

# **Towards Neuroecosociality: Mental Health in Adversity**

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## **PLEASE DO NOT QUOTE**

### **Abstract**

Social theory has much to gain from taking up the challenges of conceptualising 'mental health'. Such an approach to the stunting of human mental life in conditions of adversity requires us to open up the black box of 'environment, and to develop a vitalist biosocial science, informed by and in conversation with the life sciences and the neurosciences. In this paper we draw on both classical and contemporary social theory to begin this task. We explore human inhabitation - how humans inhabit their 'ecological niches' - and examine a number of conceptual developments that 'deconstruct' the binary distinction between organism and environment. We argue that we must understand the neurological, ecological and social pathways and mechanisms that shape human (mental) life if we are to address the central concerns of our discipline with inequity and injustice as these are inscribed into the bodies and souls of human beings.

**Key words: mental health, social determinants ecosocial theory, adversity, niche, affordance**

It is time for those concerned with social theory to engage – or re-engage – with questions of ‘mental health’.<sup>1</sup> Half a century ago, these questions were recognised to be at the heart of our understandings of the social world – whether in the work of Erving Goffman, Michel Foucault, R. D. Laing, Frantz Fanon, Dorothy Smith, Phyllis Chessler, Elaine Showalter, Thomas Scheff... Issues of power, dividing practices and social exclusion, social control and resistance, subjectivity and subjectification, normality and normalisation, knowledge and its institutional forms of authority – all these and more were not merely central to our understanding of what had become termed mental illness, not merely crucial for the reform of social practices towards those who were ‘different’, but also fundamental to the understanding of the injustices embedded in our historical and contemporary forms of life. Yet at the very time when ‘mental health issues’ suffuse popular debate, and when social epidemiologists have demonstrated the crucial role of ‘social determinants’ of mental health, these questions seem to have been marginalised in social theory, and become the concern of a disciplinary sub-speciality. It is high time this situation changed. However our aim in this paper is not to produce a manifesto, but to show some of the ways that a reengagement of social theory with questions of mental health will not only radically improve our understanding of the social shaping of subjectivity, but can also play a part in ‘revitalising’ sociology itself.

## **Beyond ‘social determinants’**

Let us begin with a seemingly simple question: how can one account for the evidence on ‘the social determinants of mental health’? The findings that mental ill health is exacerbated by conditions of social adversity are consistent and widely accepted (World Health Organization, 2014). Researchers have shown that particular groups seem to be more vulnerable to the development of mental ill health than others, for example people who live in large cities (especially in Northern Europe) (Kirkbride, Keyes, & Susser, 2018), migrants (Morgan, Knowles, & Hutchinson, 2019), or more generally those who experience social disadvantage and inequality (Fett, Lemmers-Jansen, & Krabbendam, 2019; Patel et al., 2018). The conditions involved range from psychotic experiences and psychoses to the more ‘common’ problems of mental ill health, such as anxiety or depression that afflict almost all of us at some time in our lives (March et al., 2008; Vassos, Agerbo, Mors, & Pedersen, 2016).

While this evidence is largely correlational, a large range of ‘social factors’ have been hypothesised to explain how social environments lead to mental ill health. Many of these focus on the experience of poor care-giving, stress, trauma, environmental insults and

nutritional deficits in the early years and even the pre-conception period. Prominent here are those that focus on Adverse Childhood Experiences (ACE) (Felitti et al., 2019) or on the Developmental Origins of Health and Disease (DOHaD) (Gillman, 2005). These arguments, which have had considerable impact on social policies, often unwisely ground their biological claims on unwise extrapolations from laboratory experiments with rodent models (Prescott & Logan, 2016) but are seldom the topic of sustained theoretical attention from social scientists. Some psychiatric epidemiologists have adopted the term 'social capital', suggesting that experiences of adversity, even in those who are 'vulnerable' for genetic or other reasons, can be mitigated by high levels of 'social capital', in particular the existence of, or belief in, available support systems from family, peers, community or professionals. However they seldom show much familiarity with the arguments of Pierre Bourdieu or James Coleman, or with the subsequent work of social theorists on these issues, and their research is plagued by problems of definition and interpretation (Moore & Kawachi, 2017). A number of hypotheses have been proposed to account for the 'mechanisms' or 'pathways' by which these experiences of environmental adversity have their mental and cerebral effects: stress, inflammation, microbiomics, exposures to environmental insults – often via epigenetic effects on gene expression in the brain or via processes of neuroplasticity; many of these have now become the topics of popular books (Arden, 2010; Bullmore, 2018; Doidge, 2007; Yong, 2016). Once more, however, there is a notable failure to engage with sociological or anthropological research on the ways in which human beings live their lives and manage their corporeal existence in such challenging circumstances: claims about 'how the [adverse] environment gets under the skin' often rely on shaky extrapolations from laboratory experiments.

So can social theory contribute to an understanding of what constitutes 'the environment' for a human being, living in adversity or otherwise? In this paper, drawing on both classical and contemporary social theory, we develop some ways of opening up that black box of 'environment'. We explore the nature of human socio-cultural inhabitation, the ways that humans inhabit their 'ecological niches' and examine a number of putative pathways that 'deconstruct' the binary distinction between organism and environment. This is part of our broader wish to contribute to a revitalized relationship between sociology and psychiatry, and indeed to a new 'vitalist' biosocial science (Fitzgerald, Rose, and Singh 2016). A focus on mental health – and mental life more generally - demonstrates the need for concepts that can not only enable us to generate a more biosocial account of the shaping and stunting of human mental life, but also contribute to a vitalist biosocial science, informed by and in conversation with the life sciences and the neurosciences. Such an

attention to the neurological, ecological and social pathways and mechanisms that shape human mental life is required to address the central concerns of our discipline with the consequences of inequity and injustice as these become inscribed into the bodies and souls of human beings.

## **Beyond Ecosocial Theory**

In her now classic paper of 1994, "Epidemiology and the web of causation: has anyone seen the spider?" Nancy Krieger argued that we needed to go beyond thinking of factors shaping health in terms of 'multiple causation' and 'multifactorial etiology' to develop "the concepts and framework of what might be termed epidemiologic theory, ie explanations of the current and changing health status of human societies" (Krieger, 1994: 887). For her, this was a task which had to go beyond just modelling complex relations among risk factors, in order to understand the origins and implications of those factors for the societal dynamics of health and disease – that is to say, her view was that we need concepts and theories and not just methods. However powerful the multicausal view enshrined in 'the web of causation' might be, her assessment was that in most cases the choice of the 'components' that appear in the web was not specified: the web remained merely a description of interrelationships among risk factors, and "was not elaborated to provide *explanations* of causal links" (ibid., 891). But, argues Krieger, it does actually contain an implicit 'model', simply by levelling all distinctions and focussing on those risk factors closest to the 'outcome' – the disease which is being investigated. This makes it easy to suggest that the direct causes of disease lie in individuals, either in their biology or in their lifestyles, and to ignore questions concerning why some populations have higher levels of a particular disease. She argues that this 'biomedical' framework emphasizes biological determinants of disease divorced from their social context, that are amenable to biomedical intervention on affected individuals: it views populations merely as the sum of individuals, and relegates social determinants to secondary importance. On the other hand, she argues, approaches developed from 'social medicine' explore population level differences between social groups - in terms of gender, ethnicity, employment status, or area of residence – asking how "individual's membership in a society's historically forged constituent groups shapes their particular health status, and how the health status of these groups in turn reflects their position with the larger society's social structure" (ibid.) But, she argues, despite their crucial focus on social inequality, these alternative approaches lack "a theoretical framework that truly integrates social and biologic understandings of health and disease." (ibid.: 894). This theory, which she terms 'ecosocial epidemiological theory', remains to be conceived. In this and subsequent papers, Krieger

stresses the need to grasp the ‘dynamic intertwining’ of the social and the biological from the level of populations to the level of cells, and across the socially shaped everyday lives of individuals. However, she provides few clues as to how this is to be done. The ‘ecosocial’ approach that she hopes will displace the deeply flawed ‘multivariate’ framework underpinning the ‘web of causation’ metaphor, remains to be articulated.<sup>2</sup>

We agree with Krieger that we need to reject the biomedical individualism implicit in many epidemiological theories and look instead to “the link between social divisions and disease to understand etiology and improve the public’s health” (ibid.: 899).<sup>3</sup> The area of mental health is a good one to pursue these issues, as individualistic and biomedical models have flourished, despite the clear evidence of consistent patterns of inequality in mental health between population groups shaped by social inequity. Within this field, urban mental health provides a good case study: since the mid-nineteenth century intellectuals, politicians, philanthropists, followed by psychiatrists and sociologists, have wondered why both common and severe mental disorders are more prevalent in cities in cities. While some have suggested that this is because those who are most vulnerable ‘drift’ into urban ghettos, others have argued that something in the urban environment itself is responsible. But what? Is it that towns and cities contain more migrants, who are in some way more vulnerable, or are subject to discrimination and social exclusion, or perhaps to social defeat, or is it a consequence of increased stress in the urban environment, or poverty, or low levels of ‘social capital’ or high levels of social isolation, or increased cannabis use, or pollution.... All these factors and more have been associated epidemiologically with poor mental health in urban situations, but there is a notable lack of clarity as to which are significant and in what circumstances (Author 3, 2019).

Perhaps the most well known attempt to diagram all these potential processes that affect individual health is Bernice Pescosolido’s Network-Episode Model or NEM (Pescosolido, 2006, 2011). As Author 3 points out, this “includes a time dimension covering an individual’s life course, and a number of analytical levels, connected by networks, ranging across the biological, personal, social, and system levels” (Author 3, 2019: 7). In her early statement about the development of the NEM, Pescosolido emphasises the crucial importance of “conceptualizing the *mechanisms* driving the impact of environmental forces” and the need to provide a unified way of grasping how “large, abstract structures in the complex environment affect individuals, biological processes, medical conditions, and treatment use or outcome” (Pescosolido, 2011: 194). Yet the diagram she provides to illustrate these relations seems to illustrate the cliché that if everything is important, nothing is important. Without a conceptual framework to enable one to identify which particular

levels or interactions are important, when and how, the model merely acts as a general sensitising guide. Using the term 'network' does nothing to add precision to our understanding of the interacting multifaceted, multilevel, multivariable, dynamic processes between everything from molecules to medical care facilities.<sup>4</sup>

Would we do better if we were to move from thinking about networks to thinking about mechanisms? Contemporary social science often seems reluctant to address mechanisms (Author 3, 2019). Consider, for example, the frequent resort to Socio-Economic Status (SES) in explanations of differential rates of illness. Bruce Link and Jo Phelan have argued that we should think of SES as a 'fundamental cause' of the inequalities in health; we should not seek finer and finer elucidation of the multiple risk factors that might account for such inequalities, but recognise that economic inequality is 'the cause of causes' (Phelan & Link, 2010, 2013; Phelan, Link, Diez-Roux, Kawachi, & Levin, 2004). It is easy to see the attraction of such an approach, especially in its opposition to the individualism of much biomedicine. But the definition and measurement of SES vary greatly between different studies and remains contested among health and other researchers (Oakes & Rossi, 2003)<sup>5</sup>: whatever definition used, SES is not only a very crude measure of inequities of power and resource, ignoring multiple dimensions of race, gender and geography which are particularly crucial in relation to health. And, of course, while SES correlations might provide hypotheses as to key factors involved they completely sidestep the analysis of the mechanisms by which such inequality manifests itself in rates of illness and hence give us few clues, short of radical social transformation, as to explanations, let alone interventions. How about the use of the concept of 'social capital' to account for inequities in disease incidence and health outcomes. The idea appeals to a certain common sense – surely having lots of ties with others and social support must be salutary. But, as we have mentioned, reviews of the research have shown that 'social capital' is defined and operationalised in so many ways as to be virtually meaningless (Almedom, 2005; Ehsan & De Silva, 2015; Moore & Kawachi, 2017). How about the long held belief that the pathways from urban life to poor mental health have something to do with 'stress'? Again, this explanation appeals, not least because stress does appear to be both a description of a certain kind of social experience arising from adversity, and a mechanism by which that experience is embodied. But a glance at the history of stress based explanations reveals the problems that have dogged those who have sought to specify these stress pathways either sociologically or biologically – from Hans Selye's 'general adaptation syndrome, to Bruce McEwen's arguments concerning 'allostatic load' (Jackson, 2013). When stress theories are operationalised in research, they have generated highly inconsistent results, not least because of the variation in the

biomarkers that have been used as proxy measures of stress (Author 3, 2019). Other options available in our sociological tool bag – for example those focussed on small group relations or interaction ritual chains – also imply mechanisms even though these are seldom discussed in any detail. And while some may feel that the ‘mechanical’ form of explanation is inappropriate for the human sciences, even when the term is not used and the pathways are not explicated, sociological and anthropological accounts of the interactions between humans, and their social and material milieu inescapably embody many unspoken premises about mechanisms.

In the papers that followed her 1994 question ‘where is the spider?’, Krieger argued that what is needed is not more empirical research, however ethnographically detailed or experimentally robust, nor more complicated diagrams of the multiple factors and dimensions that may affect any one individual’s pathways to ill health but which are only intelligible in each specific case; what was needed was ‘theory’ (Krieger, 2001, 2014). We take this to mean that we need ways of conceptualising the causal pathways – what Keys and Galea term the ‘causal architecture’ (Keys & Galea, 2017) – that can underpin ecosocial rhetoric, and provide us with hypotheses to explore in empirical work, and to underpin effective preventive ecosocial interventions. While acknowledging the philosophical debates here, for the purposes of this paper, we will adopt a definition of a causal pathway that mirrors Williamson and Illari’s definition of a mechanism: “entities and activities organized in such a way that they are responsible for the phenomenon” (Illari & Williamson, 2012: 132, quoted in Author 3, 2019: 4). So, we shall ask, what are the specific organizations of entities and activities that constitute the causal pathways for the different kinds of phenomena that are, today, usually thought of as poor mental health.<sup>6</sup>

## **What is ‘a city’?**

A group of neuroscientists have recently argued that we need a new interdisciplinary endeavour – “neurourbanism” – to study the relationship between urban living and mental ill health (Adli et al., 2017). We are not unsympathetic to this endeavour. But we need to question the way it is framed. The authors argue that the need for such a new discipline is urgent given that currently “every second human being lives in a city... and by 2050, 70% of the world’s population will be living in urban environments” (ibid.: 183). They echo many, notably the United Nations, who have been asserting, at least since 2006, that we are now in an ‘urban age’ in which, for the first time in history, the majority of the world’s people live in cities (Habitat, 2006). But what, exactly is ‘a city’? While a city may be denoted by a proper name, that name – London, Manchester, Berlin, Shanghai, Lagos, Mumbai... hardly

individuates some coherent milieu, a singular form of life, a common set of exposures and so forth. Indeed Brenner and Schmid have argued that the idea that the world is divided into discrete types of settlement that can provide the basis for conceptualisation of historical trends and geographical differences, is both statistically problematic and conceptually incoherent (Brenner & Schmid, 2014). Statistically problematic because it depends on the variable ways in different countries and different agencies draw the boundaries of urban territories by defining a threshold of population (an urban population threshold or UPT) that determines when a territory should be classified as 'a city.' Only administrative categories define the boundaries of Greater London or the São Paulo Metropolitan Area or the Municipality of Shanghai... Thus Brenner and Schmid argue that the widely repeated claim that we live in an 'urban age', based on the numbers, is a statistical artefact: arbitrary, empiricist and ahistorical.

Indeed, as they point out, this was recognised long ago by Louis Wirth, for whom the "characterization of a community as urban on the basis of size alone is obviously arbitrary" (Wirth, 1938:4): for Wirth we needed a sociological definition of a city (Wirth, 1938: 1):

For sociological purposes a city is a relatively large, dense, and permanent settlement of heterogeneous individuals. Large numbers account for individual variability, the relative absence of intimate personal acquaintanceship, the segmentalization of human relations which are largely anonymous, superficial, and transitory, and associated characteristics. Density involves diversification and specialization, the coincidence of close physical contact and distant social relations, glaring contrasts, a complex pattern of segregation, the predominance of formal social control, and accentuated friction, among other phenomena. Heterogeneity tends to break down rigid social structures and to produce increased mobility, instability, and insecurity, and the affiliation of the individuals with a variety of intersecting and tangential social groups with a high rate of membership turnover. The pecuniary nexus tends to displace personal relations, and institutions tend to cater to mass rather than to individual requirements.

For Wirth, urbanism was a way of life that was bringing more and more people under its spell, wherever they happened to live, drawing even the more remote parts of the world into its orbit. But his insistence that there is some kind of sociological coherence in the urban way of life does not stand up to inspection. If we think of the cities of the nineteenth and early twentieth centuries we only need to view Hogarth's images, to read Mayhew's accounts, to follow Charles Booth as he tramped the streets or to consider the maps made by Wirth's own Chicago School to recognize the heterogeneity of the urban experience, and the



multiple modes of life, the multiple, promiscuously inter-pollinating 'cultures' that have been characteristic of cities from Moscow to Mumbai, from Shanghai to Valparaiso, from Istanbul to Khartoum.<sup>7</sup> The claim that there is a sociological coherence to the urban experience is evidently false: if cities have any defining characteristic it is that, perhaps in opposition to life in the countryside, the territories delimited by city boundaries, however drawn, are not singular but multiple: there have always been many 'cities in the city'.<sup>8</sup> We can concur with Brenner and Schmid, that the current argument about 'urbanization' often involves a lumping together of the diversity of both urban and rural in a way that renders the categories virtually meaningless. If we accept that the urban is a theoretical category – and one whose statistical and demographic foundations are very shaky – it “cannot be plausibly understood as a bounded, enclosed, site of social relations that is to be contrasted with non-urban zones or conditions” (ibid.: 20). The urban experience that we need to grasp today, is actually a process of movement, of change, of constantly transforming relations. This is in part because of the centrality of the figure of the migrant to contemporary urban life – not the migrant as exception, no matter how vital refugees and asylum seekers are to our present. But the migrant as actually constitutive of the modern urban experience, both in the Global North, where, for at least two centuries, cities have grown through the constant inflow of those from elsewhere, and where the former industrial cities of the global north are hollowed out by global movements of capital, the collapse of 'traditional' patterns of employment, and the flight of those who can move to places where they imagine they will find better prospects. But also in the Global South, where megacities have grown through incorporation of the countryside, and through constantly changing patterns inward movements of people from villages and small towns in the hopes of better lives for themselves and their children.

How, then, to break up the city, to fragment and multiply 'urbanism' as a diversity of the experience of mobility and change, of highly unequal ways of life, lived in highly unequal spaces of inhabitation? What concepts shall we use if we are to try to specify 'the urban environment' or 'urbanicity' in a way that grasps the actual experiences of those who inhabit those endless flows, and roiling practices that we call cities. To address these questions is not just essential to grasp the relations between the experience of adversity and the experiences of mental distress. It is also crucial, we argue, if social theory more generally is to be able to conceptualise the multiple processes involved in the ecosocial shaping of human subjectivity, and their consequences for inequality and injustice.

## **Beyond the 'ecosocial'**

We need to change our point of view. We need to move from the bird's eye views of the map makers, the planners, and the demographers, and from the generalizations favoured by builders of macrosocial theory, to the experiences of those who live their lives in those places we call cities. Not raw experiences, of course, and not individual experiences – we are social scientists enough to know that experience always arises out of encounters with the material and social world, as these are processed by languages and suffused by affects and memories. It is these encounters which shape experience, or perhaps better, which render living experienceable. And not static, for as we have said, lives lived are always lived in motion across space and time – trajectories rather than states – within which – to use the language of mental health – they are rendered vulnerable or accorded certain capacities for resilience.<sup>9</sup> As our argument started from the ecosocial, let us start with one of the foundational concepts of ecology: the ecological niche.

### *Ecological niches*

The Oxford English Dictionary reminds us that the idea of a niche pre-dated its uptake in ecology. A niche can mean a small space, a hole, a lair, a place of refuge, or a particular social position that suits a particular character (as in “I have found my niche at last”). Daniel Gibson-Reinemer suggests that we can still see vestiges of the earlier senses in current ecological thought (Gibson-Reinemer, 2015). The OED defines the ecological sense of ‘niche’ as “The actual or potential position of an organism within a particular ecosystem, as determined by its biological role together with the set of environmental conditions under which it lives.” This definition treads rather roughly over several decades of ecological debate, notably about the distinction between the idea of a niche and the idea of a habitat.<sup>10</sup> We favour the arguments of those who combine the two – niches are relational on the one hand (one organism's niche is always established in relation to all the others) and substantive on the other (a niche implies a certain mode of life of the organism within a specific habitat in an ecological system). We thus start from an ecological idea of a niche as a location within a material and vital milieu – that is to say a milieu made up both of physical properties and of other organisms – that can be occupied by a particular organism with its mode of existence, diet, temperature range, reproductive requirements and so forth, over a specific time range.

We are not the first to argue for the utility of ‘the niche’ for social analysis. For example, Ian Hacking argued that the condition once known as ‘fugue’ – which combined a confusion about personal identity, character and history with a compulsion to travel – could

only exist in a niche shaped by the diverse socio-political and material circumstances of Europe (and, especially, France) in the late 19<sup>th</sup> century, for example the need for people to carry identity papers with them which enabled their movements to be tracked (Hacking, 1998). Others who have used the word have not worried overmuch about its conceptualisation.<sup>11</sup> But we *are* concerned with conceptualisation, especially if we are to narrow our focus from the milieu occupied by a 'species' to the diverse milieux - the multiple habitats - that underpin the forms of life of groups of humans divided by age, gender, ethnicity, economic resources, housing situation and more, and which shape them as biosocial beings. Can we use our conception of niches - as trajectories across time and space, composed of relations and transactions with humans, non-humans, the socio-material environment, shaped by language, meanings and memories and suffused with affects - to grasp the heterogeneous forms of human life that coexist, interrelate and cross-pollinate in the space of a city?

Consider, for example, Greg Downey's discussion of urban niche construction in his study of street children in Brazil, which he refers to as "a limit case showing the challenges of living in the city as an ecological niche" (Downey, 2016: S52).<sup>12</sup> The niche for these children is both pre-shaped for them, and requires a constant labour of active recreation, encompassing their daily journeys from the favelas, derelict buildings or vacant spaces where they sleep, to the places where they work, to the traffic ridden streets, road junctions, pavements or elsewhere, where they make a bit of money by begging, watching parked cars, selling sweets on the buses, or by theft. Daily, "[t]hey navigated dangerous traffic, picked their ways through unmapped favelas, evaded police and private security, and organized themselves for personal safety and conflict resolution" (ibid.: S52). They have devised forms of conduct which make their lives possible, in which they forage for food, visit charity kitchens and meal programmes or find other ways of securing their means of subsistence - for example by procuring meals from restaurant left-overs - in this niche they have collectively constructed for themselves. This is not a form of life without morals and mores - some studies remark on the prevalence of food-sharing among street kids, and the shame attached to scavenging and stealing. But in this form of life, their patterns of interaction with their material and social milieu means that they are exposed to particular forms of hostile interaction, violence and accidental injury. Their lives in this niche expose them not only to potentially hostile humans, but also to pathogens and parasites, and hence to certain types of diseases such as dysentery and perhaps HIV. There is not a form of life with access to adequate sanitation, and they rarely participate in programmes of vaccination. In some ways their niche protects them from the obesity that is prevalent

among those in poverty, who are constrained by an obesogenic milieu to industrialized food high in calories, fats, salt and sugar that wreak a high metabolic toll. But the diet achieved by foraging is restricted, limiting available calories and often resulting in malnutrition. As for mental health, we know too little: we are wary of extrapolating from general findings about the links between urban life and mental health, but it is clear that their lives are suffused with anxiety, fear and stress.

Street kids exemplify only one possible mode of inhabitation of the city. *Naked City*, the US police drama of the 1950s and 1960s set in New York City, inspired by the 1948 film of the same name, concluded each episode with the words "There are eight million stories in the naked city. This has been one of them." There are, we believe, fewer than eight million niches in New York, Rio, São Paulo or any other city; if this has been one of them, our task is to find ways go beyond description of each as a unique life story - to characterise and conceptualise them.

### *Affordances*

The niche of these street children makes possible, and is made possible by, certain ways of living a life. James Gibson's concepts are helpful here: a niche *affords* certain ways of acting. The notion of affordance refers to the inseparable interconnections that sentient, meaning-making, intentional organisms have with their environment. It thus transcends the dualism of interactionist accounts of the relation of 'environment' and 'individual' (Gibson, 1979: 127):<sup>13</sup>

The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment.

Certain material features engage with those humans co-present with them in that niche, making certain ways of acting possible (or impossible). Barry Smith puts it rather well (Smith, 2009: 125-6):

Each type of organism is tuned in its perception and action ... to objects ('affordances') which ... together form what Gibson calls the organism's 'ecological niche'. [A niche] embraces not only things of different sorts but also shapes, textures, boundaries (surfaces, edges), all of which are organized in such a way as to enjoy affordance-character for the animal in question in the sense that they are relevant to its survival. The given features

motivate the organism; they are such as to intrude upon its life, to stimulate the organism in a range of different ways.

Affordances thus 'attune' those who inhabit certain locales to a particular socio-cultural world. Gibson used the example of how a postbox affords the mailing of letters (Gibson, 1979: 138). There is no "phenomenal" postbox, no postbox as it appears for us, in the "mind": "the real postbox (the *only* one) affords letter-mailing to a letter-writing human in a community with a postal system. This fact is perceived when the postbox is identified as such, and it is apprehended whether the postbox is in sight or out of sight" (Gibson, 1979: 139, emphasis in original). The same is true of the telephone box in many parts of the world – it used to afford certain types of conversation, but no more. This is not a matter of a human being superimposing 'meaning' onto the postbox or the phone box; physical objects in any particular human niche are suffused with specific socio-cultural values and meanings that are made possible by and enable that form of life (Costall, 1995). To quote Barry Smith again (Smith, 2009: 125):

the sentient organism is housed or situated within a surrounding environment of which it serves as interior boundary... In perception, as in action... we are caught up with the very things themselves in the surrounding world, and not with 'sense data' or 'representations' ... [but a] direct linkage between the perceiving organism and its environment which grows out of the fact that, in its active looking, touching, tasting, feeling, the organism as purposeful creature is bound up with those very objects ... which are relevant to its life and to its tasks of the moment.

Gibson is a realist, but not in the sense framed by Cartesian dichotomies: it is not a question of whether what is external to an organism exists or does not exist, but rather that, the world for any organism, is dependent on its location in space and time, its perceptual capacities, its array of saliences, and the ways in which it seeks to fulfil its needs and aspirations.<sup>14</sup> In this sense, Gibson can also be thought of as a neovitalist: living organisms strive to exist, and act in their niches in ways that are consistent with that striving. We do not need to invoke any mysterious 'elan vital' to account for this: as Thomas Osborne has argued, drawing on Canguilhem's discussion of vitalism "[t]he organism is only such in relation to an environment with which it interacts ... a milieu which it establishes; and this environmental relation is dynamic, polar – a matter of struggle and of the permanent, threat of disequilibrium, breakdown and ultimately extinction" (Osborne, 2016: 194).<sup>15</sup>

Now for some creatures, such as the tick (to take the famous example used in the writings of the biologist Jakob von Uexküll, to whom we will return), the attunement

between the organism and its environment is fixed by evolution. But for many sentient beings, such saliences are not fixed, but shaped by neural inscriptions or memories suffused with affects of joy, fear, and even expectation – the dog and its bowl or lead, the horse and its saddle, bridle and rider – each is inscribed with a certain impulse to action – to drink, to trot... - which can of course be reinforced by rewards and training (see, for example, Wolfe, 2003). And for the human, and no doubt for other creatures too, con-specifics are included in the field of affordances, and so many features of those others – from their posture and gestures, to their facial expressions, to their behaviour more broadly, can ‘afford’ particular kinds of responses.<sup>16</sup> These affordances are shaped, not merely through memory but by language, meaning and symbols, each and all infused with affects, even though many of these saliences that are relevant to our lives and to our tasks of the moment, are often not conscious, and indeed sometimes so habitual that some sociologists might not even class them as actions at all.<sup>17</sup> And, of course, the ways that humans, in their various niches, give meaning to the world, the forms of knowledge they draw upon, the meanings they accord to signs and symbols, the things they believe to be true, their senses of justice and injustice – all these are not individual, but are shaped by the thought worlds that they occupy.<sup>18</sup>

Thus, for those Brazilian street children, pavements may afford sleeping, pockets may afford pick-pocketing, dumpsters may afford scavenging and so forth.<sup>19</sup> For that master-describer of the social life of small urban spaces, William H. Whyte, walls and steps in city squares in addition to their planned function, afford office workers and tourists sitting and eating lunch; different structures for shop doorways afford certain types of meeting, peering as well as entry and exit, pavements of certain dimensions afford some gathering and conversing and so forth (Whyte, 1980, 1988). But, of course, the affordances for humans are highly segmented: even thinking in gross and simplistic categories about these city squares, we can see these inequities for men and women, old and young, rich and poor, working or unemployed, tourists or favela dwellers... While from the perspective of a GPS, they may dwell in the same co-ordinates, forms of life are attuned to highly differentiated niches: bodies, brains, microbiomes become differentially ‘tuned’ to their affordances, which are suffused with affect and meaning. A building, a street corner or a park may, for some, be suffused by hopes and dreams, and for others, by visions and voices opaque and hidden to others. A pavement of a certain size affords the physical act of lying down for the billionaire as much as for the homeless child in Brazil, but while this may be sleeping for the street child, for the billionaire it is more likely to be falling down drunk, or after being struck by a stroke.<sup>20</sup>

Unlike robots, then, the vitality of human bodies—breathing, walking, grasping... entails constant attunement with affordances – smell, touch, relation to physical surfaces, not pre-programmed but constantly recreated in action, both willed and habitual. Before we suggest some ways that we might map the affordances of a particular niche to those humans who inhabit it, let us consider the neural and mental life of niches in some more detail.

### *Umwelts*

We have described the niche of Brazilian street children in terms of material features such as streets and deserted dwellings, in terms of mobility as they move from favela to traffic jams to the patches where they sleep, in terms of the food they take in and the calories they expend, and in terms of the bugs and pollutants with which they share their lives. And we have hinted at the ways that we can understand this in terms of the specific affordances that it offers to them. But how do they come to experience the world, what do they see, sense, feel, what is salient to them and in what ways? They do not experience the world in the same way that you or I would see, sense, feel if we walked those same streets, dodged the same cops, shared their scraps of food and bedded down on the same cold hard pavements. Let alone the way the world is experienced by the dogs and cats, the flies and mosquitoes with whom they cohabit. Perhaps, if we are concerned with their physical health, their skeletal structure, their level of malnutrition, we might think that the ‘experience’ of the street kids was something of an epiphenomenon. But this would be to retain a dualism that we reject. If we are to develop an ecosocial approach to mental distress we need to attend to that world of experience, in particular so that we can attend to those experiences that grip some and not others: the anxieties, worries and intrusive thoughts and voices which suffuse their niches. To do so, it is helpful to start with Jakob von Uexküll’s notion of the *Umwelt* (von Uexküll, 1930, 2010 [1934]).<sup>21</sup>

What is an *Umwelt*? As is well known, von Uexküll used this common German word for ‘the environment’ in a very specific way, to make the crucial point that ‘the environment’ for a tick, or a dog, was not the same as that for a human. What the tick or the dog, or the jackdaw ... sees, hears, smells, tastes, reacts to is what is salient to it. This is, of course, partly a matter of its evolved sensory capacities, the bandwidth of its senses, the wavelengths in which they operate, the distances over which they can register information and so forth. But those sensory capacities are evolved in such a way that it is attuned to its ecological niche – to things that form its prey or its sustenance, or are required for its reproductive activities, or which might predate on it and so forth. The animal, that is to say, lives in a world of signs, specific marks of significance that evoke certain behaviours.

Von Uexküll's most famous example, that of the tick, blind and deaf, that climbs to the top of a twig or a blade of grass and waits, for an indefinite time, until the marks of significance to it become perceptible – in particular a certain odour emitted by a mammal that is a potential host, when the tick drops. If it lands on a mammal with a certain skin temperature – around 37 degrees Celsius, the temperature of mammalian blood, it will move to a place on the skin where the hair is least dense, and embed itself, to suck that blood and begin its reproductive cycle. Thus its *Umwelt* is constituted by three sensations – perception signs that carry meaning to it – smell, temperature and hairiness, each of which, in sequence, without the intervention of any conscious intention, provokes or 'fires' a particular action – the 'fixed action patterns' so familiar to students of animal behaviour (Lorenz, 1970, 1971; Tinbergen, 1951) .

Given Von Uexküll's terminology of signs and signals, it is no surprise that he has been claimed as a founder of biosemiotics. Kalevi Kull defines biosemiotics as "the science of signs in living systems" (Kull, 1999: 386) that "sees living creatures not just as passively subjected to universal laws of nature, but also as active systems of sign production, sign mediation and sign interpretation, that harness the physical laws in order to live and sometimes to make a more complex living" (Emmeche & Kull, 2011: 1). This is not the place to enter into the often arcane debates around such semiotic approaches to 'life itself'.<sup>22</sup> For our purposes, what we can take from von Uexküll's arguments as far as human beings is quite simple, and probably no surprise to cultural anthropologists: human life is possible only because of the ways in which their habitat is saturated with meaning, where apperception and interpretation are fused and almost always non-conscious, provoking actions that are often habitual.<sup>23</sup> And while some of those sign/meaning/action complexes are almost certainly universal and embodied by the co-evolution of humans and their niches,<sup>24</sup> others are not evolved fixed action patterns, but are historically and culturally variable, and still others are peculiar to particular communities and their specific niches. The notion of sign, signal, semiotics can often seem 'affectless' – does the tick's heart beat faster when its prey appears in its *Umwelt*, is it primed with expectations and hopes, does it fear the consequences if it misses when it drops? But for humans, and no doubt for many other living creatures, a "subtle semiotic web" does, for example, include the heart, as signs stimulate the release of cortisol and spark off a cascade of hormones by way of the actions of the HPA axis (the interaction between the hypothalamus, pituitary gland, and adrenal glands) which alters heart rate, muscle tone and much more (Hoffmeyer, 2011: 47), provoking a range of affective states and regulating gene activation in the brain with multiple neural and mental consequences.



The organism and milieu are not distinct but enmeshed and interconnected in multiple ways. Humans are not constituted by discrete systems, bounded by their skin, and 'mind'<sup>25</sup> - mental states - are not the product of neural circuits walled off by the skull. It is not that brains are unimportant, but they only do what they do, not just because they are embodied, or reliant on sensory input, but because they are dependent on the capacities of bodies to do what they do. Human capacities to think and feel are only possible because of coupling with all manner of resources outside the boundaries of both skull, and what Andy Clark has dismissively termed our 'skinbag': minds, at least human minds, extend into the world via a diverse array of tools and technologies (Clark, 2008; Clark & Chalmers, 1998). 'Cognition' is both embodied and extended - it must not be understood in the Oxford English Dictionary sense of a faculty of knowing, to be distinguished from feeling and volition. We do not have to reach for Antonio Damasio (Damasio, 1995) to realise that, at least for a human, there is no knowing without feeling and willing. Our approach to our world of signs is thus less indebted to de Saussure than it is to Roland Barthes: humans live in a cultural world where objects, places, images, and indeed animals and persons, are freighted with connotations, with meanings, with memories, with myths, each of which carries an affective charge. Emotions - for example grief at the death of a loved one - are also 'extended', not contained within the individual's body, but flowing across niches that consist not just of people, but of artefacts and materials - from the funeral service itself to keepsakes for remembrance of the deceased (Brinkmann & Kofod, 2018) and realized only through "instances of organism-environment couplings" (Brinkmann & Kofod, 2018, p. 167; Colombetti & Krueger, 2014, p. 1160). Indeed much of our human urban *Umwelt* is constructed with aim of evoking affects in order to manage conduct: whether via monumental buildings, palaces or prisons, parks and public places adorned with statues, or in the mundane organization of city streets, housing estates, shopping malls and so forth. Not, of course, that they produce the effects that the architects and planners desire and imagine in their programmes and strategies!

For von Uexküll, each member of a species dwelt in a unique phenomenal world "embracing each individual like a 'soap bubble' which it is always actively creating in relation to its *Bauplan* - its own needs and designs' (Rüting, 2004: 50).<sup>26</sup> Such individualism is misplaced, even for ticks or dogs, the *Umwelt* is not an individual phenomenon, its overall parameters and configurations are coevolved between the species and its niche. And for humans, those relations are less co-evolved than co-constructed in a certain form of life. For example, in a study about mental health in South East London conducted by one of the authors of this paper, one informant (Debra, as we will call her here) described that she had

always “[...] had these worried thoughts, even when I go out, cuz I have low self-esteem so like when I go out and when I’m around people, I always think maybe they’re saying something bad about me or maybe they’re thinking, maybe they’re laughing at me... everytime I go out I’m just always, I don’t feel good about myself so when I go out, um, I try to like not look at anybody, give eye contact, I try to just put my headphones in and just go about, so if I need to go to uni I just put my headphones in, um, and some people see that as rude and I’m not trying to be rude, but I’m just, just a nervous person.”. Debra’s Umwelt is suffused with signs, meanings, affects, actively managed and shaped by her through the use of headphones to shield her from the moments of eye contact which do not indicate potential companionship, but rather potential hostility or ridicule. But this is inundated with social norms about being “rude” or not, about how to behave in urban public spaces. Her Umwelt is not an individual bubble, but neither is it yours or ours: the signs that for the researcher generated the impression of a calm, safe neighbourhood in South East London had a very different affective salience for Debra, who spoke of worries and nervousness as an ever-present part of her life. In each of our *Umwelten*, signs, meanings, affects and volition are inseparable, shaping action through processes that are often beyond the reach of conscious intentions.

### **Atmospheres and exposomes**

The notion of ‘atmosphere’ has become fashionable in human geography: the idea that each city, each part of each city, even each building, has its own ‘atmosphere’ – mixture of affects and emotions, of feelings of calmness or excitement, of melancholy or joy, holiness or eroticism... (Anderson, 2009; Gandy, 2017). And niches certainly have ‘atmospheres’ – while tourists wandering the streets of Rio may imbibe a kind of Brazilian-ness made up of a mixture of fragments from travel brochures, movies, popular stereotypes as much as by the smells, noises and sights of the streets, those street kids inhabit niches suffused with hopes and fears, anticipations and dreads. Much of the debate about atmospheres takes place at a somewhat abstracted level of philosophy, but Kathleen Stewart has examined the distinctive ‘force fields’ in which people find themselves in the situations of their everyday lives (Stewart, 2007), and Teresa Brennan has analysed what we ourselves might think of as an ecology of the senses - the smells, sounds, pheromones of excitement, aggression or fear that transfer feelings and emotions among individuals, blurring the boundaries of bodies and environments, of physiology and materiality (Brennan, 2004).

Brennan regrets that these ways of thinking are at odds with what she sees as the dominance of biological and genetic determinism. Yet fifteen years later, this no longer is

the case. We are beginning to develop a recognition that feelings, emotions, parasites and pollutants flow across individuals and their material and interpersonal ‘bubbles’ and give those bubbles a certain character. We may smile knowingly at the nineteenth century conception of miasma, which somehow combined the moral character of a place with the smells, vapours, and noxious emanations that pervaded it. But we need to return to something significant about this idea: the recognition that each niche has specific and unique sensory environment that enmeshes and constitutes those who inhabit it psychologically, physiologically, neurobiologically – a ‘sensorium’ which may be elusive, but is real in its consequences.

This sensorium is one element in what Margaret Lock refers to as “the co-constitutional processes of matter and meaning and of human and environment” (Niewöhner & Lock, 2018: 692). To use her term, human biologies are indeed situated, local biologies (Lock & Kaufert, 2001), local neurobiologies, shaped across life by the *Umwelten* we dwell within, the niches we inhabit and the affordances they offer, and by the meanings that we, individually and collectively, give to our experiences as they unfold over space and time. And the atmospheres to which we refer are more than metaphorical – one only has to consider the niches inhabited by those Brazilian street children to be reminded that these are toxic, not just because the daily activities involved in living in their niche are a constant struggle to acquire the necessities of life against a pervasive threat of violence from other people, but because, their very vitality is constantly under threat from their exposures to the pathogens and parasites with which they share their lives. This is their material exposome, “composed of every exposure to which an individual is subjected from conception to death ... the extensive range of specific external exposures which include radiation, infectious agents, chemical contaminants and environmental pollutants, diet, lifestyle factors (e.g. tobacco, alcohol), occupation and medical interventions” (Wild, 2012: 24). And there is growing evidence that people exposed to specific measurable exposures, from tobacco to environmental pollutants “have specific ‘omics’ profiles” that is to say show distinct patterns of transcriptomics, epigenomics and metabolomics (Wild & Herceg, 2013: 480).

Measuring the exposome is daunting, as De Bord and colleagues have argued, and despite the availability of some instruments such as sensors and geographic information systems, a full accounting is “at present not feasible and may never be fully realized” (DeBord et al., 2016). Different exposures impact mental health through different pathways. Nonetheless, there is evidence that one route is through their consequences for the microbiome, which is acutely sensitive to changes in the internal and external milieu and which shapes development, modulate the capacities of the organism, and affect both health

and disease, not least through the gut-brain axis (Dowd & Renson, 2018; Hooks, Konsman, & O'Malley, 2019; Human Microbiome Project Consortium, 2012; Kaplan, Rucklidge, Romijn, & McLeod, 2015; Lucas, 2018; Mayer, Tillisch, & Gupta, 2015; Valles-Colomer et al., 2019).

These exposures thus constitute some of the pathways which inextricably entangle biology and milieu across the trajectory of a life, and indeed of the shared lives of those who inhabit specific niches. And we are just beginning to map out the mechanisms through which they have their consequences, although we need to approach the current candidates with considerable caution. For example, many social scientists have been excited by the promises of epigenetics, especially that sense of this contested term that refers to processes of gene activation and de-activation across an individual's life, in response to inputs from the milieu (Lock, 2013, 2015). But while there is plentiful exciting research on environmental epigenetics (Landecker & Panofsky, 2013), much of the basic biological research has been carried out on animal models in laboratory environments, and extrapolations to humans, as is often done by enthusiasts for the programmes of ACE and DOHaD mentioned earlier, is unwise (Dowd & Renson, 2018). Others have focused in particular on the epigenetic effects of stress, through the action of perceived stressors on the hypothalamic-pituitary-adrenal axis (HPA axis) - feedback system that regulates reactions to external stressors - also digestion, the immune system, mood and emotions, sexuality, and energy storage and expenditure. However, as Author 2 has pointed out, there are innumerable problems with the ways that stress and stressors are defined and the extrapolation from laboratory experiments using highly artificial stressing techniques to the nature and effects of stress in real life situations, and over a lifetime (Author 2, forthcoming, see also Author 3, 2019). Research which has used the concept of allostatic load to grasp the 'wear and tear' effects of continued stress on the HPA over the life course is difficult to evaluate, given the varied definitions of stress and allostatic load that they have employed, and the diverse biomarkers that they have used as proxy measures (Dowd, Simanek, & Aiello, 2009). Social scientists have been particularly attracted by research on 'plasticity', especially neuroplasticity, that shows the ways that neural circuits are not 'hard wired' but are shaped and reconfigured across the life course, both in terms of structure and in terms of function in response to experiences (for an example in an argument for 'neuroanthropology', see Lende & Downey, 2012), , together with evidence that neurogenesis in some regions of the mammalian brain continues throughout life and is modulated by activities and exposures (Leuner, Glasper, & Gould, 2010; Mirescu, Peters, & Gould, 2004; Opendak, Briones, & Gould, 2016; Stranahan, Khalil, & Gould, 2006). Once again, though, caution is required: there is considerable

controversy about both the evidence for, and the implications of neurogenesis in the adult human brain, (Kempermann et al., 2018). As we have discussed, research on exposure pathways is at an early stage, measurement is challenging, and while there is good evidence for the effects of air pollution on neural development (Friedrich, 2018; UNICEF, 2018), claims about the role of the human microbiome in maintaining physical and mental health have suffered from over-hyping (Valencia, Richard, Brock, & Boglioli, 2017) often linked to attempts at commercial exploitation through the sale of microbiome inspired diets and food products. The same is true of the currently fashionable arguments about the role of ‘inflammation’ in depression and many other psychiatric conditions. Once more, they suggest intriguing pathways that do not respect the boundaries of skull and skin, and demonstrate the constitutive embeddedness of neural processes in their material milieu (Alam, Abdolmaleky, & Zhou, 2017; Borsini, Zunszain, Thuret, & Pariante, 2015; Müller, Weidinger, Leitner, & Schwarz, 2015; Pariante, 2017; Rosenblat, Cha, Mansur, & McIntyre, 2014), yet, once more, popularisation often precedes full evaluation of the evidence (Bullmore, 2018).

This is not the place for a full evaluation of these arguments. If we are to contest the erroneous extrapolations and sociological simplifications that we can observe in the literature about the social and policy implications, as exemplified in the arguments about Adverse Childhood Experiences and the Developmental Origins of Health and Disease that we discussed earlier,<sup>27</sup> we need to bring the growing socio-theoretical literature on embodiment and materiality into contact with critically evaluated evidence about these more mechanistic forms of thought about pathways and processes. This, we believe, is one of the key challenges for social theory today.

### **Towards a neuroecosocial understanding of mental health in adversity**

Is it possible, then, to find ways of grasping empirically these diverse human neuroecosocial *Umwelts* in a way that helps us to go beyond the gestures of ecosocial theory, and the ‘everything matters’ thought style of network models? Could we operationalize our ecological approach to adversity in terms of an array of niches, or habitats, what we term biological localities? We know that humans are very specific kinds of organism with a particular array of biosocial potentials, striving to make their lives within in force fields shaped simultaneously by atmospheres and memories, suffused by vectors that do not recognize the boundaries of our ‘skinbags’, many of which operate outside consciousness, shaping patterns of action and interaction habitually. How, beyond such abstractions, can we trace these processes in the embodied lives of individuals, as they both offer and

constrain the ways that we can make lives for ourselves? And how, in particular, can we return to our initial question: to understand the pathways through which adversity impacts upon mental health, and the consequences in the everyday lives of individuals?

How should we move on from the recognition that the human person is not an isolate defined by the boundaries of skin and skull, and distinct from its milieu, and bring these modes of analysis into connection with the rich ethnographic literature on the ways in which human corporeality is culturally shaped, trained and habituated to certain modes of action and interaction, and inhabits material spaces and interactions with others filled with meanings, shaped by customs and rituals. We need to understand niches, not as static planes, dimensions or locations in an ecological landscape, but as continuously recreated trajectories through a world of persons, places and objects rich with meanings, memories and affects, a world that affords certain ways of living and delimits others, in which individuals and groups strive to make a life for themselves across space and time. This, we think, is what 'the Berlin group' of Jörg Niewöhner, Milena Bister, Patrick Bieler, Martina Klausner and colleagues seek to grasp in their work with the concept of 'niching' (Bieler & Klausner, 2019; Bister et al., 2016).<sup>28</sup> For example, Bieler and Klausner, in examining the effects of transformations in the Berlin housing market on community psychiatric care, use ethnographic methods to describe the ways that "people with a psychiatric diagnosis develop specific capabilities to navigate the city. They avoid certain terrains and places in their neighbourhood or in the city more generally because of the corresponding physical affordances, the unavoidability of social interactions or the availability of resources... They render the city habitable for themselves and put various efforts into developing a mode of dwelling in urban space that is bearable, if only momentarily... [a] never finished process ambivalent process of creating a precarious comfort zone in urban space" (Bieler & Klausner, 2019: 203)

Thinking in these terms, of the active creation of niches which are inhabitable in situations of precariousness and material and other constraints, we can begin to think of the kinds of modes of inquiry that might enable us to map affordances umwelts descriptively and ethnographically, as we have suggested in our examples. We can map the experience of individuals, and the saliences, meanings and affects evoked in their daily trajectories, and situations, using mental mapping techniques such as those developed by Stanley Milgram (Milgram, 1992), or momentary assessment apps that poll individuals several times a day over two or more weeks for their assessment of their mood, and link that to their experience of their human, material and natural environment to capture the flows of affects as they are experiences across space and time (Bakolis et al., 2018). We can use the methods of

qualitative sociology, such as the spatial observational techniques used by William Whyte (Whyte, 1980, 1988), or ethnographic approaches such as those used by Suzie Hall in her study of one street in Peckham (Hall, 2013). We can chart at least some elements of exposures and exposomes using conventional measurement technologies despite their limitations. Perhaps we can find a way to operationalize our critical approach to 'stress' to develop a finer grained, ethnographic analysis of the subjective experiences that constitute stress in situations of adversity - poverty, exclusion, isolation, racism and violence, noise, smell, microbes and pollutants perceived as stressful as a result of individual biography, culturally shaped meanings and environmental insults, with deleterious consequences for brain and body. Perhaps then we would be able to identify what within urban life mitigates against stress, perhaps by redrawing mental maps of the city, and reshaping ecological niches through cafes and corner shops, informal friendships or forms of collective organization. On this basis, we believe we would be better able to advise on policies to mitigate mental distress in urban environments, and on practices likely to promote recovery. We can see precisely the ways that sociopolitical policies, such as those which increase precarity through conditionality in welfare, are lived by those impacted by them, experienced and managed in everyday lives. A knowledge of the ways that humans with different abilities and capacities inhabit their niches could inform strategies to create 'healthy, safe and sustainable cities' through architecture and urban design, housing, mobilities, management of biophysical environments from microbes to air quality. In doing so, we suggest, we would transform questions such as urban justice or the 'right to the city' by bringing them into connection with the consequences of the unequal niches which contour and constrain the vital existence of those who inhabit them.

To return to the challenge with which we opened this paper, such a research programme can show us how and why a theoretical reengagement with mental life and mental health should no longer be the concern of an isolated subdiscipline of the sociology of health. On the contrary, it requires us to rethink the central issues of social theory concerning the social shaping of subjectivity, and indeed the ways in which we theorise sociality itself. We can certainly build upon recent theoretical work on embodiment, affect, especially as this engages with a longer tradition of atmospheres and environmental politics. We can link this with an emerging theoretical re-engagement with the non-conscious habitual management of techniques of the body, and some themes from older 'interactionist' understandings of bodily encounters and the capillary forms of power, knowledge, sentiment and passion that inhere in routine social practices. We can seek to theorise the mechanisms implied in these approaches, using the openings offered by the post-dualist

developments in the life sciences that we have sketched here. But we can do so, not in the form of abstracted theories or manifestoes but in an engagement with one of the central concerns of our time – the moulding and torqueing of mental life in conditions of precarity and adversity, and the socio-political strategies necessary to build the capabilities that can enable human beings individually and collectively to make lives for themselves within the fluctuating circumstances in which they live.



## Notes

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<sup>1</sup> It has not escaped our attention that the emergence and adoption of this very term- 'mental health' – requires interrogation. We leave that for another paper.

<sup>2</sup> We are doing Krieger something of a disservice here, as she does give some clues that chime well with our argument in this paper. Thus Krieger enumerates four 'relevant ecosocial concepts: **embodiment**, which refers to the ways that humans incorporate the social and material world biologically, **pathways of embodiment** which are shaped both by particular configurations of power and the constraints and possibilities of our biology, **cumulative interplay between exposure, susceptibility and resistance** expressed in these pathways of embodiment, and **accountability and agency**, which seems to refer to the implications of particular ways of knowing about the above, and their socio-political consequences (Krieger, 2001). While she *uses* some of these ideas in her analyses, she does not really develop them conceptually, which is what we aim to do here.

<sup>3</sup> Of course, many others have also argued for new thinking in social epidemiology, notably Sandro Galea: (Galea & Link, 2013; Keyes & Galea, 2017), who has also focussed on the issues that we discuss here of the urban environment and mental health: (Galea, Uddin, & Koenen, 2011) (Sampson & Galea, 2018)

<sup>4</sup> In subsequent papers, Pescosolido seeks to use the Network model to examine specific issues, for example, suggesting that the ways individuals "strategically activate their social network ties" and the specific "network ties" they "activate" can account for such matters as their entry into contact with medical care, their levels of functioning, their social experience and their recovery (Perry & Pescosolido, 2015). However, some might share our difficulties in trying to understand this argument, for instance trying to figure out what is meant when the activation of a network is described as "a multilevel phenomenon, mirroring the nested structure of individuals, ties and networks as they function in the social world" (Ibid.: 118).

<sup>5</sup> Thus Oakes and Rossi argue "It is anomalous that relatively little attention has been paid to either the conceptualization or measurement of SES, especially in America. Although the term "socioeconomic" was apparently coined by the American sociologist Lester Ward in 1883 ... there is still no consensus on a nominal definition of SES nor does a widely accepted SES measurement tool exist ... Conceptualizing and measuring SES is among the more difficult and controversial subjects in social research. Prominent scholars have debated the theory, operationalization, and usefulness of SES constructs for about 125 years" (Oakes & Rossi, 2003, pp. 170, internal references removed).

<sup>6</sup> It has not escaped our attention that this phrase 'poor mental health' implies that mental distress is, indeed, a matter of health, in the same way that mental disease places mental distress among the variety of families of disease, and 'mental disorder' suggests that there is some normative sense of 'mental order' that is disturbed. We leave those questions for another paper.

<sup>7</sup> In fact, as (Author A) point out, the cities of Wirth's own times, including his own Chicago, were being fundamentally reshaped by internal migration, both from the immediate countryside and by the movement of freed slaves from the South of the USA.

<sup>8</sup> This is not just as some argue because of the polycentricity that has arisen from the growth of the 'suburbs' or 'edge cities' (Soja & Kanai, 2007).

<sup>9</sup> There are already some who are trying to think about mental health vis-à-vis social and material environments, including the urban, see for example work by Ola Söderström and colleagues (**Söderström, 2019**), Bieler, Bister, Klausner and Niewöhner (Bieler & Klausner, 2019) (Bister, Klausner, & Niewöhner, 2016) and Brown & Reavey (Brown & Reavey, 2019).

<sup>10</sup> There are ongoing debates about this, and the distinction and relation between the original concept proposed by Grinnell in 1917 and Elton in 1927 (Leibold, 1995; Whittaker, Levin, & Root, 1973).

<sup>11</sup> We should note that Matthew Kearns and Simon Reid Henry use the term in a way that is somewhat similar to our own, for example in their excellent paper on vital geographies: (Kearns & Reid-Henry, 2009) The term has become popular in socio-cultural anthropology since the 1970s, though seldom with detailed conceptual considerations, despite the hopes of Thomas Love four decades ago - (Love, 1977) – and often placing the concept in framework focussed on human evolution: (Fuentes, 2016)

<sup>12</sup> We have drawn in some detail on Downey's excellent description. However he also speculates at some length on the potential evolutionary conditions and consequences of the variety of urban niches

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that humans have constructed; we have chosen to focus on the non-evolutionary elements of his account.

<sup>13</sup> Gibson's conception of affordances has been much discussed, especially in the pages of the journal *Ecological Psychology*. Some have found Gibson's explanations hard to grasp, and perhaps verging on a kind of idealism, perhaps because they reject dualism. Antonio Chemero, in a much cited paper, aimed to counter that interpretation: to claim Gibson as a certain kind of realist, he argues that features of situations and niches exist, but only become affordances for a particular animal in their relations with that animal's particular abilities; thus affordances "are relations between particular aspects [abilities] of animals and particular aspects of situations" (Chemero, 2003, p. 184).

<sup>14</sup> As Smith points out, Gibson refuses to draw a bright line between the isolated subject of mental experience and its surrounding environment, instead, the challenge is "to grapple with the interconnections between the world of human thought, feeling and action, and the environment of human behaviour" (Smith, 2009: 121). Costall draws a similar theme from Gibson's writing: the relation between organism and environment is not one of interaction, but rather a "... mutuality or reciprocity ... neither environments nor organisms can be defined outside the relation between them." (Costall, 1995, p. 475) although Gibson sometimes also seems to insist "that affordances are fixed and pre-existing, just waiting ... for the appropriate animal to come their way" (Costall, 1995, p. 475). See Fultot & Turvey (2019) for an illuminating discussion of how affordances can both pre-exist organisms and be relational.

<sup>15</sup> Osborne quotes Kurt Goldstein, from his classic text *The Organism*: "The environment of an organism is by no means something definite and static but is continuously forming commensurably with the development of the organism and its activity. One could say that the environment emerges from the world through the being or actualization of the organism" (Goldstein, 1995 [1939]: 85).

<sup>16</sup> Erik Rietveld calls these 'social affordances' as they offer possibilities for social interaction (Rietveld, 2012) Gibson himself argued that many forms of behaviour depend on (mis)perceiving what other persons afford: "Behavior affords behavior ..." (Gibson, J. J., 1979, p. 135).

<sup>17</sup> For a discussion of the forgetting of habit by sociology see the classic paper by Charles Camic: (Camic, 1986) Recent writers have suggested that one can understand not just relations with the material milieu, but also with other humans, in terms of the habitual, (Pedwell, 2017; Shove, Pantzar, & Watson, 2012; Sullivan, 2006)

<sup>18</sup> Jörg Niewöhner and colleagues have drawn on Ludwick Fleck's conception of styles of thought, used by Fleck to refer to scientific communities, to characterise this (Niewöhner, Bieler, Heibges, & Klauser, 2016)

<sup>19</sup> One might think that these affordances are *only* there for the children in question. But pavements afford sleeping on for many creatures of different kinds. The affordance of the pavement, so to speak, is out there in the environment to be perceived but for whatever reason, many people choose not to act on it. This is, in part, because affordances are often suited to a particular form of life, as it is lived within a specific niche (Rietveld & Kiverstein, 2014). Note that this does not mean that one cannot *learn*, if one could find a teacher, to sleep on the pavement, to find the safest, most comfortable spot. Attending to affordances and the affordances that may be shared between us as we occupy different niches, also implies attending to how and why some affordances become picked up in particular niches, rather than others – it implies an exploration of how and why forms of affordance-related behaviour (sleeping on pavements, or writing and mailing letters) become activities that can be perceived and achieved within particular niches.

<sup>20</sup> Dokumaci (2017) argues that affordances may be perceivable but not achievable due to disabilities or illnesses. In her example of rheumatoid arthritis, this condition leads to a *rupture* in the organism-environment complementarity, as one's movements are limited and thus unable to draw easily on affordances which for others are readily available (Dokumaci, 2017, p. 399). Such ruptures may lead to the creation of *new niches*: "As current niches fail to reciprocate our non-conforming bodies, and as our mundane negotiations make the world of matters matter in ways heretofore unimaginable, the environment appears for what it is; unstable, unpredictable, and hence always differently possible. In performing affordances that are yet to be materialised/socialised in our surroundings, we do not simply 'fit to' what already exists; instead, we bend the environment in ways to make it fit ourselves." (Dokumaci, 2017, p. 404)

<sup>21</sup> Many have commented on the potential relationship between Gibson's 'realism' and von Uexküll's 'subjectivism', for example Fultot & Turvey (2019). Our argument here is that they should both be considered 'irrealists' in that neither denies the existence or significance of a world outside thought,

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but both seek to transcend the Cartesian dualism that distinguishes these a priori and then troubles itself about their relations.

<sup>22</sup> Many of these debates take place in the pages of the journal *Biosemiotics*, and take up the concepts of Gilbert Simondon that are said to have influenced Gilles Deleuze, Isabelle Stengers and many others. In these debates, which argue that biology at all levels from molecular to the molar is semiotic, the definition of a 'sign' is so general as to encompass almost anything, the form of structuralism that is invoked implies that signs form a closed system with an internal unity accounting for the dispersal of its elements (Emmeche & Kull, 2011). Our approach rejects both ubiquity and unity in favour of an empirical identification of those sign/meaning/action relations that are salient in a particular Umwelt.

<sup>23</sup> Can an habitual action be termed an action? While for understandable reasons, sociologists turned away from habit to take willed action as their object of study, we are now beginning to recognise the crucial role of the habitual in the forms of everyday life, and the ways in which those habits embody all manner of cultural norms about subjectivity, authority, power and privilege. We do not need to turn to 'nudge' theorists for this insight (see, for a few examples Bissell, 2011; Pedwell, 2017; Shove et al., 2012; Wood, 2016)

<sup>24</sup> For example, those demonstrated by the 'visual cliff' experiment in babies: (Gibson, E. J. & Walk, 1960)

<sup>25</sup> We are somewhat unhappy with the words available to describe the complex, heterogeneous, processes of mental activity: terms like mind or mental imply a kind of awareness of the self of its thoughts, feelings, volition and so forth, while many of these activities occur outside awareness. But to avoid even further complexity, we will use these terms to encompass thought, feeling, volition, emotion, decision making and much else that humans are capable of, without implying that those activities are present to the actor (indeed, to use the common sense understanding of the term they seldom "come to mind").

<sup>26</sup> An idea that contributed to Peter Sloterdijk's bubble theory (Sloterdijk, 2004). Elsewhere one of us (**Author A**) has drawn on Nelson Goodman's irrealism to explore similar issues (Goodman, 1978)

<sup>27</sup> We see similar sociological naivety in the growing claims that poverty and social inequality are 'retransmitted' or reproduced across generations because of the impact of toxic early experiences on the developing infant brain (these are well analysed in Bruer, 1999; Wastell & White, 2017)

<sup>28</sup> We would like to acknowledge our indebtedness to conversations and exchanges of ideas and papers with this group, who are based in the Institute of European Ethnology and Humboldt University in Berlin. Laurence Kirmayer and his colleagues have also called for an "ecosocial psychiatry" (Kirmayer, 2019; Kirmayer, Gomez-Carrillo, & Veissière, 2017): a "multilevel ecosocial view" of psychiatric disorders in which mind, brain and body are "co-constituted in health and illness. While emphasizing the dynamics of shared attention and "cultural affordances" this work tends to focus on the dynamics of cognition and neuronal activity, on attention and intentionality, taking its point of departure from the *person* as he or she interacts with their niche. Our own approach seeks to avoid such an interactional perspective, insisting on the active construction and reconstruction of niches in shared forms of life, as we go on to argue below

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