Title

Medicine, healthcare and the environment: from the salutogenic approach towards the salutogenic environments.

Author: Laura Menatti

KLI, Konrad Lorenz Institute for Evolution and Cognition Research

Klosterneuburg, Austria

Corresponding author: Laura Menatti laura.menatti@gmail.com

Abstract

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Highlights

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This paper answers this call by analysing the concepts of salutogenesis and salutogenic environments and by proposing them as conceptual tools to face the current crises. The paper takes inspiration from Aaron Antonovsky's theory, but it widens it to include the environment-health relationship in order to understand the current health scenario.

The paper discusses the application of the salutogenic environments to current medical theory and healthcare practice and considers how they can contribute to shed lights on the relationship and application of the health-environment coupling.

In doing so, it provides insights both for philosophy of science, medical theory and medical education.

Declaration of interest: none

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Introduction

Research in contemporary medicine is increasingly stressing the need to address and cope with the effects of climate change and more generally of the environment on health. *The 2022 report of the Lancet Countdown on health and climate change* (Romanello et al. 2022) shows how persistent fossil fuel addiction is increasing the health impact of climate change on vulnerable individuals and communities. Extreme weather events, such as heat waves and droughts, as well as climate change hazards, such as air pollution and infectious diseases, have a devastating impact on both physical and mental health. Furthermore: "climate change threatens the ability of health professionals to prevent disease and to improve health and disrupts health care delivery" (Sullivan et al. 2022, 188; see also Salas 2020). The need to foster the ecological dimension has also been underlined in medical humanities (Coope 2021; Lewis 2021), medical ethics (Zielinsky 2022) and medical education (Rapport 2003; Gehle et al. 2010; Young 2020; Goshua et al. 2021; Sullivan et al. 2022). Theoretical and practical research points out that medicine still follows a concept of health which is often compartmentalized with respect to the ecological contexts (Coope 2021, 123). Public health and biomedical frameworks have been consequently called to reorient the healthcare processes towards the integration of ecological thinking with healthcare.

Theoretical interdisciplinary analyses of the relationship between health and environment are often based on: a) complex system theory – e.g., to explain the development of the *One Health* approach or the concept of *planetary health* (see Lee & Brumme 2013; Horton 2014) and also on b) the evolution-based theories employed to understand the origin and the development of the recent pandemic health crisis via the notion of 'total environment' based on ecological, evolutionary and developmental analyses (Cazzolla Gatti et al. 2021). Philosophy of science has recently started to frame

the relationship between the environment and health in a non-externalistic way (Baedke & Buklijas 2022), and it has been recently argued that medicine would benefit from philosophical thinking and conceptual work on the relationship between health and environmental issues and climate change sensitivity (Menatti et al. 2022).

In order to clarify this theoretical line of research on the relationship between contemporary medicine and the environment, I propose here to first reflect on two concepts analysed by Antonovsky (1979): *salutogenesis* and *pathogenesis*. These notions refer respectively to two different frameworks in medicine: salutogenesis is a theory of health and disease focused on promotion of salutary measures and it is not focused merely on risk factors. Pathogenesis, on the contrary, refers to the study of the factors leading to diseases in human beings. I will analyze these two notions and show how they can be applied to the current analysis of health.

In particular, I will focus on the concept of *salutogenesis,* introduced and developed by Antonovsky starting from 1979 (1979; 1987; 1996), and I will flesh out its possible applications to the study of the relationship between health and the environment. I will do so by introducing and stressing the importance of the notion of *salutogenic environments*, which are the environments and the surroundings that, for different ecological, biological and cultural reasons, provide health and well-being to individuals and communities.

The paper argues that the analysis of the effects of the environment on health and well-being cannot be just a matter of pathogenesis, but has to be complemented with a salutogenic account, in order to fill the ecological gap in medicine that medical theory and medical practice are currently denouncing and to understand and face the current health and environmental crises.

The main thesis of this paper is that salutogenesis and salutogenic environments can be valuable concepts to be applied to the debate about the relationship between health and environment in contemporary medical sciences. They allow: 1) to clarify the opposition between the pathogenic and salutogenic aspects of the environment; 2) to underline the positive and preventive aspects of the environment as related to health to face the current crises

The paper is structured as follows: *section 1* explains salutogenesis and its specular concept of pathogenesis and distinguishes the salutogenic framework from preventive medicine and health promotion; *section 2* applies the salutogenic approach to the relationship between health and environment in medicine through the concept of

salutogenic environments. This section explains how the salutogenic environments are important for healthcare practice in terms of attention to the patients and with respect to healthcare facilities; it recompiles examples of salutogenic environments and it concludes by analysing how the notion of salutogenic environments can be fruitful for the discussion of the health-environment coupling in philosophy of science and in its application in medical sciences.

1. Salutogenesis and its origins

Salutogenesis is a theory of health and disease focused on the promotion of salutary measures and not merely on preventing risk factors. The term salutogenesis comes from the Latin *salus* (health) and *genesis* (production, generation) and means 'carrier of health'. There is no standard definition of the notion of salutogenesis as the concept of salutogenesis, the salutogenic account and the related framework has been developed, amended and corrected along many years (see Mittelmark and Bauer 2016). The salutogenic account was developed during decades by Aaron Antonovsky, a medical sociologist whose research was mainly focused on stress, specifically, the relationship between stress factors and the emergence of disease and health in different social groups; the peak of his research are the books *Health, Stress and Coping* (1979), and *Unravelling the Mistery of Health* (1987). He worked at the implementation and application of the salutogenic framework until his death in 1996. Antonovsky was a sociologist of health, yet influenced by research in different disciplines in the humanities and by scholars working in sciences (see Vinje et al. 2016): endocrinologists (such as Hans Selye 1950); microbiologists who proposed the integrative approach of disease ecology (such as René Dubos, see also Anderson 2004); psychiatrists such as such as George Engel who was one of the first to develop a biopsychosocial model of health (Engel, 1977, see also Wade & Halligan 2017); psychologists working on stress and stress measures, such as Thomas Holmes and Richard Rahe who developed *The social Readjustment rating scale* (1967) and many other scholars whose contributions converge in Antonovsky's theory in an attempt to relate medicine, psychology and biology to develop a comprehensive and systemic scientific approach to health, disease and illness.

Furthermore, Antonovsky's fresearch can be contextualised on the basis of the main biological, medical or sociological topics he addresses, and which are closely intertwined in his analysis. From the biological point of view, for instance, the salutogenic

approach discusses the homeostatic framework in medicine and biology (Cannon 1932; see Hagen 2021 for an extensive treaty on the notion and history of homeostasis). In the literature, the concept of homeostasis was put into question after the publication of Cannon's seminal work: replacement notions such as heterostasis and allostasis revised the idea of homeostasis and explicitly considered the role of change and variability both from the chemical, physiological and medical point of view (see for example, Selye, 1975; see also Hagen 2021; Bechtel & Bich 2021). Antonovsky takes into account these critical contributions when he considers 'the human organism as prototypically being in the state of heterostatic disequilibrium as the heart of the salutogenic orientation" (Antonovsky, 1987, p. 130). His commentators underline how the salutogenic approach was precisely born with the attempt to frame health as a general problem of disequilibrium, and concerning the 'active adaptation to an environment in which stressors are omnipresent and inevitable' (Vinje et al 2016, 25).

By positioning himself in this debate, Antonovsky considers that salutogenesis opens the way for rehabilitating stressors in human life. [1] He highlighted the potentiality of variability and disequilibrium for health by proposing the term 'negative entropy' or 'negentropy' (Antonovsky, 1987, p. 8-9) meaning that salutogenesis focuses on stressors for health which inevitably are present in the environment. According to Antonovsky, the "mirage of health", an expression recalled from Dubos (1960), or what has been called the mere 'microbe hunting' or again 'the magic bullets' (Anderson 2004, 40) have to be substituted by a negative entropy, leading to a search for useful inputs into the social system, the physical and organismal environment to counter-act the immanent trend toward entropy. In this sense in *Unravelling the Mistery of Health* (1987), Antonovsky attempts to merge the biological discussion of the notion of homeostasis with the social criticism of the pathophysiological approach to individual's health.

From the sociological point of view (sociology and sociology of medicine), the analysis carried out by Antonosky was initially focused on field work on minority groups

[1] See the paper 'A somewhat personal odyssey in the studying of the stress process' (Antonovsky, 1990) where A. describes his involvement in stress research as a sociologist of health. He specifies what a stressor is compared to tension for individual and marginal communities. 'Stressor is a stimulus which poses a demand to which no one has no ready-made, immediately available and adequate response' (Antonovsky 1990, 24). In the context of the debate and the literature on stress in the 1970 he initially considered a stressor as pathogenic. Yet he specifies that when facing a stressor the individual gets into a tension, which is not necessarily pathogenic. The turning point of his career towards elaborating a salutogenic account of health, is represented by the elaboration of the concept of *generalized resistance resources*, meaning the resources that allow the individual to cope with physiological and psychological stressors during her life and allows him to stay healthy.

and marginal situations. In his doctoral research he analysed the cognitive coping responses to social and psychosocial stressors, and then implemented his research in discriminated and low-income categories in US, by analysing how lowest social classes showed high rates of morbidity and mortality and by relating poverty and health (see Antonovky 1967; 1967a; 1968; 1990). He became also the director of the New York State Commission Against Discrimination (Vinje et al 2016, 27). In 1960, after moving to Israel, the path towards medical sociology become clearer and he started teaching and researching in department of social medicine (Vinje et al 2016, 27). Together with healthcare professionals, he worked at surveys within a project about artery disease, multiple sclerosis and menopause. His interest was focused on the role of sociocultural factors and social class in the determination of health, morbidity and disease. From this work, he coedited the book *Poverty and Health* (Kosa, Antonovsky, & Zola, 1969). During this research he adopted what he considered the standard pathogenic orientation in medicine and he delved into the relationship between life stressors and health and how stressors were dealt with, thanks to cultural and social resources.

When carrying out a psychosocial research on the risk factors in coronary artery disease in immigrants to Israel from North America he shifted his attention to the work of Lazarus (Lazarus & Cohen 1977) and again Selye (1950). He analyzed which mechanisms are related to stressors and which resources are recruited in order to coping with them. He developed the concept of *generalized resistance resources,* which are available to all individuals regardless of the types of disease and predispositions to develop them. As explained by Vinje (2019) the concept has a clear debt with the notion of *general adaptation syndrome* by Selye (1950).[2] The concept of *generalized resources* refers to the fact that when a stressor occurs, the individual deploys psychological, social

[2] The general adaptation syndrome is a concept introduced by Selye. It is based on the assumption that 'all the organisms can respond to stress as such and that the reaction pattern is always the same, irrespective of the agent used to produce stress' (Selye, 1950, 4667). Apart from specific reactions, there is a general adaptation syndrome, which is a process that takes place as a response to every kind of physiological stress. It consists, according to Selye, of three phases: the alarm reaction (A.R.), the stage of resistance and the stage of exhaustion. Most of the characteristics triggered during the first phase (A.R.), such as tissue catabolism and hypoglycemia, are usually reversed during the resistance phase, but reappear in the phase of exhaustion. This means that the adaptive strategies or adaptive energies in an organism are limited and finite. Furthermore, the inherent characteristic of stress is that it continuously triggers damage and defense in the organism through variable adaptive capacities. Interestingly Selye asks: 'Why does exposure to the same stressor produce disease only in certain individuals?' (Selye 1950, 1388). His answer is that the adaptation syndrome is the normal physiological reaction of every organism to any kind of stress and the exposure to stress can be expected to produce diseases if the defense reaction is inadequate. Antonovsky makes Selye's question one of the foci of his work, and his answer to it is the salutogenic account based on the sense of coherence.

and cultural resources to mediate the situation and to cope with tension (Antonovsky 1979, 99). Interestingly, these resources lead to what Antonovsky calls 'active adaptation' and specifically argues that 'Salutogenesis, (. . .) leads us to focus on the overall problem of active adaptation to an inevitably stressor-rich environment" (Antonovsky, 1987, 9).

From the theoretical point of view, his work is coeval with the developments in health promotion of the 70s, 80s and 90s (see section 1.3 on the differences between salutogenesis and preventive medicine and health promotion). It is not the purpose of the paper to retrace all the roots of his thinking. Yet it is worth emphasizing the interdisciplinarity effort of his work on the concept of salutogenesis: as a medical sociologist he worked in hospitals, with medical doctors and health care professionals, but his theory was developed in relation to biological approaches and concepts (e.g. homeostasis), and theoretical and empirical methodology in social science (e.g. qualitative interviews and quantitative elaboration of the Sense of Coherence scale).

1.1. Explaining salutogenesis: from the criticism of pathogenesis to the elaboration of a new socio-medical account

The concept of salutogenesis cannot be understood without considering it counterpart, that of pathogenesis. The aim of this section is not to emphasize the opposition between the two concepts (as some analysis of salutogenesis does), but to demonstrate their complementarity, as a coupling which may allow us to better understand the current health scenario and to address the relationship between contemporary environmental and health problems.

In medicine pathogenesis generally denotes "The pathologic, physiologic, or biochemical mechanism resulting in the development of a disease or morbid process. [patho- disease + genesis, production]" (Stedman 2016). Health has been discussed in medical sciences and humanities in terms of pathology and dysfunction. Disease, pain and well-being are also defined in these terms in philosophy of medicine and humanities (Stegenga 2018). The discussion about health in contemporary documents of medical education and medical humanities, mostly refers to a pathogenic account, meaning that medical practice and theory focus on the aetiology, care and curing of diseases (see Becker et al. 2010). The prevalence of pathogeny and of the pathogenic account in current medicine could be explained historically by referring to germ theory and the scientific dominance of this approach in Western medicine (e.g. Jimenez et al 2022; Menatti et al.

2022; Kahyesh 2023). Historians relate the prevalence of pathogeny also to debates on the relationship between degeneration over regeneration in the XIX and XX centuries (e.g. Soloway 1990; Meloni, 2016: 98), by underlining the moral, political, eugenics and racial implications of such dominance in the western history of both medicine and genetics.

Antonovsky criticised the pathogenic account in medicine in various essays throughout his career (e.g. Antonovsky 1996, 14). According to Antonovsky, the 'pathogenic orientation' is the dominant medical paradigm of contemporaneity (Antonovsky 1979, vii). Among the main critical factors, Antonovsky underlines that a pathogenic account fails in considering the complexity of the definitions of health and improving the management of healthcare systems. It focuses exclusively on a particular disease or a clinical entity: "First attention is given to the pathology, not the human being who has a particular medical problem" (Antonovsky 1987, 4). On his view, the pathogenic framework pursues an individualistic patient-based approach, and formulates health categories in terms of negative characteristics (such as absence or limitation). It is based on what he, among others (such as Dubos) calls ‘a magic bullet’ approach, meaning that one disease is related to just one cure approach (Antonovsky 1979, 37). According to Antonovsky, the pathogenic approach mostly resists the definition of disease as caused by multiple factors. Moreover, it implies a dichotomous classification of persons as being either diseased or healthy, and consequently excludes those who are non-diseased (Antonovsky 1979, 36-39; Antonovsky 1987, 3; Antonovsky 1996, 13).

Although this criticism has been maintained mainly among Antonovsky’s scholars (Mittelmark et al. 2017; Mittelmark et al. 2022), it has also been taken in by contemporary medical educators and health promoters who have been underlining the limits of adopting a pathogenic model of health, according to which disease prevention or disease treatment is the actual path to health (Becker et al. 2010; see also Jonas et al. 2014). It has been specified that: “the absence of bad behaviour does not indicate the presence of good behaviour, research consistently has demonstrated that simply decreasing a negative state does not necessarily increase positive states” (Becker et al. 2010, 2). The absence of pathogenesis does not symmetrically imply the presence of salutary factors or what we will describe later as ‘salutogenic environments’, thus environments and surroundings that lead to healthy states. This type of criticism has been addressed also to public health measures, insofar as they are generally more focused on post-factum disease management – that is when the diseases have already spread – than

on disease prevention and health promotion. It has also been underlined how disease prevention and health promotion do not imply the same actions and especially do not receive the same amount of funding, with health promotion usually receiving less attention in public and population health (Fries 2020, 20).

The majority of these criticisms does not aim to dismiss the pathogenic approach or underestimate its importance for medicine[3], but rather to complement[4] it in healthcare practice and theory with a different approach, the so-called 'salutogenic' one. As mentioned above, salutogenesis was first introduced by Antonovsky in his book *Health, Stress and Coping* (Antonovsky 1979). In that book, Antonovsky recompiles how the term was chosen after having designed and carried out studies focused on poverty and health, minorities and adaptation to diseased situations. He analyses the health of Israel menopausal women, some of whom survived the WWII concentration camps (Antonovsky 1979, 6; Becker et al. 2010, 2; Antonovsky & Sagy 2022, 20). That experience inspired him to develop the salutogenic approach. He notes that the crucial variable in a successful adaptation to stressors in this cluster of women was not just a lack of disease[5], but the cultural and socio-psychological stability (Antonovsky 1979, 7). He then observes that, considering the pervasiveness and ubiquitousness of pathogens and diseases, it was important to understand why some people get sick and die and why others do not (Antonovsky 1979, 13-22, 35). He consideres that the answer to the main question of 'why people remain healthy' is to be referred to preventive and health promotion measures in medicine, that the pathogenic approach is not able to fulfil, develop and fully understand.

From this perspective, he introduces the salutogenic framework to understand the factors leading to health, instead of focusing only on those leading to diseases and sickness. The notion of salutogenesis is based on two pivotal concepts: the idea of health as a *continuum* and the sense of coherence (SOC). The former postulates health as a continuum of multifaceted states or conditions of the human organism. It has been called 'ease/dis-ease continuum' as opposed to a healthy/sick dichotomy (Antonovsky 1979, 57). Physical and psychological stressor events push individuals towards pathogenic or

[3] See for instance the case of the epidemiological model (Antonovsky 1979, 42, 45, 55).
[4] As expressed by Becker et al.: "In theory pathogenesis and salutogenesis are complementary approaches and as America redesign its health care system, salutogenic approaches will be necessary to address the challenges that will emerge" (Becker et al. 2010, 2).
[5] He used the term 'dis-ease' instead of 'disease' to underline the processual and continual characterization of health in order to avoid a dichotomy between two different healthy and sick states.

salutogenic ends of the continuum (Antonovsky 1996). The continuum model of health describes health not as an opposition between states of sickness and wellness, but rather as a process along the life of individuals in which they move between two conditions: a state of health (at their birth) and a state of sickness (at their death). In the space in between there is a continuous movement among different states which is not the complete absence of one or the other. What is defined as normal health is instead a continuous movement between the always intertwined pathogenic and salutogenic states of life[6].

Related to the concept of health as a continuum, the second (methodological) pillar of Antonovsky' theory is the sense of coherence. 'What are the factors pushing this person toward this end or toward that end of the continuum?" (Antonovsky 1979, 37). The answer is the sense of coherence, meaning the orientation of the individuals in considering the events which surround them as a) comprehensible (it refers to the ability to understand what is happening, meaning that the challenge is understood); b) manageable (the resources to cope with a situation are available, with respect to individual life and social network) and c) meaningful (thus the ability to be motivated, to find motivation in a situation) (see Antonovsky 1996, 15). The sense of coherence is measured through the sense of coherence scale (SOC, via 13 or 29 items, see Eriksson and Contu, 2022), a sociological scale with 11 items measuring comprehensibility, 10 items measuring manageability, and 8 items measuring meaningfulness. The scale is focused on the social and individual coping factors allowing a person to adapt to unhealthy situations and to develop the resources to cope with changes in their life, more than on the pathogenic factors causing diseases in a specific individual or a group. It measures the cultural, social, physiological and psychological elements that allow someone to cope

[6] More recently the continuum framework of health has been taken up in preventive medicine by Rose's model (1992; 2008) which analyses how diseases, specifically mental disorders and addictions, have to be understood in their contextual emergence and they have to be treated together with a changing of the society as a whole, thus underlining the collaboration between individual and population health. Rose introduces the notion of 'continuum of risks and severity' (Rose 1992) by questioning the distinction between normal and pathological. He proposes that preventive medicine has to question the high-risk strategy which focuses just on a small group of people at risk and has to move towards a population strategy. In this sense, population strategy aims to influence or reduce the risk in the population as a whole through public health initiatives. The concept of continuum of health has been similarly used in philosophy of science and population health by Valles (2018), when he affirms that health is best understood as a lifelong phenomenon or according to a "Life course theory" (Valles 2018, 57). Health should thus be considered as a life trajectory of complete well-being in social contexts. "Individual health develops through dynamic relationships with the healths of their population and their social-environmental context" (Valles 2018, 59). Taking inspiration from the literature on chronic diseases as illnesses developing over time and as complex social and physiological phenomena, Valles conceptualizes health as imbricated in a continuous temporal model. Health is not based on 'time slices', but as an object on a path which needs individual long-term analysis and understanding of social interactions. In this sense, how the health of the individual develops is understood and managed along with population health (Valles 2018, 62).

with life's various stressors and manage them in the continuum of health[7]. The sense of coherence is one of the most important elements of Antonovsky' theory. Mittelmark & Bauer (2022, 14) point out that: "in his influential 1996 paper in *Health Promotion International*, Antonovsky proposed a research agenda solely of sense of coherence questions", by investigating how the sense of coherence varies along life with respect to age, culture, or the interrelation between SOC and physical or psychological well-being. The sense of coherence is reinforced by the idea of general resistant resources (GRR), meaning that a person with a strong sense of coherence, usually finds resources in the world and in the social relationship to cope with stressors of different kinds. It has been underlined how the GRR are more a: 'dispositional orientation rather than a personal trait/type or a coping strategy' (Eriksson & Lindström 2005, 460).

However, it is widely acknowledged that the theory of salutogenesis is something more than a measurement in the SOC scale. While relying on the SOC, it cannot be reduced to it. The overall scope of Antonovsky's theory is indeed wider, as it aims to innovate both medicine and the concept of health. As expressed by the same Antonovosky: "The salutogenic orientation has been proposed as providing a direction and focus, allowing the field to be committed to concern with the entire spectrum of health/disease, to focus on salutary rather than risks factors, and always to see the entire person (or collective) rather than the disease (or disease rate)" (Antonovsky 1996, 18; see also Mittelmark & Bauer 2022, 10).

Salutogenesis is an "umbrella concept" (Eriksson & Contu 2022, 88), aimed at proposing programs in medicine able to move beyond risk factors and at promoting long-term health outcomes. Salutogenesis emphasizes the role of prevention as well as the importance of health education in medicine beyond risk factors. As expressed by the same

[7] SOC survey is based on 29 questions (or 13 in the reduced version of the scale) with 7-point Likert scale answers. It is organised in three factors of comprehensibility, manageability, and meaningfulness. Examples of these factors are respectively questions such as: 'When you talk to people, do you have a feeling that they don't understand you? (answers from 'never have this feeling' to 'always have this feeling')'; 'When something unpleasant happened in the past your tendency was:' (answers from 'to eat yourself up about it' to 'to say "ok that's that, I have to live with it" and go on'); 'Doing the things you do every day is:' (answers from 'a source of deep pleasure and satisfaction' to 'a source of pain and boredom') (see Eriksson & Contu 2022, 79). According to systematic reviews (Eriksson & Lindström 2005, see also Eriksson & Contu, 2022), the scale has been proven to be psychometrically sound. It has been largely used, translated, and validated in several languages and employed in sociological, psychological and medical studies (see Becker et al. 2010; Eriksson & Lindstrom 2005; Meier Magistretti 2022; Eriksson & Contu 2022). The factorial structure of the scale is something problematic (Eriksson & Lindstrom 2010, 462) as the factorial structure of the three dimensions of the scale is not always clear. Yet its predictive validity is considered quite strong, for instance in discriminating specific at-risk categories in long-term studies (Eriksson & Lindstrom 2005, 463).

Antonovsky, the salutogenic model "derives from studying the strengths and the weaknesses of promotive, preventive, curative and rehabilitative ideas and practices, it is a theory of the health of that complex system, the human being" (Antonovsky 1996, 13; see also Mittelmark et al. 2017). The salutogenic approach is based on promoting 'salutary factors' (Antonovsky 1996, 14) and addresses all people, both healthy and sick, by working with communities instead of targeted people at risk or with a specific disease. In his last paper, published posthumous, he summarizes salutogenesis as the orientation that "sees each of us, at a given point in time, somewhere along a healthy/dis-ease continuum" (Antonovsky 1996, 14). Consequently, the majority of contemporary scholars identify salutogenesis with the salutogenic orientation or the salutogenic model to be applied to biomedical sciences and health promotion by focusing "attention on the origins of health and assets for (positive) health, contra to the origin of disease and risk factors" (Mittelmark & Bauer 2022, 11).

1.3 Salutogenesis: differences with preventive medicine and health promotion.

To better understand the idea of salutogenesis and its implications for medicine, it is important to clarify the differences with preventive medicine and health promotion.

Preventive medicine usually refers to the prevention of diseases and it implies: "efforts directed toward the prevention of disease, either in the individual or in the community as a whole—an important part of what is more broadly known as public health. Preventive medicine, in addition to reducing the risk of disease, has important roles in preventing disability and death" (Britannica 2022; see also Nikku & Eriksson 2012). Preventive measures have been developed way before the modern era, e.g., through dietary prescriptions or isolation of sick people (Becker 1988). Preventive measures, behaviours aimed towards improving health, and more specifically The the role of the environment for health has been acknowledged way before modern times and modern medicine (see Ward Thompson 2011). Quarantines, landscapes and environmental management, such avoiding marshy areas, constructing public and religious building to avoid pestilences and diseases has been documented along different eras and cultures by historians of medicine and environmental historians (see Meloni 2021; see also Martini & Lippi 2021 for the pioneering works in modern medicine of personalities such as I. Semmelweis or F. Nightingale in the XIX century). However,

contemporary medicine has been focusing mainly on the pathogenic risks and it has officially and extensively included risk prevention after the development of germ theory and discoveries by L. Pasteur and R. Koch (Snowden 2020, 205; Bingham et al. 2004; Gaynes 2019; Gradmann 2009; Porter 1998).

Health promotion (for a history see Bingenheimer et al., 2003; Raingruber 2012; Tulchinsky &Varavikova 2015), instead, has been defined as the process of 'enabling people to increase control over their health determinants in order toto improve their health and thereby be able to live an active and productive life', as stated in the Ottawa Charter (WHO 1986). In 2009 the *American Journal of Health Promotion* provided a more comprehensive definition in which health promotion is aimed at the achievement of the *optimal state of health*. It is said that: "Health Promotion is the art and science of helping people discover the synergies between their core passions and optimal health, enhancing their motivation to strive for optimal health, and supporting them in changing lifestyle to move toward a state of optimal health. Optimal health is a dynamic balance of physical, emotional, social, spiritual and intellectual health" (O'Donnell, 2009, iv).

The salutogenic approach acknowledges the role of prevention and promotion of health in medicine at both the individual and community levels. Antonovsky was well aware of the debate on health promotion and preventive medicine, a debate that he participated in , discussing it both from the theoretical and practical point of view all over the decades of his work both in United States and in Israel. His commentators (see Lindröm & Eriksson 2006) underline that the theoretical framework of salutogenesis is in line with the health promotion theory. They specify that health promotion principles as presented in the above mentioned Ottawa Charter (1986) can be distinguished in three phases: 1) recognizing the role of social determinants of health 2) setting the objectives of an active productive life 3) promote the activity and enabling the dynamic processes toward health. In this sense, salutogenesis is said to recall the same points presented in the Ottawa Charter as it is focused on 1) finding solutions 2) identifying the general resources enabling moving towards healthy states and 3) finally identifies the social, collective and populations systems and mechanisms which 'serves as the overall mechanism or capacity for this process, the SOC (sense of coherence) (Lindröm et al. 2006, 242).

Yet in his last paper (1996), Antonovsky specifies that salutogenesis adds a significant theoretical and practical addition to health promotion, by 1) moving the attention from the individual to population health and to communities which are not

necessarily at-risk; 2) salutogenesis moves from risks factors, such as smoking, overnutrition, addiction etc. towards what Antonovsky called "a greater health" for all the persons, meaning that health has to be related to all the aspects of life and should not be focused only on the eradication of risk factors or diseases (Antonovsky, 1996); 3) salutogenesis is based on a comprehensive conceptual framework which could finally guide medical actions; 4) finally, health promotion, according to Antonovsky, 'lacks a theoretical foundation' (Antonovsky 1996, 12). In this sense, salutogenesis was introduced with the aim to change the general framework of medicine. As Antonovsky specifies: "It is then my goal here to propose such a foundation, in terms of what I call the salutogenic model. It is however not a theory which focuses on keeping people 'well'. Rather, in that it derives from studying the strength and the weakness of promotive, preventive, curative and rehabilitative ideas and practice, it is a theory of the health of that complex system, the human being" (Antonovsky 1996, 13).

As Antonovsky underlines preventive medicine focuses on the pathogenic aspects of medicine and the risk factors, this is the main difference to a salutogenic model. With respect to health promotion, the aforementioned definition contains the concept of 'optimal health' (O'Donnell, 2009, iv) as the element at which health promotion is aimed. The notion of 'optimal health' could receive the same criticism that was moved to the 1948 WHO definition of health[8]. It has been noted - also from philosophy of medicine - that this definition offered an overly idealized view of health (Saracci 1997; Bircher 2005) and it could contribute to an excessive medicalization of society (in order to reach the ideal state of health). The salutogenic approach could not contemplate a notion of optimal health, due to the idea of continuum of health proposed by Antonovsky already in 1979. The salutogenic approach is more compatible with the concept of the *potential of health*, which does not oppose a state of pure and optimal health to a state of sickness and it does not pursue an idealized idea of health.

With respect to both preventive medicine and health promotion, I argue that the salutogenic approach positions itself on what could be called a 'proactive' line of thinking in promoting health. Whereas prevention (and preventive medicine) and health promotion focus on the reduction of risks and the avoidance of problems and difficulties, proactive salutogenic measures focus on creating supportive contexts even if no immediate risk or disease is occurring. According to salutogenesis, the main focus of medicine should be

[8] In his essays, Antonovsky discusses also official medical documents, such as the WHO definition of health and its implication for health promotion (Antonovsky 1979; 1996).

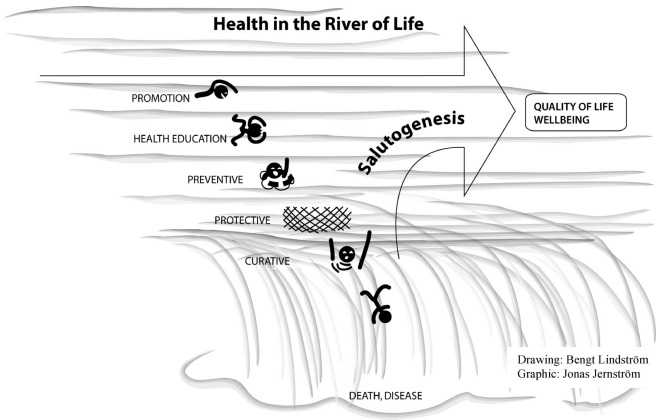
thus creating states of health which are higher and wider than the ones currently experienced (see Becker et al. 2010; Antonovsky 1996).

Recent publications about salutogenesis (such as the *Handobook of Salutogenesis* in 2022, Mittelmark et al. 2022) stress again the difference between a salutogenic framework and the preventive medical approach. It is for instance underlined that: "Salutogenic health promotion is holistic in its nature and is targeted for whole populations and not only for individuals at risk" (Antonovky Av. 2022, 549; see also Vinje et al. 2017, 34). To clarify this idea, scholarships on salutogenesis have proposed the metaphor of the *river of life* (fig. 1 by Eriksson & Lindström, 2008). According to this metaphor, it appears not enough to promote health by avoiding stress or by building bridges to cross the river of life in order to keep people from falling into the river or helping people from drowning in the river - thus curing people from pathogenesis. Medicine should help people to swim or teach them (maybe by avoiding any paternalistic approach) how to swim, through promotion, health education, and preventive actions, to improve and empower people towards health and well-being.

In conclusion, salutogenesis generally attempted a reformulation of the concepts of medicine and health. It does not merely mean preventive medicine and it does not propose itself just as a branch of health promotion. It appeals to a wider and more systemic conceptualization of health which includes both preventive and proactive measures, but complements the pathogenic approach with salutogenic proactive measures (see Becker et al. 2010).

Fig. 1 (Eriksson & Lindström, 2008)

Fig. 1: Health in the River of Life.



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2. The salutogenic environments: an innovative tool for contemporary medicine and healthcare

The salutogenic model has been adopted, studied, and analysed in medicine and social sciences. The years 2017 and 2022 have witnessed the publication of different editions of the *Handbook of Salutogenesis* which recollects different experiences and applications of the framework to education, medicine, sociology, psychology etc. (Mittelmark & Bauer 2017; Mittelmark & Bauer 2022). A brief search in the medical database *pubmed* shows that salutogenesis has been mentioned more than 3.000 times in papers related to medicine, with its citations increasing in 2021 and 2022. The salutogenic orientation applied to medicine and healthcare facilities refers to an umbrella of measures that seems to merge with concepts developed in medical theory, such as the empowerment of patients in decision-making, the so-called patient-centred medicine, integrative care, sustainability measures for healthcare facilities, community-based medicine etc (Grover et al. 2021; Gartner et al. 2022, Menatti et al. 2022, 38). The salutogenic model fosters the implementation of these measures and approaches, but introduces, for instance, the application of the sense of coherence (SOC) to patients and healthcare professionals in

order to evaluate their needs and manage stressors within healthcare facilities (Pelikan 2022, 400; see also Dietscher et al. 2022).

Few papers apply the salutogenic model to the understanding of the environment and its relationship with contemporary health within and outside healthcare facilities. I propose here to apply the notion of salutogenesis to the environment-health coupling, by developing the concept of *salutogenic environments*. The latter will be distinguished from other concepts used in the literature, such for instance the notion of restorative environments in psychology. My analysis aims to provide a broader, and not exclusively pathogenic, consideration of the role of the environment in medical theory and practice. A thorough analysis of the salutogenic impact of the environment on health, its complementarity with the pathogenic one, and its possible applications to medicine and medical theory has not been conducted yet. This is the purpose of the second part of this paper.

The concept of the environment is complex and often ambiguous. Public and population health consider the (mostly physical) environment as all the non-genetic influences on the individual, including social, economic and cultural influences (Riegelman & Kirkwood 2019, 352). In this sense, the physical environmental can be understood as 1) unaltered or natural, 2) altered and 3) the built environment. This distinction is functional to the analysis of environmental diseases and injuries. For instance, the unaltered environment comprises floods and heart quakes, but also more subtle radon and sunlight, elements which are correlated to specific risks for health. The altered environment reflects the impact of chemicals, radiation and biological that human beings have been introducing in the environment and which cause risks and harm. Finally the built environment refer to how building, and related product (e.g. food, hitting, air pollution) can be a source of risk for health and also for well-being. This distinction is then related to the various ways in which human beings and environment interact, in order to assess risks both for human and ecosystems and to provide public health policies (Riegelman & Kirkwood 2019, 360).

From an interactionist perspective, human beings are continuously exposed to the environment, cope with it, and this relationship has implications for health and well-being (see Menatti et al. 2022). If public health is aimed at risk assessment of the environment, yet medicine and psychology have also focused on the positive potential of the different kind of environment, by focusing on the quality, the diversity and the possibility of use and access and social interaction which could convey restoration, aesthetical appreciation

and health and well-being outcomes. The terms used to describe the external surroundings in psychology and humanities reflect this diversity beyond the ecological characterizations of the environment: place, space, surrounding(s), greenery, green space(s), blue space(s), grey spaces, landscape(s), urban landscape(s), natural landscape, wild spaces, wilderness etc. (Bell et al. 2005).

It should be mentioned that Antonovsky does not explicitly develop a specific account of the environment and that the term of salutogenic environments has not been used. However, in many of his essays, the physical and social surroundings play an important role both in a) creating stressors – e.g. for the fact that we are exposed to pathogens and there is a ubiquity of stressors, (Antonovsky 1979, 79 and138) b) in fostering health and coping with external/internal stressors: "Stability and continuity bring us to the crux of the matter. A strong sense of coherence involves a perception of one's environments, inner and outer, as predictable and comprehensible" (Antonovsky 1979, 125). Moreover, in the literature on salutogenesis, there is a growing interest in how: "Physical and social environment can enhance well-being and performance" (Mittlelmark & Bauer 2022, 12). In health promotion research, this is referred to as 'supportive environments' (Mittlelmark & Bauer 2022, 12; see Dilani 2008) as a tool to provide an intra-personal and social application of the salutogenic theory.

Although it has not been introduced by Antonovsky for this specific purpose, the salutogenic approach applied to the environment allows us to better understand the role of the latter in medical sciences and its relation to health. Specifically, in this section I will introduce the notion of 'salutogenic environments' and discuss how it allows to: a) clarify the opposition and the complementarity between the pathogenic and salutogenic aspects of the environment; b) underline the positive and preventive aspects of the environment as related to health and healthcare facilities; c) provide a better understanding of what the role of positive and salutogenic environments can be in healthcare both from a practical and theoretical point of view.

2.1 What are the salutogenic environments and why they are important

The pathogenic account is at the basis of the majority of the works on the relationship between health and the environment. In medical documents and medical theory, the environment is mostly framed as a factor which may lead to diseases or a lack

of health in general, exemplified for instance by climate change sensitivity or the case of endocrine-disrupting chemicals.

Climate change sensitivity refers to the effects of climate change on health and well-being. As already mentioned, *The 2022 report of the Lancet Countdown on health and climate change* (Romanello et al. 2022) shows how persistent fossil fuel addiction is increasing the health impact of climate change on vulnerable individuals and communities. Extreme weather events, such as heat waves and droughts, as well as climate change hazards, such as air pollution and infectious diseases, have a devastating impact on both physical and mental health. The importance of recognizing the role of climate change on health has been growing in the last decades (Costello et al. 2009). Official medical and political documents - such as the Millennium Ecosystem Assessment (see Reid et al., 2005), the *OneHealth* approach (see Hinchliffe, 2015; Mackenzie & Jeggo, 2019) or the most recent *United Nations and the Intergovernmental Panel on Climate Change* (IPCC 2023) - call for the recognition of the impact of climate change on health and new healthcare policies. The COVID-19 pandemic has exacerbated the health and the environmental crisis; the proliferation of new infectious diseases has been recognized as an issue related to the environment and to the effects of climate change (see the notion of 'total environment' in Cazzolla Gatti et al. 2021).

The second example is the case of endocrine disruptors: the chemicals substances that alter the endocrine system of organisms[9]. The evidence on the impact of endocrine-disrupting chemicals (EDCs), especially on animals, is described by many studies. Starting from the middle of the 20th century the use of synthetic chemicals in consumer products has spread rapidly. Concern about the use of these products started in 1950 when the American biologists Burlington and Lindeman (1950) found that DDT, a pesticide for insect control commonly used in the United States at the time, has estrogenic effects on male chicks. In 1962 R. Carson shed light on DDT's effects through her book *Silent Spring* (1962) which soon became of paramount importance for the emerging American and global environmental movement. Yet, it was not until 1991 that the research on a large number of these chemicals gained attention both in the scientific and social debate, thanks to the systemization of the studies developed by T.E. Colborn. She focused on the interference of chemical compounds on the endocrine system, the reproduction and the development of wildlife and humans in the Great Lakes region in the United States

[9] https://ec.europa.eu/environment/chemicals/endocrine/definitions/endodis_en.htm

(Colborn et al. 1993)[10]. Since then, the amount of research on EDCs has increased and a large amount of evidence, mostly in wildlife and animals has been provided (see Bergman et al. 2013).

These elements fall into a pathogenic analysis of the environment. They recompile the harmful effects of climate change and of environmental contamination on the health and well-being of human beings and ecosystems. The pathogenic analysis of the environment is an important tool to understand both the current ecological crisis and what health is at the larger and often underestimated global scale in contemporaneity. More importantly, these analyses show how human beings' health is intertwined with the state of the environment and ecosystems. The proliferation of concepts such as 'eco-health' (Parkes et al. 2014), 'socioecological model of health' (Krieger 2011; Krieger 2021) or 'socioecological system health' (De Garine-Wichatitsky et al. 2021) goes in this direction, as they underline both the sociological and ecological elements that are often overlooked in public health measures. These concepts have been recently introduced in medical education and their application had been called for in medical practice and theory, more specifically in public health and health promotion.

Yet, what is almost absent in the contemporary biomedical analysis is the other side of the environment: the salutogenic one. The notion of *salutogenesis* can complement the pathogenic account in medicine and health theory and could be applied to the medicine-environment debate through the idea of salutogenic environments. I consider that salutogenic environments are all those parts of the surrounding that, for cultural, biological or ecological reasons, can have a positive effect on the health and well-being of a population, specific clusters of people, or an individual.

Even if the term salutogenic is recent, yet the positive role of the environment is not a new topic. Environmental history, history of medicine, landscape theory and human geography, have underlined a continuity in the attention to the salutogenic role of the environment from ancient times to the contemporaneity: from the ancient Persians, to the Greek Egyptian and Roman cities, to the therapeutic use of landscapes in the English Landscape Garden movement or the urban parks movement in the 18th century (Ward Thompson 2011; Milligan and Bingley, 2007; Gesler 1992; Geltner 2019; Meloni 2021).

[10] In 1991 T. Colborn organised the first of a series of pioneering meetings at Racine, Wisconsin, later known as Wingspread Meetings, where she gathered experts from ecology, medicine, zoology, and wildlife management, among others, to understand the effect of chemical contamination on human health and ecosystems. On that occasion, the concept of EDCs and the disrupting chemical hypothesis was developed (Krimsy 2000).

And again, before the XX century, healing gardens and therapeutic landscapes were designed with the specific purpose to heal psychical and mental health conditions. From the perspective of history of medicine, Rosenberg (2012) emphasizes the importance of the Hippocratic text on *Airs, Waters, Places* in this regard, as part of "a conceptual tradition that saw the body not only as situated in place, but as a continuously processing entity, always at risk as an aggregate of those elements in the natural world that sustained it" (Rosenberg, 2012, 661: see also Bashford & Tracy 2012). Rosenberg describes the Hippocratic ecological and sociological understanding of human beings, and the role of the Hippocratic physician who is: "an obligate climatologist, geographer, political scientist, and ethnographer as well as healer, a clinician urging the necessity for understanding peculiarities of place in evaluating and treating patients" (Rosenberg 2012, 661). In this sense, Rosenberg retraces these characteristics throughout the history of medicine, underlining the importance of geography and meteorological conditions for aetiology and care (without forgetting the nefarious racist implications of the climate and environmental determinism, see Livingstone 2012). However, as Rosenberg specifies, "by the mid-twentieth century this accustomed epidemiology of place had become decreasingly central in Western medicine, not so much forgotten as moved from center stage. It had become a supporting player in a little-questioned narrative of progress toward an increasingly inward and ultimately biochemical and biophysical understanding of the body" (Rosenberg 2012, 664). The body of the patient became abstracted from the surroundings and few specialists, mostly in epidemiology, social medicine and tropical medicine, kept working on the on the relationship between health, disease and environments (Nash 2006).

Despite the many examples provided by history of medicine and architecture, the salutogenic role of the environment has been progressively marginalized. Discussion of the salutogenic role of the environment is missing in philosophy of science and in most of contemporary medical theory. There are many reasons for this oblivion. One could be referred to a reductionist approach in modern sciences and medicine, which has been discussed and questioned in philosophy of science and philosophy of medicine (e.g., Ahn et al. 2006; Beresford 2010; Valles 2018, 32). This oblivion led to the lack of a relational framework of health and well-being that accounts for how the environment both supports and promotes health, besides being a source of negative impacts or risks for human beings and organisms in general. Nevertheless, such relational framework is necessary to

understand how the environment can foster health for individuals and communities and how it should be managed and protected as a source of health.

There are different reasons that support the need to re-state the importance of salutogenic environments and develop ideas in this direction:

1) first of all, the presence or absence of a pathogenic environment *per se* is not the only dimension of the relationship between health and the environment. Unhealthy states can be developed in environments with limited risks to health, and healthy states can be fostered by environmental elements. Furthermore, health and well-being are not merely the absence of disease but refer to the improvement of the general conditions in which the life of an individual or a population happens. This idea somehow recalls some assumptions of the WHO 1948 definition of health according to which health is "a state of complete physical, mental and social well-being and *not merely the absence of disease or infirmity*' (WHO 1948). In this view, health is not just the absence of a pathogenic element, but the presence of a salutogenic environment is a complementary element to be considered in a wider and comprehensive consideration of health (see also section 2.3).

2) The notion of salutogenic environments can respond to the necessity of understanding what the environment is for the health of the organism and clarify the complexity of this relationship. In the last decades, the analysis of the environment in medicine has been developed mostly with regard to the proximal environment of the organism, or with regard to environmental pathogenic elements affecting the life and development of the organism. Just recently the role of the environment has been analysed in a non-externalistic way for the organism (see Baedke & Buklijas 2022). However, we cannot understand what the environment is, as related to health, if we remain exclusively in the realm of a pathogenic account. The notion of salutogenic environments can fill this gap and provide both a more comprehensive framework and specific conceptual tools to address the relationship between health and the environment in medicine and philosophy.

3) Introducing the notion of salutogenic environments can respond to the call for a systemic, relational and ecological understanding of health by medicine in general, and specifically by medical education, medical humanities and medical theory (Coope 2021, Lewis 2021, Zielinsky 2022, Rapport 2003; Gehle et al. 2010; Young 2020; Goshua et al. 2021; Sullivan et al. 2022). The salutogenic environments are a tool which can allow to analyse the positive value of the environment on health and to foster ecological sensitivity and awareness within healthcare professionals.

4) Healthcare professionals and medical educators could benefit from the research on salutogenic environments as a new set of lenses to observe and to consider the different dimensions of the relationship between environment and health, and to apply this know-how to the caring of the patients. The salutogenic/pathogenic coupling can shed light on pivotal aspects of the aetiology, treatment, care and cure of the patient's diseases and conditions. More specifically, through the lens of a salutogenic framework and by pursuing the analysis of salutogenic environments, health professionals can understand where the patient comes from in terms of social and environmental surroundings. They can for instance evaluate the effects of climate change disruptive events on health, but, at the same time, they can assess the positive effects of the environment on the health and well-being of the patients. The salutogenic framework can provide insights about the places where patients spend their lives, concerning post-treatment, recovery and prevention. The environment of the patient has been sometimes considered in terms of social determinants of health. The environment belongs to the list of Social Determinants of Health (Commission on Social Determinants of Health, 2008; Committee on Educating Health Professionals to Address the Social Determinants of Health, 2016; see also Solar & Irwin, 2010), by referring to "housing, basic amenities and the environment", together with the various conditions which have an impact on health, among them: governance, education, employment, social security, etc. Social determinants are valuable tools in determining health risks and preventing disease in a given population (e.g., Cockerham et al., 2017; Scribner et al., 2017). They are also at the basis of recent accounts of population health (Valles, 2018). However, the reference to the environment within the social determinants of health is often generic and usually pathogenic. The concept of salutogenic environments can be considered an implementation and an amelioration of this aspect of the social determinants of health. Analysing the salutogenic environments for patients' life could allow to focus not just on the risk factors, but on all the aspects of the environment enabling health and potential of health, in the different phases of caring for and curing the patients.

5) The salutogenic framework and the notion of salutogenic environments can provide insights into the place of care and healthcare facilities. In this sense a vast amount of medical, psychological and architectural literature, as I will show, starting from the pioneering work by R. Ulrich (1984), has been demonstrating the role of the environment in fostering health and well-being inside and outside healthcare facilities. This literature provides insights into spaces, landscapes and environments which can contribute to the

health and well-being of healthcare professionals, patients and patient's families (see section 2.2).

6) From the philosophical and theoretical point of view, the notion of salutogenic environments allows shedding light differently on the contemporary evidence in medicine, environmental psychology, and architecture (based on qualitative and quantitative methodologies) that illustrates the positive role of the environment in preventing diseases and promoting health. The notion of salutogenic environments addresses the positive role of the environment for health and well-being, which has been often left unexplored n contemporary medicine. With this new perspective, it is possible to discuss, compare, and integrate theories that are used in humanities and cognitive science to justify the positive role of the environment, such as cultural theory, evolutionary biology, or theories of perception. Talking about salutogenic environment responds to a timely call about the importance of the environment in the conceptualization of health and well-being. It introduces a novel dimension in the debate in biomedical science and humanities. It may help to analyze the growing amount of evidence proposed by psychology, medical theory, and environmental sciences to provide a comprehensive, relational and situated account of health.

7) From the epistemological point of view, the discussion of the salutogenic role of the environment and the salutogenic environments has implications with respect to the literacy of medical sciences, and the communication and trustworthiness of scientific research (Douglas 2022). Relating and analyzing the effects of the environment on health should be implemented according to science-based communication and research. However, greenery and environment are often erroneously related to pseudoscience or alternative medicine, which risks undermining the research about ecological issues and impedes a psychologically and biomedically consistent consensus and evidence-based analysis of the relationship between health and the environment. This field of studies should not be left to pseudoscience, but approached, instead, with the tools of science and humanities. To avoid excess of reductionism, it would benefit from the contributions of those disciplines at the crossroads of medicine and humanities, such as philosophy of science, environmental philosophy, philosophy of medicine, medical humanities or environmental humanities. By appealing to evidence-based methodologies and scientific reasonings, the analysis developed from a salutogenic perspective could go in the direction of questioning pseudoscience in medicine (Louhiala 2010; Mukerji & Ernst 2022).

In the next section, I will discuss the antecedents to the concept of salutogenic environments and the studies on the role of the environment in fostering health, developed by research in medicine, psychology, and architecture. These works do not constitute a coherent body of research, and they are not systematized. The notion of salutogenic environments can provide a comprehensive theoretical framework that may help to make sense of or to interpret this huge amount of evidence.

2.2 Examples of positive roles of the environment and not the mere avoidance of pathogens

In the contemporary literature the positive role of the environment and its salutogenic potentialities have been partly identified by environmental psychology, cognitive sciences, and also by architecture through evidence-based studies and by pursuing a scientific assessment of the role of the environment on health. These disciplines analyse the beneficial effects of green/blue natural and urban spaces on health and well-being, in terms of cognitive, biophysical, and psychological outcomes.

A large variety of studies encompasses and looks beyond the mere aesthetical pleasure obtained when just looking at landscapes and environments, by pursuing scientific-based analysis both of the ecological preferences and the outcomes of the environment on health and well-being (Menatti & Casado 2016; Twohig-Bennett & Jones 2018). The topic is not new in the history of medicine and architecture, as shown in section 2.1.

In the last decades, medicine and psychology have provided evidence with regards to the role of the environment in the prevention and the treatment of diseases, and also in ordinary life, by stating that the mere presence or physical activity in green spaces already improves the quality of life (Ward Thompson et al. 2010). Green playgrounds, parks and urban landscapes are considered as capable to improve mental and physical health, as well as cognitive abilities and social engagement (Gascón et al. 2015; Twohig-Bennett and Jones 2018). Psychology usually employs the notion of ‘restoration’ or ‘restorative environments’ meaning those natural or urban green spaces which have a potential in restoring attention and reducing stress. As such, the concept was introduced to study how green spaces could mitigate a pathogenic condition such as stress and attentional fatigue. Several studies of non-patient groups indicate that viewing nature even briefly can

produce substantial restoration from stress, also during the COVID-19 pandemic (Labib et al. 2022, see also Ulrich et al. 1991; 2008, Parson & Hartig et al. 2014). Restoration is usually associated with place attachment, identity, sense of place, bonding etc, with reference to cultural, biological and evolution-based theoretical explanations (see Kaplan 1995; Menatti & Casado 2016; Menatti et al. 2019; Scopelliti et al. 2019). More recently, environmental psychology has also widened the analysis of greenery in the enhancement of social interaction, equality and cognitive abilities in different clusters of people[11]. The methodology used is based on qualitative and quantitative methods (pre-post studies; observational studies, surveys, studies based on biomarkers, analysis of heart rate measures, and brain activity etc, see for instance the recent Song et al. 2020). The role of natural landscapes and environments is also considered pivotal in the reclaiming of the *Land* by native communities. Deep cultural reasons are in this case intertwined with psychological and ecological ones (Hatala et al. 2020).

Less studies have been developed inside healthcare facilities, about the use of natural environments within the walls of the hospitals or as a part of the prevention and treatment of health conditions. Nevertheless, there are evidence-based studies that have been conducted with this respect and are worthy of interest. One of the first in terms of time is a study dated 1984, in which R. Ulrich demonstrated that a view through a window could influence recovery from surgery. The study was pioneering in environmental psychology, as it shows that patients in a suburban Pennsylvania hospital between 1972 and 1981 who were assigned to a room with a window view of a natural setting had shorter postoperative hospital stays; received fewer negative evaluative comments from nurses' notes; took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brick building wall. Statistically significant differences were found between the tree-view patients and brick wall-view patients regarding patient length of stay, pain medication use, and nurse notes. Even if we can identify a few limitations, such as the separation between natural and urban landscapes and the lack of consideration of cultural preferences in evaluating the restoration of the environment[12],

[11] Recently, a chapter by Lindern et al. (2022) has applied the concept of salutogenesis to explain *a-posteriori* those evidence-based studies developed in psychology about the so-called 'restorative' role of the environment. We find also different papers in psychology which have included the term 'salutogenic' as synonymous with restorative in their vocabulary, yet without clearly referring to Antonovsky's theory (e.g. Ward Thompson et al. 2014).

[12] The limitations were acknowledged by Ulrich himself, for example when he referred to the "built" view in this study (a largely featureless brick wall) he observed that it was a comparatively monotonous one, thus the conclusions of the research could not be extended to other types of built views. The conclusions

yet this paper was very influential for the implementation of the psychological research on the role of the environment, the landscape and what is today defined as greenery (in its real presence or just a view) inside healthcare facilities. The literature on this topic in psychology, sciences, and humanities has increased since then (e.g., Whitehouse et al. 2001; Devlin et al. 2016; Ulrich et al. 2020).

In medicine, in the last decades, the environment has been used as a tool (as a visual image, art-piece) in the treatment of pathologies and the examination process. Large images of natural environments have been combined with nature soundtracks to reduce stress and agitated behaviour in patients with dementia, including Alzheimer's (Whall et al. 1997) and to alleviate the pain of patients during invasive examinations (the so-called distraction theory (McCaul & Malott 1984; Miller et al. 1992; see also Malenbaum et al. 2008).

In architecture and landscape architecture, the main data about the interaction between environments and patients or healthcare professionals are mostly related to the so-called 'evidence-based design (EBD). Evidence-based design, by following the general paradigm of evidence-based medicine, attempts to measure the physical and psychological effects of the built environment on its users. The EBD studies show that the use of landscapes/greenery or natural environments inside healthcare facilities provides a reduction of infections, implies less stress for medical staff and improves the quality of perceived healing in different categories of patients (see for this Becker & Jones-Douglas 2006; Cooper-Marcus & Sachs 2013; Pedrinolla 2019).

A review of the positive effects of the environment on health and well-being is an important complement to the negative (pathogenic) ones. As already stated in section 2.1, the absence of negative effects does not necessarily mean positive outcomes for health and well-being. The literature about the negative effects of the environment on health - e.g. the one coming from climate change - is growing every day, and rightly so, while attempting to foster ecological awareness in medical education and contribute to sustainability sciences. This literature refers to the pathogenic role of the environment on health. Yet, taking into consideration also the positive effects of the environment could

cannot be extended also to other patient groups, such as long-term patients, who may suffer from low arousal or boredom rather than from the anxiety problems typically associated with surgeries. "Perhaps to a chronically under-stimulated patient, a built view such as a lively city street might be more stimulating and hence more therapeutic than many natural views. These cautions notwithstanding, the results imply that hospital design and siting decisions should take into account the quality of patient window views" (Ulrich 1984:2).

help to fully grasp the role of the environment on health and could have important consequences on the way we design, manage and protect our surroundings (Roe & McCay 2021).

In conclusion, evidence from medicine, psychology and architecture shows 1) that the environment can be a topic of study in health sciences, both from the salutogenic and pathogenic perspectives; 2) that until now the role of the environment has been mostly analyzed in finding a solution to a pathogenic condition, such as stress, fatigue, lack of concentration etc.; 3) that the salutogenic environments are not just a way to avoid stress or restore an attention problem, but are the general way to foster health and well-being among people.

3. Conclusion

Research in medicine is increasingly calling for the importance of considering the environment and climate change issues in medical theory, education and healthcare practice. In this paper, I have analysed how the ecological dimension of health in medical sciences can be understood and enhanced through a salutogenic approach, first introduced by Antonovsky (1979; 1987; 1996). I have adapted the salutogenic approach to the current healthcare scenario to provide a better understanding of the relationship between health and the environment. I have first analysed the difference between pathogenesis and salutogenesis in medicine, two concepts that are mostly overlooked in philosophy. I have then applied the salutogenic framework and more specifically the concept of 'salutogenic environments' to the analysis of the contemporary environment-health coupling. This research shows that a salutogenic approach is pivotal both in theory and in medical practice as it: 1) underlines the positive and preventive aspects of the environment as related to health 2) allows to clarify the opposition between the pathogenic and salutogenic aspects of the environment

This paper is a first attempt to introduce the salutogenic framework in the philosophical community and establish new bridges between medicine and philosophy.

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