Embodyment: a conceptual glossary for epidemiology

Nancy Krieger

Embodyment. This construct and process are central to ecosocial theory and epidemiological inquiry. Recognising that we, as humans, are simultaneously social beings and biological organisms, the notion of “embodiment” advances three critical claims: (1) bodies tell stories about—and cannot be studied divorced from—the conditions of our existence; (2) bodies tell stories that often—but not always—match people’s stated accounts; and (3) bodies tell stories that people cannot or will not tell, either because they are unable, forbidden, or choose not to tell. Just as the proverbial “dead man’s bones” do in fact tell tales, via forensic pathology and historical anthropometry, so too do our living bodies tell stories about our lives, whether or not these are ever consciously expressed. This glossary sketches some key concepts, definitions, and hypotheses relevant for using the construct of “embodiment” in epidemiological research, so as to promote not only rigorous science but also social equity in health.

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GLOSSARY

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become embodied and generate population patterns of health, disease, and wellbeing, including social inequities in health. This work necessarily entails concretely measuring population rates, biological characteristics, diagnostic criteria, disease states, and myriad social, physical, chemical, and biological exposures thought to be relevant to shaping risk of the specified outcomes. The hope is that by systematically conceptualising this work in relation to "embodiment," it will be possible to promote not only more rigorous science but also enhanced knowledge relevant to attaining social equity in health.

**EMBODIMENT: EPIDEMIOLOGICAL NOTIONS**

**(a) As a construct, process, and reality, contingent upon bodily existence**

Embodiment is a verb-like noun that expresses an abstract idea, a process, and concrete reality. Whether used literally or figuratively, it insists on bodies as active and engaged entities.

In the case of epidemiology, at the most general level, embodiment, as an idea, refers to how we, like any living organism, literally incorporate, biologically, the world in which we live, including our societal and ecological circumstances. From an epidemiological vantage concerned with population health, this world is comprised of animate populations and inanimate entities interacting at multiple scales and levels in myriad ecosystems that have evolved over time, with the living beings actively shaping and not simply passively responding to their environs. Embodiment, for epidemiology, thus entails consideration of more than simply "phenotypes," "genotypes," and a vaguely defined (and implicitly external) "environment" eliciting "gene-environment" interactions. We live embodied; "genes" do not interact with exogenous (that is, outside of the body) environments—only organisms do, with consequences for gene regulation and expression.

As such, embodiment necessarily is a process, for it entails the temporal transformation of bodily characteristics as a consequence of animate beings' terms of engagement in their world. While much of this engagement may entail conscious choices and thus agency, it need not always be a "conscious" process or necessarily involve psychosocial "risk factors." Thus, tobacco firms may excel at marketing cigarettes simultaneously as a symbol of "independence" (and often, "masculinity"), as a "luxury" to people with limited economic resources, and as a kind of "affirmation" of existence locally marginalised groups, such as African Americans and also lesbian, gay, bisexual and transgender youth. Choices of tobacco marketing executives thus influence the responses of these groups to pervasive and targeted advertising, as do the psychoactive properties of nicotine in alleviating stress. Even so, the physiological processes by which nicotine induces nicotine dependence at a cellular level are not, in itself, conscious. Related, an infant is not conscious of its birth weight or gestational age, even as it can be analysed in relation to many levels (pages 10–13).

**(b) As a multilevel phenomenon, integrating soma, psyche, and society, within historical and ecological context, and hence an antonym to disembodied genes, minds, and behaviours**

Embodiment is, by definition, a multilevel phenomenon, as it necessarily entails the interplay between bodies, components of bodies, and the world(s) in which the bodies live. As observed by the biologist Steven Rose, when a frog jumps into a pond to avoid being eaten by a snake, it is a unitary phenomenon, resulting in a safe frog and disappointed snake, even as it can be analysed in relation to many levels (pages 10–13). Among these levels are: micro phenomena within the body, for example, the physiology of sight, the biochemistry of muscle cell contraction; macro phenomena, for example, the evolution of ecosystems including both frogs and snakes; and meso phenomena, for example, the factors leading to that particular frog being hunted by that particular snake on that particular day. Embodiment, as a construct, usefully invites considering connections between these different levels when developing explanations at any particular level.

Analysing embodiment of social conditions accordingly requires specifying both the social conditions and the biological processes by which they are embodied. These social conditions may be manifested in physical, chemical, biological, or social exposures. Their biological impact in turn will depend on biological characteristics of exposed body. These characteristics may themselves often be shaped by exogenous exposures and cannot simply be inferred from gene frequencies. For example, among many species of fish and reptiles, environmental and social conditions, not chromosomal complement, determine biological sex: depending in some cases on temperature and in others on the presence and behaviours of members of its species, the same organism can develop into either a biological male or female. New research from the fast growing field linking evolutionary and developmental biology likewise is finding that gene function may depend on gene location, for example, in type of cell or type of developmental
depending on tissue location (page 187), 35 (page 161)40).

A related literature is likewise encouraging moving from a disembodied to embodied study of human culture, cognition, behaviour, and emotion23–33—all aspects of being that have a profound bearing on how we live in our bodies and hence our health. Our use of language, consumption of food, sexual practices and identities, types of recreation, use of psychoactive substances, use and experience of violence, and our experience of emotion: all of these are contingent upon and affect bodily practices, in ways that vary by social conven-
tions, use and ignored to explain social inequalities in health; a corollary is that, given probable complementary causal explanations at different scales and levels, epidemiological studies should explicitly name and consider the benefits and limitations of their particular scale and level of analysis.

<table>
<thead>
<tr>
<th>Table 1 Core constructs of ecosocial theory1–3</th>
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<tr>
<td><strong>Construct</strong></td>
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<td>Embodiment</td>
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<td>Pathways of embodiment</td>
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<td>Cumulative interplay between exposure, susceptibility and resistance</td>
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<td>Accountability and agency</td>
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<th>Table 2 Selected defining aspects of bodies, as jointly biological organisms and social beings4</th>
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<td><strong>Body aspect</strong></td>
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<td>(1) as biological organism and member of a biological species</td>
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<td>(2) as social being and member of society</td>
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(c) As clue to life histories, hidden and revealed

Embodiment is the reason we are able to discern critical aspects of the conditions of people’s lives from the state of their bodies, both dead and alive. By considering the stories bodies tell, it is possible to overcome limits imposed by what people are able or willing to recount.

In the case of the dead and prior generations, embodiment leads us to consider what features of social conditions can be discerned from bones and teeth, from records of births and deaths, as well as from written medical records and autopsy results, if available. Historical anthropometry and demography, for example, with their analyses of changing distributions of height and life expectancy, have yielded important insights into the standard of living afforded different populations in prior eras, including diet and conditions of work.5,7 Reaching back even further, paleoarcheology has likewise provided valuable evidence regarding conditions of life—and death—in prehistoric times.7 That analyses based on such records cannot be corroborated—or refuted—by the deceased person is rarely, if ever, treated as problematic, precisely because of the credence given to recorded anatomical and physiological characteristics. Like any data, however, such embodied evidence can be compromised by various forms of measurement error and bias, including selection bias because of reliance on non-random “convenience” samples, in contrast with population based data.5,7

In the case of the living, embodiment likewise invites considering the stories bodies tell in conjunction with those recounted—or hidden or denied—by individuals. One reason, among many, for the profound impact of Kemp’s 1962 paper on “The battered child syndrome”55 was that it focused on bodily evidence of injuries among infants and children incompatible with self injury, while instead consistent with use of force by an adult against a child. As in the case of domestic violence, despite manifest evidence of such injuries in both the contemporary or historical record, verbal records were weighted towards perpetrators’ accounts, because victims often feared to or, in the case of infants, were unable to, testify or have their word be taken seriously.16 51–54 Embodied evidence has proved to be key in bringing attention to the myriad harms, not only physical but psychological, caused by familial and other forms of interpersonal violence.16 18 52–54 Conversely, bodies can also provide evidence that puts self report and other accounts in context. For example, measures of biomarkers for exposures can be compared with self report measures of exposure. Along these lines, research on serum cotinine compared with self reports of smoking has shown high correlations among smokers, coupled with some misclassification of occasional and infrequent smokers, with little systematic bias by socioeconomic position.57 By contrast, studies comparing self reported with measured height and weight have found evidence of systematic bias by socioeconomic position, with some studies finding a greater—and others a lesser—tendency of persons with more compared with fewer socioeconomic resources to inflate their height and underreport their weight.39 40 Research on self reported compared with measured food intake has likewise provided evidence of systematic bias, in part reflecting a link between increasing education and a greater concern for socially acceptable responses.41

Related, bodily evidence can put in perspective claims about societal impacts of inequality advanced by those benefiting from the status quo. For example, during the US economic depression of the 1930s, economic conservatives claimed the absence of any dramatic change in mortality rates proved conditions were not as bad as economic liberals alleged; counteracting these claims, Edgar Sydenstricker, the first statistician at the US Public Health Service, argued that the impact would first be seen in morbidity, not mortality, given the difference in aetiological period—and he then marshalled the evidence to prove his point, by establishing a 10 city study of the health impact of the depression that set the basis for what would eventually become the US National Health Interview Survey.65–66 More recently, US research linking self reports of racial discrimination to somatic and mental health has recorded adverse effects for people of colour, but not for white Americans reporting “reverse discrimination,” thereby hinting at differences of the health impact of long term compared with sporadic instances of unfair treatment.19 57–60

(d) As reminder of entangled consequences of diverse forms of social inequality

Embodiment integrates experience in still one more way highly pertinent to epidemiological inquiry: it reminds us we cannot neatly parse either our social experience or their cumulative impacts on any one or several disease processes. In particular, it highlights the strong likelihood of socially patterned confounding affecting study of exposure-outcome associations in observational studies.7 In this kind of research, the construct of embodiment can importantly assist in specifying apt covariates and in interpreting results.14 For example, considering the public health problem of increased risk of hypertension in African Americans compared with white Americans, “embodiment” reminds us that a person is not one day African American, another day born low birth weight, another day raised in a home bearing remnants of lead paint, another day subjected to racial discrimination at work (and in a job that does not provide health insurance), and still another day living in a racially segregated neighbourhood without a supermarket but with many fast food restaurants.1–4 16–19 71–80 The body does not neatly partition these experiences—all of which may serve to increase risk of uncontrolled hypertension, and some of which may likewise lead to comorbidity, for example, diabetes, thereby further worsening health status.7 To tease out whether and which of these factors are relevant to (or confound) the chosen health outcome under study thus requires conceptualising confounding in relation to embodied consequences of social position.

Indeed, failure to take embodiment seriously can lead to epidemiological research inadvertently increasing, not decreasing, morbidity and mortality. Consider only the current controversy over long term use of hormone replacement therapy (HRT), whereby a recognised and non-trivial increase in risk for breast and endometrial cancer was discounted in favour of claims of preventive benefits for cardiovascular disease.61–65 Despite epidemiological evidence published since the 1970s showing the existence of a powerful “healthy user” effect, whereby women who were prescribed and could afford HRT were healthier than the typically less affluent and less healthy women who could not,61 52 66–69 claims of cardiovascular benefits were and continue to be touted with little regard for how socially patterned confounding affects likelihood of both use of HRT and cardiovascular risk.60 65 66 Had a concern for embodiment and its implications for the social patterning of health been more central to epidemiological research, perhaps epidemiologists would have less readily accepted the biomedical definition of menopause as a disease of “estrogen deficiency”91 and would have sooner curtailed—rather than abetted—widespread iatrogenic use of hormones among healthy women.61–63 67–69

In summary, the construct of embodiment is vital for epidemiology. This is as true for studies concerned with elucidating micro-level factors influencing risk of disease as it is for macro-level studies concerned with explaining temporal
and spatial contrasts of population rates of morbidity and mortality, including social inequalities in health. The domain of study of our field—determinants and deterrents of population rates of disease, disability, death, and health”—necessarily requires us to study people in context.

Ultimately, it is by embodying this context that we manifest the observed population patterns of disease, health, and wellbeing, hence the rationale for making study of embodiment a central concern.

REFERENCES


THE JECH GALLERY

Afghanistan is back in the international public health community

After more than 20 years of war, it was a really great pleasure for participants of the 2nd international conference on local and regional health programmes, held in Quebec (Canada) in October 2004, to listen to a paper presented by an Afghan health professional (Shakir Sahibullah, MD from Aide Médicale Internationale). Firstly, it was an opportunity to share our collaborative experiences on health financing studies and it was an opportunity to share our collaborative experiences on health financing studies with colleagues from everywhere, as I have been working in Afghanistan since 1996 and in collaboration with the Afghan since 2001. Lastly, but not least, as more than 40 countries were present it was an important occasion, even if aid donors are still miserly, to show that Afghanistan is back in the international public health community.

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REFERENCES