription and incorporation of these environments.

In climate change, people and their bodies are challenged by health risks, adding to the already existing confrontation with the effects of specific living conditions, working practices, diets, modes of mobility, lighting, soundscapes and much more, especially in urban contexts. Against this backdrop, cities and urban design have an inherent moment of access and influence on health (Eitler and Prestel, 2016), both as spaces of possibility for health and as places of limits. At the same time, understandings of health have implications for urban form. The relevance of constructing and signifying space and spatiality in relation to societal approaches to health becomes visible here. It shows that social relations are spatially condensed and manifest in different spatial scales, places, territories and networks (Belina, 2013; Sander and Becker, 2022). Thus, to the extent that understandings of health are inscribed in concrete spaces and spatial forms, condensation and manifestation occur not only discursively and symbolically, but also materially and physically (Kessl and Reutlinger, 2022). The processual nature of spatial forms, i.e., processes of scaling, place-making, territorialisation and networking, express this context of socio-spatial relations (Jessop et al., 2008). Consequently, the creation, transformation or destruction of (built) environments is always also the subject and expression of societal conflicts and, as a

result, part of the political (Harvey, 1996, 2019) and of the elements of health and illness.

In order to analytically integrate health as a socio-spatial ordering and structural principle into the contemporary diagnosis of the concrete societal constitution, we will now embed it in the theory of regulation. Regulation theory is particularly suitable for this purpose, as it explicitly addresses the crisis-proneness and simultaneous stability of capitalistically organized societies.

2.3 Regulation theory

Regulation theory, which emerged in France in the 1970s, is based on the assumption that "capitalist society, characterized by societal contradictions and antagonisms, is fundamentally unstable and prone to crises" (Hirsch, 2005, p. 82, own translation; Hirsch and Viertel, 1977). It poses the question: "What factors actually enable the temporary stabilization of capitalist economies characterized by fundamental contradictions?" (Becker, 2009, p. 89).

To answer this question, social relations and their (re)production are at the center of the analysis. Social relations are characterized by their fundamental capacity to reproduce and the inherent regularity/permanence of certain social practices (Lipietz, 1988). In this sense, *social relations* describe the interaction between social actors in the context of social structures, while also shaping these structures themselves. So, the production and reproduction of social relations is not a conflict-free process, but is characterized by contradictory and antagonistic social practices and power relations. The fact that there are nevertheless temporary phases—*historical blocks*—of stability of social relations in societies is due to a stabilizing interplay between the *regime of accumulation* and the *mode of regulation*. *Regime of accumulation* refers to the economic structures and mechanisms that shape the accumulation of wealth and capital on a given society and/or period. The accumulation regime describes the mode of production or a particular historical form of stable capital accumulation. Capital accumulation, i.e., the transformation of goods into money and the subsequent productive investment of profits in new goods under competitive conditions in order to expand capital, is imperative for capitalist systems (growth paradigm). To ensure this, a *mode of regulation* is required in which hegemonic patterns of behavior, interpretation and ideas of development are formed and manifested. Thus, the *mode of regulation* refers to a system of rules, norms, and institutions that stabilize the regime of accumulation. Within a concrete-historical societal formation, the mode of regulation thus ensures that the interests of different societal groups are canalized and that societal cohesion is guaranteed through integration into an overall societal consensus. In this way, the theory of regulation also avoids the assumption of an immanent logic of the reproduction of capital in capitalism and instead emphasizes the need for forms of stabilization that go beyond the economic (Görg, 2003). The mode of regulation is formed by a variety of different *forms of regulation*. *Regulation* describes the process of reproducing a social relation, its enforcement and manifestation (Lipietz, 1988). The process of historical generalization, normalization and societal recognition is linked to the acceptance by individuals and the integration of the social relation into norms, everyday practices and habits, with adjustments possible in the course of history. Regulation therefore refers to those structural and institutional forms in which antagonistic societal forces and interests are canalized and stabilized beyond purely economic structures (Sablowski, 2014). The concept of regulation thus differs from the neoclassical economic notion of stability and self-regulation of the market on the one hand, and from the purely economic interpretation of structural Marxism on the other (Missbach, 1999). At the same time, the concept of regulation goes beyond that of planned political or economic regulatory, but includes it. Regulation does not take place exclusively through state authorities and apparatuses in the narrower sense. Instead, statehood is an expression of the reproduction of social relations (Gramsci, 1971; Lipietz, 1988). The state is thus understood neither as an executive function reduced to law and force, nor as a neutral authority for the preservation of a social contract (as in liberalism), nor as a detached particularity of the bourgeoisie (as in Marxism). Instead, it is understood as a social relation that includes civil society as a site of decision-making and, as the bearer of legitimate violence, ensures the preservation of a certain hegemonic societal order (Demirović, 2007; Hirsch and Kannankulam, 2011; Poulantzas, 2014). In this context, hegemony is not understood as a simple relationship of dominance, but as a type of domination based on consensus (Gramsci, 1971). It is linked to the ability to give general acceptance, and thus stability, to ideas about the order and development of society across classes (Wissen, 2011; Bedall, 2014). At a material level, this hegemony is linked to a capitalist material model of wealth [*material core* (Gramsci, 1971)], which is one of the causes of the ecological crisis (Brand and Görg, 2022).

3 Health as a structural element of (post-)Fordist regulation

These theoretical considerations now serve as a background foil for the contemporary diagnosis of current understandings of health and their significance for dealing with the climate crisis. The historical reconstruction and contextualization of the respective economic and social structures that characterize the accumulation regime and the mode of regulation have their roots in the processes of industrialization, urbanization and human activity that began in the 18th century. However, our analysis focuses not on the first industrial revolution, but on the period after World War II, when the ecological crisis and climate change became significant topics of discussion.

3.1 Health concepts in the transformation from Fordism to post-Fordism

Regulation theory research has identified so-called *Fordism* as a *historical block* of relative stability of capitalist societies with a hegemonic mode of development within the industrialized nation states (USA, Europe, Japan) after the Second World War. This phase is characterized by a *regime of accumulation* based on Taylorism as a technological paradigm and the increasing

rationalization of production and labor processes in the direction of highly industrialized mass production (Jessop, 2020). The social compromise between labor and capital, mediated by bargaining systems based on social partnership (trade unions) and the expansion of the Keynesian welfare state, stabilized this accumulation regime. The establishment of welfare state structures ensured the creation and maintenance of a broad social consensus based on the link between social security and mass consumption by integrating opportunities for the (further) training of qualified workers into production and exploitation cycles, thus promoting and stabilizing mass consumption (Jessop, 2020; Esser, 2021). The provision of social security in the event of unemployment or illness ensured reproduction in the event of falling out of the employment system. The Fordist standard employment relationship became the norm for the basis of calculation. These *forms of regulation* also included the consolidation of the monopoly of definition and action over people's health and illness on the part of the natural-scientific and curative medicine and thus the dominance of a biomedical model of health (Labisch, 2018). The broader health sciences, especially hygiene, were also increasingly oriented toward the natural sciences for the identification of biological causal chains, for example in the fight against infectious diseases. A functionalist concept of health crystallized, which sees health as a prerequisite for an efficient society and the production of health as a process of civilization (Bittlingmayer, 2016; Abel, 2021; Franzkowiak and Hurrelmann, 2022; Schleiermacher, 2022). Here, health interventions arise from national economic considerations and the constant perpetuation of the demystification of the world (Horkheimer and Adorno, 2002 [1944]) through scientific and medical progress in order to maintain productive labor; visible, for example, in the emergence of company medical services and workplace safety. This is accompanied by various social processes. For example, people are adapting to the typical concept of the nuclear family, which is also manifested in the organization of cooperatives and social housing. The paid forms of work are increasingly male-dominated and are widely accepted as such. Another example is the development of a professional interest in the detailed nutritional composition of food products. All this is an expression of Fordist ideas about how society should be organized and how this affects the lives of families and even their health (Göckenjan, 1985; Bänziger, 2013).

This Fordist mode of development came into crisis with the social and world market upheavals of the 1970s, which led to restructuring processes in the *accumulation regime* and the *mode of regulation*. The term *post-Fordism* has emerged in academic discourse to describe this restructuring phase of capitalist social formation. Post-Fordism is characterized by an *accumulation regime* of increasing globalization processes, visible in increasing deregulation and market liberalization and driven by the internationalization of capital and the expansion of financial markets (Hirsch, 2001). Added to this are processes of flexibilisation and acceleration through new production technologies, work organizations and forms of employment. Ensuring international competitiveness becomes the hegemonic goal of the "national competitive state" (Hirsch, 1997). On the *regulation* side, the enclosure of the welfare state is disintegrating, leading to a "land grab of the social" (Dörre, 2019) through cuts in social security systems, privatization of public services and commercialization of services of general interest. These structural changes go hand in hand with processes of the appropriation of the psycho-emotional dimension of human workforce, i.e., the commodified valorisation of subjectivity.

These restructurings and the growing hegemony of neoliberal economic theories are significant for understanding health in the transition from Fordism to post-Fordism, as Brunnett shows, drawing on Foucault's work on biopolitics [here and below (Brunnett, 2009)]. Against the background of the concept of hegemony explained above, the understanding of health in post-Fordism is characterized by subjectivation and the paradigm of healthy self-modeling, whereby health is valorised and finally made functional as capital. The subject-oriented approach to health is also institutionalized through the initiatives of the new social movements (including women's health and ecology movements) and the emerging alternative health practices and concepts, which also focus more on prevention and health promotion. The claim or narrative of these new social movements had a strong emancipatory element, advocating the strengthening of individual rights of freedom and self-determination (Buechler, 1995). Based on the idea of a liberal society, the focus here is therefore on the individual's ability to shape health, and less on the structural conditions. This argument is still used by proponents of such a health concept, for example in debates about the power of disposal over one's own body. However, the emancipatory intentions of these movements are to a large extent internalized as neo-liberal modernization and incorporated into the new *mode of regulation*, which multiplies the opportunities for consumption and intensifies competition and social inequality (Brand and Wissen, 2021). The growing importance of health as a social practice in society as a whole develops features of disciplined health behavior and efficient self-optimisation, which is particularly effective in the middle classes in order to demonstrate a planned and forward-looking relationship with oneself and one's body, anchored in a rational belief in future advantage (Brunnett, 2009). Health becomes a process that can be individually shaped and controlled through personal skills, competencies and personal responsibility. It is no longer associated solely with the biomedically ascertainable state of physical and mental health, but is understood as a continuous process of self-modeling, disciplining and dealing appropriately with environmental conditions. The reference triangle of the individual, society and nature is thus transformed to the extent that both nature/environment and society are no longer seen as sources of conflict for the individual. Instead, the individual can adapt flexibly and, in principle, indefinitely by means of learnable skills; the power over one's own health is thus in one's own hands. Such an internalization of (neo)liberal ideas by the individual becomes effective as social domination, because it increases the social pressure for self-disciplining and self-modeling behavior and marginalizes the structural elements of social relations as sites for health-related measures. Individual health thus becomes a factor of positioning in socially structured spaces. This symbolic revaluation of health goes hand in hand with an economic revaluation. The consumption of health goods becomes a factor for increasing health capital in order to promote individual success, performance and marketability. The economization of health and social policy reinforces this and at the same time makes access to health more difficult.

At the same time, the natural science and curative medicine of Fordism is transferred to post-Fordism and continued through further professionalization and technologization. This also means that medicine is increasingly adapting to liberalization trends and efficiency criteria. Individualization trends are further strengthened by medical advances in medicine and promote the increasing shift from public health measures to private responsibility (Labisch, 2018). At the same time, this maintains society's belief in the demystification of the world through the potential prospect of eternal life, which curative medical treatment is supposed to make possible (Dross, 2023). The argument for further advances in medicine is linked to the promise of further increases in individual freedom, self-fulfillment and autonomy. Medical interventions tailored to the individual are intended to optimize the individual's mode of living. Again, this reflects a strong liberal understanding of society, which is primarily concerned with its single parts, i.e., individuals, rather than structural aspects. Thus, social consensus is maintained through *regulation*.

3.2 Health in a changing climate

These hegemonic patterns of post-Fordist regulation continue in the treatment of the climate crisis, affecting the triangle of domination of nature, domination of the subject and social domination.

As a form of domination of nature, the scientific biomedical focus already established in Fordism is further transported in the reduction of climate change to health risks—invasive species, increasing heat, natural disasters, etc.—and the resulting horror scenarios of an "attacking nature" against which we must arm ourselves. This is the familiar modernist project of separating ourselves from nature and liberating ourselves from its constraints. The belief in technological progress, which also guides medical practice, supports curative problem-solving strategies that promise to cure health problems without having to change fundamental societal formations, so that their reproduction is maintained. This leads to a selective response to the climate crisis, in that single problems of a changing climate are addressed and tackled, but the societal causes of climate change remain unaddressed. This is particularly true of the growth paradigm of capitalist economies and the associated externalization of costs, which is problematic in both environmental and health terms (Lessenich, 2018). Instead, new market-based solutions offer additional opportunities for capital accumulation.

The mode of regulation also manifests a perception of the problem based on the triad of environmental hazards-exposure-vulnerability, in line with the hygiene model of disposition, exposure and mediating vectors (Labisch and Woelk, 2006), in favor of the development of curative and behavioral measures. Thus, education, monitoring of environmental influences and standards for rules of behavior as well as technical measures become the preferred elements of health-related adaptation to climate change, while less attention is paid to structural measures (see for example Die Bundesregierung, 2020; Robert Koch Institute, 2023). The controllability of the climate crisis—i.e., of nature—is linked to calculating and monitoring environmental and climate parameters and the problem-solving strategies derived from them. In this way, climate change continues to be constructed and demarcated as something outside of society. Territorialisation acts here as a structural principle and helps to obscure the societal origins of climate change, i.e., capitalist socialization and fossilistic modes of production.

The forms of regulation of subjectivation and individualization—as forms of domination of the subject—which have also become established in the understanding of health since post-Fordism, favor the behavior-related approach to health in climate change, also in the area of prevention and health promotion. In line with the liberalizing orientation of post-Fordist development, the individual's responsibility for their own health is addressed through behavioral tips, e.g., in the case of periods of heat, guides to healthy nutrition and the advice on physical activity. The interpretation of health as a capital of the entrepreneurial self (Bröckling, 2007) is reinforced by shifting health from the public to the private sphere, making climate-mitigating and climate-adapted behavior a value of individual health. To avoid environmental hazards and reduce individual vulnerability, developing resilience becomes a goal, which can lead to competing for the necessary resources. So, living in a neighborhood with adequate green and blue spaces, protected from heat islands and extreme weather events can have a positive effect on increasing health capital. The effects are reflected, for example in socio-spatial (distributional) conflicts, like, gentrification and segregation (Bauriedl, 2022). Similarly, in a society where social status is largely determined by consumption patterns, individual changes in consumption patterns toward sustainability can become a status symbol. This can further increase social inequality. In this way, environmentally conscious consumption can become a driver of social differentiation (Beckert and Bronk, 2019; Beckert, 2022). However climate neutrality cannot be achieved by changing individual behavior. Climate neutrality is primarily dependent on structures such as production, mobility and housing, which cannot be changed by individual action. This recognition is obscured by the widespread shifting of responsibility for climate change health issues to the level of individual responsibility. This in turn results in a form of territorialisation and place-making that separates society from the individual and outsources the overall social responsibility for climate change to the private sphere (scaling).

These forms of domination of nature and domination of the subject are constituted in interaction with social domination. By continuing the instrumental capitalist domination of nature and the linear logic of progress of technical and scientific rationality, the reproduction of the societal relation with nature is maintained without having to eliminate the societal causes. At the same time, new markets, both in the traditional medical health care and in alternative health markets that address the individual behavioral level, are opening up in the field of health-related climate mitigation and adaptation. In this context, the link between social domination and domination of the subject becomes visible. Successful self-assertion and personal responsibility for health in climate change become the criterion for the positioning of the individual within society. At the same time, the distance to nature created by civilization is preserved and maintained through the narrative of the domination of instrumental reason over nature and the body.

The negative effects of societal metabolism, i.e., the social and ecological costs, also as a result of globalized production chains and consumption flows, are externalized and become visible as socio-spatial inequality structures, both on a global scale and on a small scale between centers and peripheries (Lessenich, 2018; Bauriedl, 2022). Visible in urban neighborhoods that are increasingly affected by the negative impacts of climate change, but also in the valorisation and investment in spaces that appear profitable in the future, while capital is withdrawn elsewhere and spatial reconfigurations take place (Sander and Becker, 2022). Post-Fordist restructuring is also associated with shifts in scale (Reuber, 2012): while economic structures become increasingly internationalized and global networks of accumulation emerge, health as a form of regulation is increasingly reduced to the level of the individual. As a result, neoliberal restructuring can take hold at all levels of scale, and at the same time localization at different levels of scale obscures the connection between these spheres, with the aim of a stable formation of accumulation regimes and modes of regulation.

4 Health in public space

The regulation-theoretical view of health in the context of climate change shows that health, and in particular public health, is not an object that can be described in a rational and objective way, but is rather a conflict-ridden societal issue of the political. In this interpretation, the value and appropriation of health is subject to the production and reproduction of societal relations with nature and its forms of domination. The processes of individualization and subjectivation in post-Fordism, combined with the biomedical sovereignty of interpretation over health and illness, scale the health consequences of climate change to the level of individual and personal responsibility. This is visible in national strategies such as the German Strategy for Adaptation to Climate Change (Die Bundesregierung, 2024), where health is addressed as a separate field of action, however, limited to (i) pathogenetic aspects such as heat and pollen exposure, or the transmission of pathogens, and (ii) educating and informing the population about the consequences of climate change as a measure to be taken. Thus, a strong emphasis is placed on the individual as responsible person. This is not a uniquely German phenomenon, but can also be seen for example at European Union level (European Commission, n.d.). The scientific literature also shows a strong pathogenetic focus in the field of climate change and health: 80% of the international research studies are impact studies that primarily examine the effects of climate change on human health from a natural science and medical research perspective (Berrang-Ford et al., 2021). This shows that such understandings of health are firmly anchored and being developed in politics, society and science.

The importance of the spatial dimension for health-related approaches and interventions to the climate crisis is neglected, as are, for example, is public health issues of urban planning or the relevance of health to policy sectors such as transport. Instead, there is an increasing rationalization and de-politicization of health issues through the supposedly objective natural sciences and a shift from the public to the private sphere, which also leads to a further marginalization of (urban) public health. For instance, the WHO concept of "health in all policies" calls for an intersectoral collaboration to promote public health, such as through urban design that supports walking and cycling, or through education that empowers individuals to make informed choices wherever possible (Greer et al., 2022). In terms of climate change, this approach has been extended to a bidirectional perspective, i.e., ensuring good public health supports the achievement of climate targets, in the sense of a "health for and to all policy" (Greer et al., 2022).

The city and the design of urban environments are important spatial scales to address, because they determine who is or will be exposed to the consequences of a fossilistic production, such as climate change. Urban Public Health addresses these scales by focusing explicitly on the function and design of urban environments, its effects on health and, in particular, the possibilities for creating health resources through structural change (Schröder et al., 2022). In this way, the issue of climate mitigation opens up as a health-related issue, rather than restricting public health to issues of climate adaptation and its mainly curative problem-solving strategies.

Adherence to the economic growth paradigm and acceptance of the continued externalization of environmental and social costs should therefore be fundamentally questioned by public health. These are two of the main causes of disease, poverty, and health inequalities that public health has been trying to address for decades (Marmot, 2005). When developing health interventions, it is crucial to critically examine whether they actually address and change existing structures or if they have a stabilizing effect on current capitalist societal orders.

The aspect of empowerment, a key concept in the health promotion strategy, should be consistently understood as a process of redistributing political power and transforming domination relations. This involves developing a collective critical awareness of structural inequalities and collectively designing alternatives, rather than simply focusing on the acquisition of personal competences and skills (Ruiz Peyré and Schmitt, 2022). Furthermore, our theoretical framework can serve as a starting point for future work, particularly health promotion and urban planning practices in the context or regulation of societal relations with nature by means of health understandings.

5 Conclusion

Aim here was to address existing constructions of health in climate change and their implications for dealing with the climate crisis, particularly in relation to the design of urban environments. The regulation-theoretical localization of the topic of climate change and health, including hegemonic and spatial perspectives, allows for the disclosure and critical questioning of existing understandings of health. It becomes clear that in dealing with the climate change, understandings of health are perpetuated that reproduce the existing power and domination relations of capitalistically organized societies. These understandings of health ensure that the societal relationship with nature, which has been thrown into crisis by the ecological crisis and climate change, is neither forced to transform nor to create new alternatives,

but on the contrary attempts to stabilize itself once again. In this sense, health acts as a form of regulation in these contexts and contributes to the renewed harmonization and stabilization between the accumulation regime and the mode of regulation. However, an expanded concept of health that emphasizes structural health promotion and socio-ecological transformations can disrupt existing power relations and their reproduction processes. It places health on different spatial scales, beyond the individual, highlighting its societal and political dimensions. In this way, our research should help researchers and policy-makers to develop new ideas and practical solutions that are sustainable, climate-friendly and provide health resources for all. Positioning climate change as a public health issue requires a shift from curative, individual and behavioral interventions toward a focus on structural health promotion, especially through the development of health-promoting, just and climate-friendly urban environments. It also means that health must once again become more of a political issue and that existing boundaries between the private and public spheres must be questioned. This requires a stronger focus on the political dimension of public health and on health as an explicit part of the political.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

JS: Writing – original draft. SM: Writing – review & editing.

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The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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