Chapter 5

The Promise and Treachery of Nutrition in DOHaD

Science, Biopolitics, and Gender

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5.1 Introduction

In this chapter, we explore how and why the application of Developmental Origins of Adult Health and Disease (DOHaD) theory has not led to social change and improved reproductive justice. We draw upon the framework of reproductive justice, paying homage to the work of feminist scholars of colour who argued that concepts of reproductive rights were too narrow in their focus on autonomy, choice, and abortion [1, 2]. In combining 'reproductive rights' with 'social justice', the concept of reproductive justice encompasses much broader aspects of social life that intersect with reproduction, including family relations, conditions of work, housing, and welfare arrangements. Reproductive justice invites us to envisage DOHaD in a broader political field that takes account of how these social and structural inequalities profoundly shape the reproductive experiences of women.

In previous work, we have examined how DOHaD ideas can lead to blaming of mothers when health is seen as an individual responsibility, rather than socially determined. In this present piece, we try to understand more about the unfulfilled promise of addressing health inequities relating to food, gender, and reproductive justice. We suggest it is not just the tenacity of neoliberal ideas that gained prominence in the 1980s, foregrounding individual choice and responsibility while curtailing public services and welfare provisions (see [3]). We argue that older entangled histories of nutrition and militarism as well as neoliberal politics have enabled a particular understanding, positioning, and uptake of nutrition within DOHaD.

We build on the arguments of others that the field of nutrition and health has long been dominated by a narrow mode of thinking that has been termed 'hegemonic nutrition' [4]; this is characterised by standardisation and reductionism, in which food is reduced to its constituents and bodies are decontextualised [4, 5]. In the United Kingdom (UK), as we will explain, this ideology resonates with a celebrated history of nutritional research from the early twentieth century that identified the causes of common, intractable diseases and enabled improvements to be achieved by simple means. The approach was only slightly modified when dietary imbalance and energy excess came to the fore as the nutritional problems of the second half of the twentieth century, with dietary advice now the remedy.

Drawing on Foucault's concept of biopolitics and approaches used in the field of feminist science and technology studies (STS), we critically explore the deeply embedded logic of hegemonic nutrition, pointing to an assemblage of taken-for-granted politics and practices that work towards efficiency, bodies fit for purpose, and 'proper' moral conduct (long before the present neoliberal era). We trace this history and argue that this mode of

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thinking pervades the research that was undertaken to advance DOHaD ideas and the dominant interventions that were then devised. This stance continues to reproduce universal views of food and women's bodies that render invisible the complex realities of daily lives.

5.2 A Feminist Science and Technology Studies Approach

We come to the field of DOHaD from our respective disciplines of social epidemiology and social anthropology, with central interests in health inequalities, gender, and feminist STS. Science and technology studies sees science and society as inextricably intertwined. The analytic approach entails tracing the histories that are written into scientific practice, of how 'particular knowers, were embedded in, and influenced by, their religious, political, or gendered convictions, about how they could know depended on the people around them, the time and place, their class, and their own identities and interests' [6, p. 161]. While there are many different approaches within STS, a feminist STS approach draws attention to gender and its intersections with other relations of power and how these are smuggled into a science that is often presented as value free.

As feminist STS scholars, we actively interrogate disciplinary knowledge (including our own), their boundaries, and unequal power relations, reflecting on the taken-for-granted assumptions that underpin common-sense understandings of women's biosocial lives in DOHaD. We attend to matters of power within DOHaD and where it is vested – manifest in the conference arrangements, the keynote speakers, the websites, the reviews, and special issues. We notice who and what gets funded; how calls for new grants are framed and specified. We notice what sort of research receives accolades. We notice what is marginalised or left out. We think about how this is the result of much larger historical and political agendas and the continued dominance of biomedicine [7].

We are attuned to the boundary work that defines the fields of nutrition and DOHaD, and how nutrition has been discursively constructed to align with the 'epistemic authority of science' [8, p. 12], that is, the biomedical model. Such 'legitimation of knowledge claims [are] intimately tied to networks of domination and exclusion' [9, p. 1], which are themselves tied to structural systems of inequality.

We know that many DOHaD researchers will not be familiar with the above ideas. More simply, but with much loss of nuance, we think about which disciplines are seen as authorities on women's health and the implications of this view. When social conditions lead to health problems, surely this would invite social research and responses. Instead, what occurs is biomedical research and responses, and we seek to understand and critique this.

5.3 Social Inequalities in Health and the Promise of DOHaD

In 1980, the UK Working Group on Inequalities in Health reported that inequalities in health had widened since the National Health Service was established in 1948; this was attributed to various aspects of daily life and work, with implications for social policy [10]. Shunned by the Thatcher government, the 'Black report' (named after the chair of the Working Group) nevertheless received international attention and renewed research and advocacy around the social determinants of health.

Against this backdrop, within a decade, the theory that growth and development before birth influenced a person's health over the life course was proposed by David

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Barker and his colleagues. It suggested a new mechanism for the link between social position and health [11], expanding the reach and relevance of ideas about the social determinants of health. With the accumulation of evidence and growing acceptance of DOHaD ideas, action to address social determinants seemed imminent with the 1998 Independent Inquiry into Inequalities in Health [12].

Yet social inequalities have continued to widen, in the UK and elsewhere, accompanied by an increase in economic insecurity [13, 14]. In Western countries, DOHaD ideas have not led to improvements in the social determinants of health of women and infants. Instead, a narrow view of nutrition and its role in the first 1,000 days has taken hold [15].

5.4 Developmental Origins of Adult Disease and Maternal Nutrition

The cohort studies undertaken by Barker and his colleagues in the UK in the late 1980s showed that an individual's weight at birth was associated with the risk of death from cardiovascular disease many decades later. Extended work pointed to problems with nutritional supply in fetal life. This understanding was consolidated in discussions with specialists in fetal physiology and placental development in the UK, Australia, and New Zealand [16].

Barker had been thinking about intergenerational nutrition for many years. In 1966, he published three papers from his PhD on prenatal factors and 'subnormal intelligence'. He noted an excess of children with an intelligence quotient between 65 and 74 in the two lowest social classes and suggested this might be explained by poor maternal diet or physique (with short stature reflecting stunting). In subsequent research, he considered a wide range of explanations for geographic variations in disease (such as gout and gallstones) within Britain, including occupational exposures and trace elements in drinking water [17]. However, he is said to have been most interested in adult diseases as possible consequences of nutritional conditions or infections in early life, evident in the studies that commenced when he became director of the Medical Research Council (MRC) Environmental Epidemiology Unit at Southampton University in 1984.

Research on disease aetiology, as upheld in biomedicine, is inevitably reductionist through the emphasis on identifying mechanisms and insisting that causation is only convincingly demonstrated by the experimental manipulation of specific factors [18]. Thus, despite the appreciation by Barker and his colleagues of the relevance of social circumstances and structural factors [19], wider environments were erased in the laboratory experiments and clinical studies required to provide the proof that maternal nutrition has effects on fetal growth and development. Not only has this logic directed vast attention to the physiology (and later, epigenetics) of the fetus and placenta, but it has also heavily influenced ideas about how to respond to nutrition as a cause of poor health.

Research motivated by the DOHaD theory concerning women's diets, pregnancy, and fetal growth indicated that the problem did not lie in specific nutrient deficiencies or in a specific condition such as anaemia. Historical and contemporary cohort studies of pregnant women suggested dietary imbalance or quality might be relevant, but also body composition (see [20]). Women's diets in pregnancy are usually a continuation of their established dietary patterns, and older work had already suggested that cumulative nutritional status before pregnancy influenced fetal growth more than dietary intake during pregnancy [21].

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By the early 2000s, the focus had shifted to body size and women classified as obese, partly in response to concerns about gestational diabetes and obesity in children [22]. DOHaD researchers and practitioners might have emphasised the connections between obesity and stress and hardship [23]. Instead, they largely succumbed to what Scrinis [24] has called 'nutritionism', where individuals are provided with advice and detailed information on the constituents of food and induced to think in microbiological terms. This is an approach to problems involving nutrition that harks back to early-twentieth-century ways to address nutritional deficiencies. Excess body weight does not arise from a nutritional deficiency, but it is cast as a deficiency of information and willpower that is squarely located within 'non-normative' bodies [25].

5.5 The Treachery of Nutrition

We suggest that identifying nutrition as a cause of poor health invokes modes of research and institutional responses that do not involve social or structural change. As we will explore, nutritional causes of poor health are widely seen to require detailed biomedical analysis, translated into 'lifestyle' advice for individuals. This template does not attend to eco-social causes [26]; thus class and racial/racist inequalities are unacknowledged and undisturbed. We refer to this as the treachery of nutrition. This epistemic privileging of biomedical sciences renders other disciplines (such as social sciences) marginal to DOHaD knowledge and acceptance and constrains possibilities: for multiple knowledge (including lay knowledge); for inclusive funding for different research questions, methods, and interventions; and for new policy agendas.

At the core of the treachery of nutrition are its historical roots in biochemistry and physiology and the biomedical model. This disciplinary alliance and approach were remarkably successful in addressing deficiency diseases (such as rickets) in the early twentieth century, as will be outlined. However, the nature of the pressing problems changed to dietary imbalances and over-consumption. The old emphasis on micronutrients and the need to instruct people to consume unpalatable substances (such as cod liver oil) was carried forward. The approach was renovated as profiling of nutrients in foods and diets and providing people with instructions around this, despite the fact that lack of knowledge was hardly the problem it had been. Others have criticised the reductionist approach that dominates thinking about nutrition and health, in general, and the narrow responses this offers [4, 24, 27]. Here we take this up specifically in relation to DOHaD, which has become a site for the reproduction of hegemonic nutrition and a means for its proliferation in healthcare and popular media.

The expectations of nutrition as a means to improve public health rest on portable, insertable solutions: a spoonful of cod liver oil, a dose of lime juice, a dab of Marmite. These do not improve the living and working conditions of people but rather make them fit for work (historically, as sailors or labourers) or bearing arms (notably in World War I). This has been carried forward: an ounce of education, a brief piece of advice, a mobile phone app. The legacy of this tradition is clear within DOHaD. Also clear is that certain views of bodies and food pervade the field: making women fit for childbearing and food as substrate for fetal growth.

What this approach neglects is the gendered, sociocultural, economic, and political contexts of food and food systems, and the everyday lives of women and their emotional wellbeing, that shape the many practices of how eating, care, and nourishment are done.

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We acknowledge that some DOHaD efforts have been directed to these broader contexts [28, 29], and we would encourage much more of this. We know it remains important to address micronutrient deficiencies in pregnant women in many parts of the world [30], and folic acid supplementation is important to prevent neural tube defects [31]. However, different approaches are needed for obesity.

5.6 The Overweening Shadow of Historical Nutritional Research

The history of nutrition research and its emergence as a science, as represented in imperial and colonial accounts, emphasises advances made in the UK and the USA from the 1900s [32]. These advances prioritised the discovery of nutrients, descriptions of nutritional deficiencies, and factors affecting nutrient availability. In the UK, this history is marked by concerted government efforts to research specific public health problems and then mobilise a response on a large scale. Unparalleled elsewhere, this reflects the much greater involvement of the UK than the USA in the two world wars. Nutrition was an 'instrument of state' [33, p. 702], as outlined below, pressed into service to ensure the food security of troops as well as that of the home population, with the UK vulnerable to blockade and experiencing a shortage of agricultural labour (see [33, 34]).

As recounted by Acheson (who preceded Barker as the director of the MRC Environmental Epidemiology Unit and then became Chief Medical Officer 1983–1991), 'The story of the Government's triumphantly successful food policy in World War II has often been told . . .' [35, p. 210]. To ensure the food supply, there was rationing underpinned by nutrition science. Thus, staples of bread and potatoes were not restricted, while meat, fat, and sugar were; vitamins were distributed; expectant and nursing mothers had an extra allowance of milk. The physical health of the population, notably children, measurably improved [35].

Less well known is an older history of endeavours, for example, to avoid scurvy in troops in World War I. An appeal by the War Office led to Harriette Chick at the Lister Institute recommending the consumption of beans and lentils that had been germinated or sprouted [34]. The political situation (war) made the study of vitamins (then known as accessory food factors) an imperative, and the functional properties of certain foods were used to solve the problem of maintaining the health of troops within the constraints of army food supplies; pulses for germination were much easier to store and distribute than fresh fruits and vegetables.

Also noteworthy is the history of rickets [32], which manifests in children as bowed legs and other skeletal deformities. Rickets was perplexing in research, long the subject of apparently contradictory findings and debate. In retrospect, we know that this confusion was because rickets is due to a deficiency of vitamin D (needed to absorb calcium), which can be sourced from sunlight or from diet (while some cereals can reduce absorption of calcium). In 1914, the (then) Medical Research Committee funded Edward Mellanby to undertake research that included his famous experiments with dogs; he fed puppies different diets to see which resulted in rickets, systematically identifying a deficiency of a fat-soluble accessory food factor that must be responsible and testing 'anti-rachitic' diets. Mellanby concluded that rickets was a deficiency disease that could be cured by providing animal fats or cod liver oil. After World War I, clinical trials with children in Vienna (led by Harriette Chick) demonstrated that rickets could be treated and prevented by these means (or sunlight) [36].

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Mellanby went on to have a long career providing advice to the Ministry of Health and to the War Cabinet in World War II. His early work set a pattern for the interaction of clinical and experimental work that he advocated in a book with that title and as Secretary for the MRC from 1933 to 1949. Mellanby was hugely influential through the positions he held, and biomedical and nutrition science was shaped by his historically resonant presence. (See, for example, the celebration of this research tradition in the 'Timeline of MRC research and discoveries' on the website of UK Research and Innovation.) This pattern of clinical and experimental work was carried forward by McCance and Widdowson in their work on fetal and infant growth after World War II [37] and was advocated and upheld in the DOHaD field as the biomedical model par excellence.

Thus, after the initial findings from observational epidemiological studies, animal experiments that are the hallmarks of 'proper' scientific nutritional research were soon undertaken. This was vital to prove the principle that dietary manipulations in pregnant animals can alter long-term metabolic function in offspring. Most of the research was undertaken in rats, with consequences for offspring of maternal low-protein diets, in particular, described in detail: altered fetal growth; reduced size of truncal organs (but brain sparing); hypertension; abnormal glucose and insulin responses; impaired inflammatory responses; and shortened lifespan (e.g. [38]).

But these experiments should not be interpreted as demonstrations of what should happen in humans, in the way the older experiments on deficiencies provided direct guidance on what to insert into the diet. Even research with laboratory animals induced to have large amounts of body fat (e.g. [39]) only proves that this condition can affect the morphology and physiology of offspring; it does not indicate when or how obesity in women forming families should be addressed. Kelly and Russo [40] have identified this mistake in reasoning: the mechanisms of aetiology for non-communicable diseases are not the mechanisms of prevention. Thus, identifying obesity as a cause of poor health is not enough; it is not a pathogen or isolated behaviour to be eliminated; it has complex social origins that need to be understood for prevention to be possible.

We do not question a role of basic nutrition science, but we question it being viewed as almost all that is necessary, as providing a guide for clinical trials and related actions. The reductionism apparent in nutrition and in biomedicine more broadly was as strong as ever in DOHaD research, perhaps firmly embraced in the effort to gain legitimacy. The early findings from cohort studies had received the standard criticisms of observational epidemiology (see [41]): findings might reflect bias or confounding, correlation is not causation, and what was the mechanism? So the response was to undertake experiments in which nutrition was manipulated and to pursue biological mechanisms (eventually epigenetics). But more than this type of knowledge is required, and Penkler [15] notes that DOHaD researchers are beginning to recognise this.

Biomedicine and the basic sciences have profoundly shaped the field of nutrition and health, leading to well-trodden patterns of organisation across the scientific community. Thus, nourishment is seen in reductionist terms, food and the food–body relationship are standardised, and expert knowledge is seen as the corrective. This hegemonic nutrition is decontextualised: it does not attend to the exigencies of everyday lives; the roles of place, racism, gender and gender relations; or the politics of food systems. It dominates at the expense of other ways of thinking about food and health and possibilities for intervention. Valdez refers to this pervasive logic as an 'epistemic

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environment' [42, p. 9], as it highlights how scientific knowledge production is shaped and 'how science imagines, manages and apprehends future health' [42, pp. 9, 10]. This boundary work involves selective foreclosures [43], and in the case of DOHaD, this foreclosure consistently locates the 'problem' in maternal diets and in women's reproductive bodies, not in the broader conditions of daily lives.

5.7 Biopolitical Deployment of Nutrition Interventions

The DOHaD field clearly reflects a genealogy of hegemonic nutrition that can be further understood through Foucault's concept of biopolitics. Foucault argued that a new form of power emerged in the nineteenth century, with governments seeking to control and manage populations from a distance through expectations of collective conduct. Through shaping expectations about appropriate ways to live and behave, and having citizens monitor themselves and others, governments did not have to exert overt power (e.g. through threats of physical punishment or imprisonment). This form of power is known as biopolitics. Citizens learned about these expectations and how to conform through institutions such as schools and clinics (that had become widely accessible), as well as laws and regulations. Although the strategies and technologies of biopower (the ways expectations are created and maintained) have changed over time, one enduring focus has been reproduction and the role of mothers in serving the health of their children and in maintaining the population needed for labour and war [44, 45]. The biopolitics of reproduction is now extended to the health of their children before birth [46].

Biopower works subtly as it operates horizontally in everyday worlds rather than appearing to be imposed directives. People are asked to take responsibility for their health through self-care and to work on their own bodies according to normalised standards (see [47]). Autonomy is emphasised, and this resonates with a liberalism ideology. (But as the example of obesity makes clear, individuals are not free to reject expectations to do this work.) Expectations for collective conduct are set in conjunction with a range of networked agencies and professional organisations that authorise and legitimise norms. The medical profession and the basic sciences have long been sources of authority drawn upon in biopolitics (sometimes notoriously, as in the eugenics movement) [48, 49]. Biopower can be useful in organising communities and improving health, but it can also entail harm when problems are purely individualised.

There is a history of research in which pregnancy, childbirth, and caring for children are considered through the lenses of medicalisation and biopolitics [44, 50]. Mothers-to-be and mothers are subject to expert advice, medical monitoring, and public scrutiny, with discourses on appropriate self-care proliferating in popular media. Conforming is a personal responsibility and a moral imperative, regardless of a woman's life circumstances or constraints. In general, biopolitics identifies certain groups as needing more scrutiny and guidance to comply with bodily self-regulation. The 'problem' groups are those that fall outside the normalised parameters of health or civility, such as the poor, the unemployed, migrants, or people of colour. Such groups are often represented as ignorant and uneducated, requiring heightened surveillance and education. In relation to pregnancy, women whose body size is classified as obese are now seen as a 'problem' group. Here lies the potential to re-inscribe discrimination.

Antenatal lifestyle interventions for pregnant women, particularly those with large body size [51], are an exemplar of gendered biopolitics. Women are typically counselled

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by dieticians and provided individual advice. There are now apps to track nutritional intake and physical activity and to receive behaviour modification messages. Other educational supports in the service of improving lifestyles include any number of pamphlets, social media sites, and food marketing. While the use of digital technologies gives this a veneer of twenty-first-century self-help, these lifestyle interventions have not significantly changed since the 1950s [42].

Conceptually, biopolitics helps us see how medicine, nutrition science, and health promotion – now integrated in DOHaD – direct women to put more effort into managing their pregnant bodies and securing the future health of their children. For some women, this may be useful and provide a sense of control, but for others it is a source of unfair pressure. The individualisation of responsibility means that women are blamed, or feel blamed, when they do not act appropriately [52, 53], and the difficulties faced by women in disadvantaged circumstances and/or ethnic minorities are not taken into account. Furthermore, meaningful support and social change do not occur.

We are not trying to deny that improvements in antenatal care have reduced maternal and perinatal mortality and morbidity, notably over the first half of the twentieth century. We are not suggesting that women are not agents in biopolitical processes (especially middle-class, white women). However, we do criticise lifestyle interventions in antenatal care as the dominant response to DOHaD in Western countries. From within this paradigm, there have been questions about the efficacy of the approach because it probably occurs too late to benefit fetal development [54], so a shift in focus to pre-conception care has been proposed [55]. That would simply shift the problem of foreclosure we identify to an earlier point in women's lives.

Biopolitics constructs health as an individual responsibility. But as Wells has argued, society has created 'metabolic ghettos' in which people are susceptible to obesity, and there are many steps that governments could take to address the commercial and corporate determinants of obesity and to support people to have healthier lives [56]. These are social justice initiatives – not the portable, insertable solutions exemplified by cod liver oil.

5.7 Interdisciplinary Approaches Are Needed

The challenges of broadening and transforming disciplinary boundaries are multiple, even for those working from within. Tensions in the field of nutrition concerning its disciplinary emphasis have long been recognised (e.g. [57]). In 2005, Cannon and colleagues [27] set out the basis for a 'new nutrition science' that was social and environmental as well as biological. Within the American Society for Nutrition, the case for 'mode 2' research (another term for applied research) has been made [58]. Several European nutrition entities have jointly proposed embracing broader research domains and disciplines, including anthropology, sociology, and cultural studies [59].

But where are the funds to be found? For decades, nutrition science has received enormous funding from industries involved with agricultural production and food manufacturing. We note that the food industry has a vested interest in human nutrition being framed as food composition, with consumers needing better education, as this deflects attention from the corporate determinants of health (via multinational corporations making huge profits from processed food that is high in salt, fat, and sugar [60]). It is unclear how to fund the volume of research needed to provide depth and variety in

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the eco-social knowledge of nutrition, especially when health and medical research councils continue to see nutrition in biomedical terms. DOHaD could become a strong advocate for such research diversity.

It is not just through biomedicine and nutrition science that a repressive approach to diet and nutrition proliferates. This is reproduced across health and educational institutions as well as popular culture. DOHaD ideas have generated a great deal of wider interest [61], so there is an opportunity to engage with institutions and communities to ask questions about the traditional framing of nutritional problems and their solutions and to showcase alternatives [4, 43].

5.8 Conclusion

In conclusion, we would first like to acknowledge some limitations of this piece. There is also entangled colonialism and racism that we have not explored, nor have we been able to do justice to the biopolitics of the foundations of antenatal care (to avert population decline) (see [62]). We have focused on hegemonic nutrition as seen in the UK and Australia (which ignores Aboriginal and Torres Strait Islander knowledge). We had to be selective with the references provided, and we acknowledge there are many other scholars whose work is relevant.

The UK, Australia, and similar countries have favoured individualised responses to obesity prevention, despite being urged to take a societal or systems approach [63]. So far, this is also the dominant response within DOHaD, and DOHaD ideas have not changed social or structural factors that shape the health of women and their children. Indeed, the ideas might have found acceptance in an era that emphasises individual responsibility precisely because they follow a well-trodden path and are not disruptive. From our interdisciplinary standpoint, we recommend looking beyond biomedicine and nutrition science for answers to problems that encompass socio-economic-political-material-bio systems. Broadening attention to social environments includes appreciating and attending to the power relations of multiple knowledges, to differing disciplinary knowledges, and to the situated knowledges of the people and communities that are the focus of DOHaD. Without such interdisciplinary and co-constituted attention, DOHaD will not be able to address health inequalities.

References

1. Roberts D. *Killing the Black Body: Race, Reproduction and the Meaning of Liberty.* New York: Pantheon Books, 1997.
2. Ross L, Solinger R. *Reproductive Justice: An Introduction.* Berkeley: University of California Press, 2017.
3. Shrecker T, Bambra C. *How Politics Makes Us Sick: Neoliberal Epidemics.* Houndmills, Basingstoke, UK: Palgrave Macmillan, 2015.
4. Hayes Conroy A, Hayes Conroy J. *Doing Nutrition Differently: Critical Approaches to Diet and Dietary Interventions.* Ashgate: London, 2013.
5. Sanabria E, Yates-Doerr E. Alimentary uncertainties: From contested evidence to policy. *BioSocieties* 2015; 10: 117–124.
6. Martin A. Science as culture. In Brock M, Raby D, Thomas R. (eds) *Power and Everyday Practices.* Toronto: Nelson Education, 2011; 161–181.
7. Fisher M, Baum FE, MacDougall C, Newman L, McDermott D. To what extent do Australian health policy documents address social determinants of

https://doi.org/10.1017/9781009201704.007 Published online by Cambridge University Press

health and health equity? *J Social Policy* 2016; 45: 545–564.

8. Gieryn T. *Cultural Boundaries of Science: Credibility on the Line*. Chicago, IL: University of Chicago Press, 1999.
9. Lennon K, Whitford M. Introduction. In Lennon K, Whitford M. (eds) *Knowing the Difference: Feminist Perspectives in Epistemology*. London: Routledge, 1994; 1–16,
10. Department of Health and Social Security. *Report of a Working Group on Inequalities in Health*. London: DHSS, 1980.
11. Barker DJP. The foetal and infant origins of inequalities in health in Britain. *J Public Health Med* 1991; 13: 64–68.
12. Acheson D. *Inequalities in Health: Report of an Independent Inquiry*. London: HMSO, 1998.
13. Stiglitz J, Fitoussi J-P, Durand M. *Beyond GDP: Measuring What Counts for Economic and Social Performance*. Paris: OECD, 2018.
14. Paremoer L, Nandi S, Serag H, Baum F. Covid-19 pandemic and the social determinants of health. *Br Med J* 2021; 372: n129.
15. Penkler M. Caring for biosocial complexity. Articulations of the environment in research on the Developmental Origins of Health and Disease. *Studies in History and Philosophy Science* 2022; 93: 1–10.
16. Barker DJP, Gluckman PD, Godfrey KM, Harding JE, Owens JA, Robinson JS. Fetal nutrition and cardiovascular disease in adult life. *Lancet* 1993; 341: 938–941.
17. Barker DJP. Geographical variations in disease in Britain. *Br Med J* 1981; 283: 398–400.
18. Davis JE. Holism against reductionism. In Davis JE, Gonzales AM. (eds) *To Fix or to Heal: Patient Care, Public Health, and the Limits of Biomedicine*. New York: New York University Press, 2016;1–29.
19. Barker DJP. *Mothers, Babies and Disease in Later Life*. London: BMJ Publishing, 1994.
20. Godfrey K, Barker DJP. Fetal nutrition and adult disease. *Am J Clin Nutr* 2000; 71 (suppl); 1344S–1355S.
21. Ounsted M, Ounsted C. *On Fetal Growth Rate: Its Variations and Their Consequences*. London: Heinemann Medical, 1973.
22. Oken E, Gillman MW. Fetal origins of obesity. *Obes Res* 2003; 11: 496–506.
23. Moore V, Warin M. The reproduction of shame: Pregnancy, nutrition and body weight in the translation of developmental origins of adult disease. *Science, Technology, & Human Values* 2022; 47: 1277–1301.
24. Scrinis, G. *Nutritionism: The Science and Politics of Dietary Advice*. New York: Columbia University Press, 2013.
25. Warin M, Turner K, Moore V, Davies M. Bodies, mothers and identities: Rethinking obesity and the BMI. *Sociol Health Illn* 2008; 30: 97–111.
26. Krieger N. Proximal, distal, and the politics of causation: What's level got to do with it? *Am J Public Health* 2006; 98: 221–230.
27. Cannon G, Leitzmann C. The new nutrition science project. *Public Health Nutr* 2005; 8: 673–694.
28. Penkler M, Hanson M, Biesma R, Muller R. DOHaD in science and society: Emergent opportunities and novel responsibilities. *J Dev Orig Health Dis* 2019; 10: 268–273.
29. Strommer SL, Lawrence W, Shaw S, Correia Simao S, Jenner S, Barrett M, et al. Behavior change interventions: Getting in touch with individual differences, values and emotions. *J Dev Orig Health Dis* 2020; 11: 589–598.
30. Keats EC, Haider BA, Tam E, Bhutta ZA. Multiple-micronutrient supplementation for women during pregnancy. *Cochrane Database Syst Rev* 2019, 3. Art. No.: CD004905.
31. De-Regil L, Peña-Rosas J, Fernández-Gaxiola AC, Rayco-Solon P. Effects and safety of periconceptional oral folate supplementation for preventing birth

https://doi.org/10.1017/9781009201704.007 Published online by Cambridge University Press

defects. *Cochrane Database Syst Rev* 2015, 12. Art. No.: CD007950.

32. Carpenter KJ. A short history of nutritional science: Part 3 (1912–1944). *J Nutr* 2003; 133: 3023–3032.
33. Cannon G. The rise and fall of dietetics and of nutrition science, 4000 BCE–2000 CE. *Public Health Nutr* 2005; 8: 701–705.
34. Smith R. The emergence of vitamins as bio-political objects during World War I. *Stud Hist Philos Biol Biomed Sci* 2009; 40: 179–189.
35. Acheson D. Nutrition monitoring of the health of the nation. *J R Soc Health* 1987; 6: 209–214.
36. Carpenter KJ. Harriette Chick and the problem of rickets. *J Nutr* 2008; 138: 827–832.
37. Buklijas T. Food, growth and time: Elsie Widdowson's and Robert McCance's research into prenatal and early postnatal growth. *Stud Hist Philos Sci* 2014; 47: 267–277.
38. Langley-Evans S. Fetal programming of cardiovascular function through exposure to maternal undernutrition. *Proc Nutr Soc* 2001; 60: 505–513.
39. Samuelsson A, Matthews PA, Argenton M, Christie MR, McConnell JM, Jansen E, et al. Diet-induced obesity in female mice leads to offspring hyperphagie, adiposity, hypertension, and insulin resistance. *Hypertension* 2008; 41: 383–392.
40. Kelly MP, Russo F. Causal narratives in public health: The difference between mechanisms of aetiology and mechanisms of prevention in non-communicable diseases. *Sociol Health Illn* 2018; 40: 82–99.
41. Joseph KS, Kramer MS. Review of the evidence on fetal and early childhood antecedents of adult chronic disease. *Epidemiol Rev* 1996; 18: 158–174.
42. Valdez N. *Weighing the Future: Race, Science and Pregnancy Trials in the Postgenomic Era.* Oakland: University of California Press, 2021.
43. Guthman J. *Weighing In: Obesity, Food Justice and the Limits of Capitalism.* Berkeley: University of California Press, 2011.
44. Ginsburg F, Rapp R. The politics of reproduction. *Annu Rev Anthropol* 1991; 20: 311–343.
45. Clarke A. *Disciplining Reproduction.* Berkeley: University of California Press, 1998.
46. Lupton, D. 'Precious cargo': Foetal subjects, risk and reproductive citizenship. *Crit Public Health* 2012; 22: 329–340.
47. Coveney J. *Food, Morals and Meaning: The Pleasure and Anxiety of Eating.* New York: Routledge, 2006.
48. Lemke T. The birth of bio-politics: Michel Foucault's lecture at the College de France on neo-liberal governmentality. *Econ Soc* 2001; 30: 190–207.
49. Rose N. The politics of life itself. *Theory Culture Soc* 2001; 18: 1–30.
50. Oakley A. The sociology of childbirth: An autobiographical journey through four decades of research. *Sociol Health Illn* 2016; 38: 689–705.
51. Flynn AC, Dalrymple K, Barr S, Poston L, Goff L, Rogonzinska E, et al. Dietary interventions in overweight and obese pregnant women: A systematic review of the content, delivery, and outcomes of randomized controlled trials. *Nutr Rev* 2016; 74: 312–328.
52. Warin M, Zivkovic T, Moore V, Davies M. Mothers as smoking guns: Fetal overnutrition and the reproduction of obesity. *Feminism Psych* 2012; 22: 360–375.
53. Richardson SS, Daniels CR, Gillman MW, Golden J, Kukla R, Kuzawa C, Rich-Edwards J. Society: Don't blame the mothers. *Nature* 2014; 512: 131–132.
54. Catalano P, deMouzon SH. Maternal obesity and metabolic risk to the offspring: Why lifestyle interventions may not have achieved the desired outcomes. *Int J Obes* 2015; 39: 642–649.
55. Vogel C, Kriznik N, Stephenson J, Barker M. Preconception nutrition: Building advocacy and social movements to

https://doi.org/10.1017/9781009201704.007 Published online by Cambridge University Press

stimulate action. *J Dev Orig Health Dis* 2021; 12: 141–146.

56. Wells J. *The Metabolic Ghetto: An Evolutionary Perspective on Nutrition, Power Relations and Chronic Disease*. Cambridge: Cambridge University Press, 2016.
57. Waterlow JC. Crisis for nutrition. *Proc Nutr Soc* 1981; 40: 195–207.
58. Pelletier DL, Porter CM, Aarons GA, Wuehler SE, Neufeld LM. Expanding the frontiers of population nutrition research: New questions, new methods, and new approaches. *Adv Nutr* 2013; 4: 92–114.
59. Tufford AR, Calder PC, Van't Veer P, Feskens EF, Ockhuizen T, Kraneveld AD, Sikkema J, de Vries J. Is nutrition science ready for the twenty-first century? Moving towards transdisciplinary impacts in a changing world. *Eur J Nur* 2020; 59 (Suppl 1): 1–10.
60. Nestle M. *Unsavory Truth: How Food Companies Skew the Science of What We Eat*. New York: Basic Books, 2018.
61. Budds K. Fit to conceive? Representations of preconception health in the UK press. *Feminism Psych* 2021; 31: 463–482.
62. Hanson C. *A Cultural History of Pregnancy: Pregnancy, Medicine, and Culture 1750–2000*. Houndmills, Basingstoke, UK: Palgrave Macmillan, 2004.
63. Ulijaszek SJ, McLennan AK. Framing obesity in UK policy from the Blair years, 1997–2015: The persistence of individualistic approaches despite overwhelming evidence of societal and economic factors, and the need for collective responsibility. *Obes Rev* 2016; 17: 397–411.

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