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Nicholas Nisbett

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Malnutrition as more-than-food: understanding failings in the broader infrastructures of nurture

Nicholas Nisbett

Institute for Development Studies at the University of Sussex, Brighton, UK

ABSTRACT

This paper considers critical approaches to child malnutrition and its broader causes, which necessarily include, but extend beyond, food. Materialist approaches to food in geography have emphasised how food is only one thing to move through, affect or be incorporated into children's bodies alongside numerous other social and material relations. Drawing on (the untapped similarities in) wider geographies of infrastructure and care, as well as feminist perspectives on childhood, infant feeding and shame, this paper attempts to develop a broader geography of infrastructures of nurture: the underlying and contested relationships necessary to sustain life; and the consequences attached to their gaps and failings.

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Introduction

Child malnutrition is the result of acute and persistent political failures to provide adequate health, food and other societal systems necessary for child health and growth (Friel and Ford 2015; Nisbett 2019). In its chronic forms of stunting (reduced growth) and obesity and overweight, it affects, respectively 150 million children and 39 million children, worldwide (UNICEF, WHO, and World Bank 2021). Acute and chronic forms of undernutrition, including micronutrient deficiencies, are estimated to be the underlying factor behind 45% of all child deaths, the majority of which occur in low and middle-income countries (Black et al. 2013).

Malnutrition is often understood to be a lack of or an excess of particular food or nutrients, but in global health research it refers more broadly to a range of critical health conditions in which the body is compromised and often severely weakened or put under strain by the feedbacks which occur between poor nutrient intake, the body's immune system and wider physiological functioning. Going beyond nutrients, or even food, as nutrition is critical here: a child's body weakened by illness and disease will both demand more nutrients and absorb less, just as poor nutritional health will lead to lowered immunity and more persistent, serious illness of longer duration. Non-communicable diseases such as diabetes and heart disease are increasingly being linked by epidemiological evidence to poor nutrition in childhood. A concern with child malnutrition, then, is not a concern with too little or an excess of food and nutrients – it is a concern with inequitable and preventable failures in child growth, child illness and lifelong disease, and with still high global levels of child death.

Scholarship on child malnutrition has been divided between technical/policy and critical fields, often operating in distinct epistemic or disciplinary silos. The critical food work that I draw on in

CONTACT Nicholas Nisbett n.nisbett@ids.ac.uk

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this paper has been hugely important in helping focus on broader structural inequities and the medicalisation, or individualisation, of responses to malnutrition (Scrinis 2008). But in its project to magnify the micro and macro political drivers of food inadequacy, critical food can often overlook important wider aspects of nurture and care that are suggested by some public health approaches (though rarely examined critically within that same public health literature). For example, despite rich literatures on sanitation or environmental justice existing within geography, this literature is infrequently referenced in critical food studies, even though 'out-of-place' matter including human and animal faeces, or environmental pathogens such as pollution find their way into children's guts and lungs and are implicated in a range of chronic bodily conditions which limit nutrient absorption and child growth or cause obesity. Likewise, geographies of care and early childhood devote a great deal of time to considering the critical relationships and materialities that govern a child's nutritional status in the womb and early years; yet this work remains marginal to the concerns of some critical food studies, which can often still default to a focus on the global politics of production and consumption.

In this paper, I utilise a public health perspective in dialogue with geography and wider critical food studies to argue that the wider caring relations and infrastructures necessary for infant nurture cannot be viewed via food alone: food is a necessary but in itself insufficient relationship amongst all those material and social relationships which sustain healthy child growth. These relationships I label infrastructures of nurture.

To develop this perspective, I *do* draw extensively on geographies of food, with their focus on the (feminist) political ecology of the body (Hayes-Conroy and Hayes-Conroy 2008); and on food and the body as sharing porous boundaries with socio-natural processes mapped over multiple scales (Del Casino 2015; Goodman 2016). But I also draw on two other distinct (though not unrelated) literatures which can help to deepen and expand this perspective beyond food and nutrients. One literature is geographical and political ecology scholarship on infrastructure, which sees infrastructure as comprising an intertwined set of social, material and natural relations necessary for the sustenance of basic needs (Desai, McFarlane, and Graham 2015; McFarlane and Rutherford 2008; Ranganathan 2015; Redfield and Robins 2016). The other literature is drawn from geographies of care and of infant feeding, which interrogates the nature and embodied ethics of caring practices and relationships and speaks further of the development of children's bodies and selfhood/subjectivity in relation to others (Faircloth 2013; Fisher and Tronto 1990; Hanrahan and Smith 2018; Holt 2017; Lawson 2009; Milligan and Wiles 2010).

Infrastructures of nurture and care

Geographies of food provide a good departure point in highlighting the radical relationalities of food as implicated in a broad mesh of socio-natural relations that are better understood as 'more than food' (Goodman 2016) or food *assemblages*. Assemblage and similar neo-materialist approaches are multiply defined (Anderson and McFarlane 2011), but at their core require a focus on how different 'things' – whether these be biological or other matter; people, their practices and their wider social connections, or broader discourses, norms and ideas – are assembled at particular times and places, in ways that matter or 'make a difference' (Barad 2007). This inherent anti-dualism – this mixing of social and natural concerns and categories – is important. Rather than focus separately on nutrient-body relationships, or the norms, ideologies and discursive construction of nutrition, an assemblage approach necessitates combining separate disciplinary attention to the biological relations of child growth and immunity, the social role of food and eating, or the political-economy of who is undernourished, where, when and why.

However, the word nutrition, with its nutrient-centricity, does little justice to this wider set of relations and can leave analysis wedded to relations of child growth and care that are mostly food-centric. In a volume on critical nutrition, Sanabria and Yates Doerr argue instead for 'the frame of 'the aliment' [*that which nurtures the body*] [which] recognizes that nourishment extends

beyond what is eaten, entailing care for socially, economically and ecologically viable food systems and sustainable diets' (Sanabria and Yates-Doerr 2015, 119 my emphasis). Inspired by this need to find a new language detached from both food and nutritionism, I move further from the food connotations of *the aliment* and instead adapt Yates-Doerr and Sanabria's focus on *nurture*.

Nurture in common parlance already suggests something of the right circumstances for adequate child growth, nutrition and wider wellbeing, as well as the social, material and discursive relationships which enable this. Nurture includes not only the obvious relationship of a body to its ingestion of food, but the relationship of that body to other bodies, in ways that sometimes blur the boundaries between those bodies and other materials, as exemplified by babies nurtured in the womb, or on or off the breast and with the paraphernalia of infant feeding (Boyer 2010; Newell 2013). Nurture also refers to the wider cultures and practices of food preparation and eating that are captured in much wider work on food cultures and foodways (Watson and Caldwell 2005). But it can also refer to psychological and affective relationships of care (Faircloth 2011; Holt 2017) and thus links to and builds on wider literatures on care and caring practices (Hanrahan and Smith 2018, 233; Lawson 2009; Fisher and Tronto 1990, Milligan and Wiles 2010).

New understandings of infrastructure offer a further opportunity to connect to the material experience of children and their carers in ways that help focus on how people meet their essential needs, the role of public policy and provision in supporting this, and the socio-material relationships underpinning such provisioning. In essence, infrastructure is understood as a set of socio-material relationships essential for meeting basic needs, but which being a set of limited resources, are under constant political contest. But the term infrastructure has developed far beyond common understandings of the physical arrangements or networks of pipes, cables or roads that one might find in engineering or urban planning. One definition sees infrastructure as a 'grid', encompassing 'a wider complex of state administered infrastructures, the material goods they provide *and the norms they enable*' (Redfield and Robins 2016, 151, my emphasis). Other definitions of infrastructure go further in referencing 'both [..] material […] and social configurations', incorporating 'not just physical, but also social, economic, political and ecological processes' (Desai, McFarlane, and Graham 2015), i.e. the collective systems that allow 'urban life to take place in precarious and marginalized neighbourhoods' (Desai, McFarlane, and Graham 2015, see also Ranganathan 2015, 100). Much of this work has been ethnographically grounded and thus concerned with the way in which everyday experience of infrastructure is situated in historical, geographical and embodied (gendered, racialised, colonised) negotiations with formal and informal systems. It is the politics of such infrastructural assemblages (also termed *political infrastructures* – McFarlane and Rutherford 2008), not necessarily their physical presence, which determine whether or not basic needs are served, obstructed or ignored.

Feminist work on infrastructure has been particularly important in demonstrating these ways in which infrastructure access (or, more frequently, the consequences of infrastructural failings) is performed differently in gendered, aged and otherwise socially differentiated bodies (Truelove 2011). For example, Truelove has written of how, in relation to water in Delhi's informal settlements '[w]omen's bodies encounter differing degrees of gendered hardships, physical labour, and public shame that are shaped by their situated position within families, communities, and class groups in the city (Truelove 2011, 147). Truelove writes how this gendering is experienced by girls from an early age in ways that significantly affect their freedom and movement – staying home to wait for water tankers, or performing care work while other women fetch water. Missed education and other opportunities can mean they end up locked in a cycle of dependency: women and children become critical human components in marginalised people's coping assemblages that arise to deal with infrastructural failings (Truelove 2011, p.148).

There has been only sparse work on food infrastructures. In a special issue of Global Food History dedicated to the theme, Pilcher writes of culinary infrastructure, a term which 'expresses the tension between avowedly subjective symbols and meanings of culinary cultures and seemingly more objective, indeed concrete, physical infrastructure' (Pilcher 2016, 107). A number of other

authors focus on a more traditional sense of infrastructure representing retail and associated supply chains (Clark, Conley, and Raja 2021; Myers and Caruso 2016). Earlier works on urban metabolism and hunger (Heynen 2006; Shillington 2013) also share similarities in their focus on the circularity of flows between the city's different socio-natural and political sub-systems. Food and other nurturing infrastructures bear similarities to other infrastructures in that they are easily hidden, assumed or ignored until they break or are in need of urgent maintenance and repair (Graham and Thrift 2007; McFarlane and Rutherford 2008). At that point of rupture, as shown by numerous urban food riots which followed the 2007/8 global food price crisis (Hossain and Scott-Villiers 2017), or the current crisis in childcare and educational care work which have been exposed by the Covid-19 pandemic, the wider relationships necessary for their maintenance are brought into sharp focus, as is the contrast between those who gain and lose from their everyday state of disrepair or make-do.

These literatures on care, on infrastructure and on food are rarely, if ever, brought together. Like the nurturing relationships explored here, care's place has been marginalised in the academic cannon as a primarily feminist concern; but suppression of the role of care also reflects wider political filters of what matters (Hall 2020; Lawson 2009). Heroic conceptions of infrastructure's civil engineering feats receive attention over its place in systems of human care and yet it is indeed striking how feminist and critical scholars arrived earlier at care's definition, just like current notions of infrastructure, as the relations and practices necessary 'to maintain, continue, and repair our world so that we can live in it as well as possible' (Tronto and Fisher 1990, 4). More recent work has updated these original concerns to pursue 'firmly the political question of who decides what is cared for in our becoming world' (Hanrahan and Smith 2018, 233), as part of distinct spatial and temporal politics we might label 'landscapes of care' (Milligan and Wiles 2010).

In bringing together work on infrastructure and care I note how all infrastructures: involving not only human, but material and other socio-natural relationships, depend on ideologies and norms of care stretching from the individual to the state and to (contested) notions of collective humanity. These are structures of support laid down over lifetimes that benefit others not only in that lifetime, but also often overlapping or distant, lifetimes (Milligan and Wiles 2010). Like the nurturing infrastructures explored here, all infrastructures, therefore, are infrastructures of care situated along different spatial and temporal scales.

In the sections that follow, the work of this paper is to try to find new and productive ways of combining these insights, when explaining the infrastructures of nurture which support child growth. The first section focuses on the relationships between food and bodies: particularly the reproduction of uneven infant bodies as part of the uneven relationships of global capitalism and the inequitable rollout of the critical infrastructures accompanying it. The second section focuses on materialities of malnutrition by focusing not on food, but on other materials such as faeces, water, pollution and chemicals. These are also substances that are part of, or permeate, the body and which rely on socio-natural infrastructures for their proper management if not to be the source of childhood disease. Like the first two sections, the third section is also interested in bodies and materialities, but also focuses on the practices, performativity and affective relationships associated with infant feeding in particular as a critical and neglected time for the formation of bodies and of child and adult subjectivities.

Food and reproductive nurture in the creation of uneven bodies

Geographies of food have been subject to several recent reviews, which note that our relationship with food can help illustrate the multiple ways in which our bodies become entangled with broader socio-material relations (Del Casino 2015; Goodman 2016; Hayes-Conroy and Hayes-Conroy 2013). Food's role as a substance with immediate visceral, material and vital affects is underlined; as is its place within the wider human-material relations brought together in systems of food production, consumption and the cultural politics of food and taste (Bennett 2007; Del Casino 2015;

Hayes-Conroy and Hayes-Conroy 2008). These relationships, alongside the body's learned and affective responses to certain foods, can act as a 'strategic place from which to begin to understand identity, difference and power' (Hayes-Conroy and Hayes-Conroy 2008, 462), particularly along the lines of gender, race, ethnicity and class (Slocum 2007).

In their review of the field, Beal and Ervin describe how an earlier 'nutritional geography' which concerned itself amongst other things with spatial patterns in biological and cultural factors behind nutritional deficiencies; has given way to a broader 'geography of malnutrition' with a more explicit 'focus on the negative outcomes and causes of poor nutrition' (Beal and Ervin 2018, 50). Even within this wider framing, however, work on malnutrition has still tended, historically, towards the causes of hunger illustrated in terms of basic equations of supply and demand, i.e. work that is broadly production and/or consumption focused. This includes work that has considered production in food and agriculture systems, such as that focused on the politics of the green revolution, or work following Amartya Sen on food access and entitlements (Beal and Ervin 2018, 51).

If nutritional geography's earlier spatial and economic focus presumed a simplistic relationship between food, environment and biology, however, then this is corrected by more recent critical and feminist work on food, as well as specific work on food and children (Brembeck et al. 2013). Much of this research has been focused on the relationship between food and the body, including the way in which food availability, norms, habits and tastes are shaped by wider relations of neoliberal capitalism, patriarchy, racism and colonialism and their extension into or co-production with the body (see papers in Hayes-Conroy and Hayes-Conroy 2013). Children's bodies and practices become a site not only for these wider biopolitics, but also a specific biopolitics of childhood, health and behaviour (Walker 2020, 354; Zara et al. 2020, 8). Such work joins broader studies of health inequality, which have examined the embodiment of social inequity and uneven development, manifested as chronic or intergenerational health conditions, including malnutrition (Del Casino 2015, 805; Gatrell 2005).

Research on foodways and food cultures (Counihan, Van Esterik, and Julier 2017; Watson and Caldwell 2005), or culinary infrastructure (Pilcher 2016), evoke food's broader dependencies on knowledge, practice and culture. This may be knowledge captured in recipe books or more formal food work undertaken by chefs (Pilcher 2016), but more commonly such more-than-food relations reference the embodied and socialised practices of food gathering, preparation and commensality that have long been the topic of food studies (Mintz and Du Bois 2002). Here, what one does, in terms of how food is gathered, stored, processed, cooked, shared and fed, is as important in ensuring safe and nutritious food as the nutrient profile of the food itself. But this aspect of nutrition, the classic 'utilisation' in the four 'pillars' which form the definition of food security used by international agencies such as the FAO, is a poor cousin to the other pillars which focus on food access, availability and stability.

Bringing the body, practices, emotions and affect into food debates also draws strongly on feminist materialist and wider anti-racist and intersectional theory to allow for a specifically political project of what, where and when matters (Hayes-Conroy and Hayes-Conroy 2008, 468). This includes whose bodily experience comes to matter; and the inequities experienced by differently bodied people. Such 'visceral' or material feminist (Warin 2015) analysis has refocused attention not only on how bodies are felt, experienced and lived in, but also how 'a whole host of internal bodily affairs […] may be seen to shape (and be shaped by) all manner of socio-political relations' (Hayes-Conroy and Hayes-Conroy 2008, 464). Del Casino writes how these approaches 'may come to challenge a much more traditional focus on food access and accessibility' (Del Casino 2015, 805, see also Hayes-Conroy and Hayes-Conroy 2010, 1279), drawing attention to the link between societal inequities and children's bodily materiality and experiences, and how they are shaped not only within lifetimes, but between generations (Warin 2015, 62). The body as a vector in the intergenerational transmission of poverty has also not gone unnoticed in more mainstream public health approaches, which are increasingly focused how health inequities in childhood are associated with the health inequities of earlier generations (see, for example, Perez-Escamilla et al. 2018; Wells 2010).

An important contribution to this topic is Rioux's (2015) study of undernutrition in Victorian Britain. Rioux explores the gendered relations, reproductive roles and domestic spaces which marked this period of industrial capitalism and their effects on women and children's bodies in particular. In so doing, he begins to illustrate what infrastructures of nurture come to resemble in areas where public provision fails to develop adequately alongside the industrial expansion of capitalism. Extending work on uneven development (Smith 2010), Rioux describes the ways in which the social and material deprivations of that period can be seen as coming together to produce the 'uneven body', which 'defines the body as the repository of social inequalities and the crystallisation of historically and spatially specific dynamics of exploitation and domination that arise at the nexus between production and social reproduction' (2015, 2).

Rioux notes how early industrial capitalism led, inevitably, to '[t]he mass production of stunted, thin, feeble, anaemic and rachitic female and young bodies [,which] was indeed another sign of the great 'progress' of industrial capitalism' (2015). While meagre availability of food might play a part in this production of feeble bodies, availability and consumption are *always* mediated by gendered relations, with mothers' bodies acting as the buffer zone for families to 'absorb[] the worst effects of capital's inability to provide stable, let alone progressive forms of social reproduction' (2015, 11). Referencing the intergenerational relations that must be considered in any account of food, care and bodies, Rioux writes how

> Mothers' health (or lack thereof) was transmitted to their infants. Given the low-nutritional diet of many women; 'breast milk was not very plentiful, and a women with a "good breast of milk" was often pointed to with praise or envy' (2015, 8, citing Ross 1993).

The products and associated supply chains of early industrial capitalism which grew to remedy industrially induced deficiencies in the supply of maternal milk only exacerbated the problem. Dirty and adulterated supplies of milk carried with them a whole host of disease and pathogens, which goes some way to explaining why levels of infant deaths via diarrhoea reached proportions of 15–20% in the period 1896–1914 (2015, 10).

Rioux's deconstruction of the multiple forces assembled within the uneven bodies of c19th children is a careful example of how the social and material relationships of capitalism are embodied in people's attempts to cope with nutritional inequities, as well as the inadequate and early attempts at a public infrastructure that grew to meet them. A number of current critical studies of public health infrastructure echo and extend these themes. This includes the anthropologists Emily Yates-Doerr and Bronwyn Gillespie (Gillespie 2016, 2017; Yates-Doerr 2015), who have focused on the experience of mothers and other targets of public health nutrition interventions in Peru and Guatemala. In these ethnographies we come to understand how a wider public health infrastructure incorporates health workers, community clinics and doctors and dieticians offices, the various 'job aids' such as dietary guidelines and 'food plate' illustrations, dietary supplements such as micronutrient powders or iron and folic acid tablet, village-based cooking demonstrations and other forms of training, all juxtaposed with people's own understandings of child growth and nutrition, which often differ substantively from public health advice.[1]

Public health actors face challenges in going beyond simple food provision to attempting to intervene in knowledge and practices around food and infant care, from feeding and cooking advice and demonstrations to different dietary prescriptions. But where efforts to develop this infrastructure fail, it is in part because they fail to address the wider inequities in the socio-material worlds of poor women. Public health practice can reduce wider food and culinary knowledge to a set of reductive prescriptions centred around good and bad foods/nutrients (Yates-Doerr 2012) or parenting (Gillespie 2016, 2017). Such interventions can ignore people's own understandings that run counter to public health behavioural prescriptions, including that health, wider wellbeing and nurture are distributed via relationships between many bodies, not one body, and via different types of care relations and practices and environmental interactions, not just biomedical ones (Yates-Doerr 2017; Yates-Doerr and Carney 2016). Simultaneously, women are often recruited into such projects

as community volunteers, or to join time-consuming mothers' or women's groups, with little regard to additional burdens these may place on them (George 2008). Ultimately, rather than addressing underlying and structural causes (including the ongoing legacies of racism and colonialism experienced by indigenous women in Guatemala or Peru), such interventions risk simply contributing to further problematic relationships with the state and its agents, representing women simultaneously as citizens failing to take responsibility for the conditions they embody, inadequate mothers (Gillespie 2016, 2017) and as a female reserve army for public health.

These and similar pieces of work within the field of critical nutrition (see also e.g. papers in Hayes-Conroy and Hayes-Conroy 2013) advance our understanding of the relationships of nurture in multiple ways. Firstly, they invoke critical food perspectives / material feminism in using the body as a starting point to bring other power relationships into view (Hayes-Conroy and Hayes-Conroy 2008; Probyn 2000; Warin 2015). Importantly, these relationships are mediated both via food and without food. Secondly, they are a reminder that nurture and care of infants are a part of reproductive labour, heavily gendered, racialised and always tied up with wider political economy and capitalist transformation (Hall 2020; Nally 2011; Rioux 2015). These gendered roles are further exploited in multiple ways of self-governance or unpaid labour and volunteerism. Thirdly, they highlight a wider sense of nurture as care – a set of relations which include the affective and emotional relations and bonds between carer and the cared for, and practices of care that might not be recognised by medical knowledge (Faircloth 2013; Yates-Doerr and Carney 2016). This is something I return to in more detail in the third section of this paper. And finally, they demonstrate how a reductive approach to food, nutrients (Scrinis 2013), eating and infant care can do violence to these relationships through ignoring them, undermining them and otherwise trying to govern and intervene in them.

Nurturing infrastructures as assemblages of lively matter, bodies, norms and shame

As a material substance, food provides an obvious starting point into infrastructures of nurture. And yet materialist and 'more-than-human' approaches to food in geography and other critical food studies have also emphasised how *food is but one of many* substances to move through, affect and/or be incorporated into those bodies alongside numerous other social and material relations (Bennett 2007; Fox et al. 2016; Goodman 2016). Such studies, therefore, are a powerful illustration of the 'vibrancy of matter' (Bennett 2007, 2009) in determining nutritional status, but which may be lost in a 'food-first' approach to nutrition.

Broader attention to children's subjectivity and agency in playful interactions with their environment, including food and other ingestible substances helps develop a more lively account (Bennett 2009) of both children and of matter. Studies of the interactions of children and water, for example, have highlighted the importance of watery play as part of children's becoming in interaction with socio-natural environments (Hadfield-Hill and Zara 2019). A review of nexus thinking and geographies of children, youth and families (Walker 2020) also highlights the role of non-human agents and children 'intra-acting'[2] (Barad 2007) during play, given children's propensity to use and adapt found objects in their creative and discursive engagement with the world (Änggård 2016 citing Barad 2007; Rautio 2013).

Observational studies within public health are similarly revealing of children's constant entanglements with their immediate material environment which will often include a range of play and exploration with and consumption of significant amounts of soil, cow manure, other animal faeces such as chicken droppings as well as associated pathogens such as *E. coli* (Ngure et al. 2013). This may lead to chronic gut inflammations that can exist without clinically visible signs such as diarrhoea. Such forms of gut-altering 'environmental enteropathy' can have prolonged consequences in terms of limiting chidlren's nutrient absorption via the gut and, relatedly, immunity and growth (Humphrey 2009; Solomons 2003). Many such infections relate in one way or another to pathogens present in human or animal faeces, hence the category of a whole range of 'faecally transmitted

infections' and their related impacts on children's guts and nutrient absorption capacity (Chambers and von Medeazza 2014).

Other work within nutritional science and epidemiology is also exploring early links between air pollution or other environmental chemical exposure and child stunting (Sinharoy, Clasen, and Martorell 2020) and obesity (Heindel et al. 2022). A recent paper on the environmental sources of obesogens (chemicals which increase the growth of white adipose tissue – i.e. fat cells) and their sources lists a range of chemicals found in anything from the lining of food cans to vinyl flooring, clothing, furniture, pharmaceutical drugs, industrial chemicals, paints and disinfectants (Heindel et al. 2022, 3). Sources of air pollution linked to stunted child growth in the womb or the early years include both car and industrial pollution, or particulates from burning crops or fires and stoves used at home burning fossil fuels, wood and animal dung (Sinharoy, Clasen, and Martorell 2020). Notably, such work so far fails to engage with the environmental justice literature, which would interrogate the ways in which such the socio-spatial politics of these health inequities are often racialised in countries such as the US.

While public health and broader biomedical literature are therefore helpful in reminding us of why matter, place and environment all matter in terms of nurture, recent geographical accounts of water and sanitation, or the wider food-energy-water nexus (Walker 2020; Zara et al. 2020) are also useful in reminding us of the role of public health and/or various infrastructural configurations in advancing a particular form of biopolitical control designed to keep people, or rather whole population groups, in their place (Lock and Nguyen 2018). Work on sanitation and water, for example, has been important in showing how sanitation infrastructure and public health measures served an important role in extending modes of governmentality into new public and private spheres, with many parallels to ethnographies of public health intervention in people's cooking, eating and dietary practices (Gillespie 2016, 2017; Yates-Doerr 2015). Several authors have traced the co-development of public health and colonial approaches to both the industrial poor in coloniser countries and to non-white subjects in areas under colonial control (Desai, McFarlane, and Graham 2015, 101–102; McFarlane 2008). The experience of sanitation governance has been labelled, notably, as a form of 'excremental colonialism' (Anderson 1995), cited in Jewitt 2011) in controlling appropriate behaviours, access to viable sanitation solutions and the resulting representation of the presumed 'filth' of poor/non-European parts of the city (see also Kooy and Bakker 2008). Such development occurred in much the same way that control over diets and measurement of bodies has been one of the key disciplinary tasks of public health in similar contexts (Biltekoff et al. 2014; Gibson and Dempsey 2015; Lock and Nguyen 2018). Whilst disgust might once have motivated Victorian and colonial authorities to tackle inadequate sanitation (Gandy 2004), shame and disgust are now being used as a prominent behavioural trigger to encourage individuals to respond to their own inadequate sanitation in community led total sanitation (CLTS) initiatives (Jewitt 2011, 615). Such approaches are troubling in terms of the potential further marginalisation and stigmatisation of the poor. Jewitt's paper notes the example of people from villages in rural Indonesia banned from marrying or attending Haj, by local Imans, for lacking a pit latrine (Jewitt 2011). Parallels exist again with many societal approaches to diet and nurture: strong stigma attaches to both breastfeeding (next section) and defecating in the wrong place or time or even discussing bodily excretions of breastmilk or faeces. The classic shame of 'not being able to put bread on one's table'; the connection of food and eating to the stigma attached to obesity or eating disorders such as bulimia; and the pressures of motherhood as described by Wolf (2007) are similarly indicative of how shame inhabits parental feelings about food and infant care, leaving Faircloth to caution against public health approaches '[t]rying to colonize the affective or emotional aspect of breastfeeding' (Faircloth 2013, 355).

Infrastructures of nurture in infant feeding and care

Feminist geographies of infant feeding, breastfeeding and of early childhood fill an enormous gap in terms of the relations that they bring into the critical purview of nurture. Our subjective attitudes,

tastes, behaviours and practices are formed in childhood and shape both child and adult bodies; the period of early infancy and the food and non-food practices and relationships that surround it warrant as much attention as is now directed towards adult food practice in broader geographies of food (Holt 2017). Infrastructures of nurture supporting infant feeding reference not only practices of care from immediate and wider networks of care givers, but also much of the feeding and public health apparatus that accompany provision for the early years. This ranges from the ideologies that promote different approaches to this crucial period and to constant media reference, to children's centres, to lactation consultants, to breastpumps, to formula powder and marketing.

Public health research has largely focused on behavioural change education as a way of supporting this period of infant feeding (Rollins et al. 2016). An alternative focus provided by feminist scholarship is to consider instead how already gendered feeding practices lead to an intensely social, emotional, affective and physical relationship between parent and infant and yet depend fundamentally on wider social and material relations in a period that is thoroughly governed and controlled (Boyer 2010, 2012; Faircloth 2011, 2013; Holt 2017; Newell 2013; Palmer 2009; Schwab 1996; Wolf 2007).

Holt (2017) has focused on the period of infancy as a critical period of child development, both materially and in the formation of subjectivities as part of key parental and caring relationships. She echoes many of those writing on food in noting the 'interconnected material, bodily process of growth and change […][which means that] food ingested in childhood has a formative effect on bodies; infants' social origins can become indelibly marked in their bodies through food consumed' (Holt 2017, 482). To this, she adapts Lupton's concept of interembodiment as a means 'for exploring the intersubjective, interdependent subjectivity/agency of infants with their carers' (Holt 2017, 489). This leads her to consider infant assemblages in more detail themselves as critical points in the formation of habitus: '[o]ur infancies and their 'necessary dependencies' […] are always present in our adult selves' (Holt 2017, 492, citing Butler 2004).

While I return to the inter-subjective and affective aspects of these relationships, it is worth noting that it is the wider materialities of the infrastructures supporting forms of infant feeding that are often 'sidelined' (Newell 2013, 257). Newell has argued that we need therefore to enlarge the purview of material actants to include not only breasts, but

> bottles, breast pads, bras, stretchy and strategic clothes, bottles, sterilisers, breast pumps, fridges, breast milk and formula milk, and also calories charts, administrative forms in hospitals, laws, public and private spaces, as all these play a part in stabilising on how feeding practices are done. (Newell 2013)

In considering the different types of relationship needed for breast milk to travel via the use of breast pumps, Boyer similarly finds a 'complex socio-technical network of artefacts and actors at play' (Boyer 2010, 10), one which requires people, things and ideas to align in ways that question assumptions around 'natural' breastfeeding in contemporary society (Boyer 2010, 9).

Such extended breastfeeding assemblages incorporate a number of relations which can profoundly influence decisions to breastfeed, or not, or when to wean, and what and how to feed infants more generally. The burgeoning literature on public and personal attitudes to breastfeeding (Boyer 2012; Faircloth 2011, 2013; McCaughey 2010; Newell 2013; Shaw 2004; Smyth 2012; Van Esterik 2002; Wolf 2007) is yet further evidence of the 'intense governmentality' of interventions focused on early childhood (Holt 2017, 493). This is a period in which medical and public health professionals, from midwives to doctors and health visitors, are all engaged in advising parents and carers and mothers in particular, measuring and weighing infant bodies (Holt 2017) and otherwise acting as agents of broader opinion on what it is to care for an infant (and who ought to be doing that caring). Notably, this changes in time and space: the same types of actors – midwives, doctors, hospitals and even international agencies such as UNICEF who were once proponents of infant formula (Schwab 1996) may now be found extolling the benefits of exclusive breastfeeding.

Understanding such relationships sheds light on the way that uneven infant bodies are produced and have long been produced by a set of historical and contemporary, global and local political

conditions (Palmer 2009; Rothstein et al. 2020; Schwab 1996). Prominent international activism in the 1970s and 80s focused on the role of multinational infant formula companies such as Nestlé in building a sophisticated web of relationships and practices involving medical professionals and hospitals combined with persuasive and irresponsible marketing and advertising to utterly debase and denaturalise breastfeeding in many low-income country contexts (Palmer 2009). Efforts to promote formula sales by any means were shown to be responsible for the large drop in breastfeeding throughout those countries where it was most needed, in the face of broader insanitary and food insecure conditions (breastfeeding in these contexts significantly improves immunity to the point where early initiation of breastfeeding is associated with a huge reduction in infant deaths Victora et al. 2016). Schwab (1996) describes how formula milk, 'responsible for saving some lives but also in part, for a massive decline in breastfeeding worldwide, and hundreds of thousands, perhaps millions of infant deaths' (Schwab 1996, 479), was itself representative of an evolution in thinking that associated these scientifically concocted formulas with modern, technologically enhanced, mechanistic views of the human body. These views and associated commercial interests actively sought to undermine vernacular, non-western and vitalist conceptions of the human body and its nurture (Schwab 1996).

While feminist writing on breastfeeding has grappled in the past with the unevenness of breastfeeding practice in the majority world (Palmer 2009), most recent writing on the topic has been situated in high-income countries and has contrastingly focused on the pressures mothers receive to breastfeed and not to breastfeed there (Faircloth 2011, 2013; Stearns 2013; Wolf 2007). Some writers have focused on difficulties faced by many mothers who want to breastfeed but come up against practical or discursive barriers (Boyer 2011, 2012; Faircloth 2011, 2013; Newell 2013; Shaw 2004; Smyth 2012; Van Esterik 2002), while other writers have focused on the ways in which such discourse around the 'natural' benefits of breastfeeding simply serves to amplify the experiences of women urged to reach broader, unattainable, ideals of natural femininity, reproduction and 'total motherhood' (Wolf 2007). Relatedly, how transmasculine individuals experience chestfeeding and gendered expectations around feeding has only been studied sparsely (MacDonald et al. 2016).

While debates on breastfeeding in different parts of the world do vary, it is also worth noting the similarities in discourse. In the majority world, parents and particularly mothers face similar pressures to conform to 'optimal' WHO recommendations on breast and infant feeding. This is problematic as it is rarely done with full cognisance of their broader material circumstances, the sheer impossibility, for example, of being able to feed an infant from the recommended five of eightfood groups in some low-resource settings. This could explain why, in the language of such interventions, results are sometimes difficult to achieve 'at scale'. Though at the same time, such interventions are understandable against a backdrop of continued aggressive anti-breastfeeding tactics of multinational formula companies targeting vulnerable mothers (Rothstein et al. 2020).

Rather than simply demonising public health approaches promoting breastfeeding 'behavioural change', a critical approach might delve further into the pressures to follow such public health advice. In sum, the everyday and embodied performativity of shame endured by mothers in response requires more thought both within and outside of these public health interventions. It is an illustration of how infrastructures of nurture and care can incorporate ideologies around norms and behaviours that both gender and individualise responsibility and shame. Such norms might emanate from public health officials, but they might also circulate within relationships of kin and community. In turn, this opens up the whole idea of nurture for critical reflection in much the same way that researchers have nuanced the negative aspects of 'care' (Fisher and Tronto 1990; Hanrahan and Smith 2018).

Conclusion

The concept of infrastructures of nurture draws from scholarship in public health, geography and other critical accounts of food and nutrition to emphasise the multiple relations that must be taken

into account when understanding the social and material infrastructure necessary to support human life in the early years.

Bringing together perspectives on care, nurture and infrastructure suggests a number of productive avenues for further research, whether in geography, critical food studies or public health. This extends work already delving into more-than-food relations (Goodman 2016) to a fuller dialectic with the relations brought into view by various aspects of nurture and infrastructure discussed here.

First, this implies increased attention to the materialities of malnutrition and the intra-actions between children and the substances they interact with and ingest. These might include, food, water, dirt, or other material at large including chemicals, pollutants, animal and human faecal matter. Second, these material relationships need to be studied as mediated by broader infrastructures of nurture and care, extending into and out of home based environments, to be maintained, repaired or dismantled according to various norms and ideologies, but also forms of foodwork and carework that are practised, not verbalised, and performed in distinct socio-spatial settings. Third, the inequities that are so produced need also to be understood as both historical and spatial, with the unevenness of child development and children's bodies in particular settings, cities and regions acting as a reminder of the inequities of reproductive nurture, so well illustrated by contemporary and historical accounts (Gillespie 2016; Rioux 2015). Fourth, interventions, whether in the form of public health or in the form of wider social or political rhetoric and opinion, can often add a gendered burden of shame to those failing to provide such basic needs in support of child growth: further understanding this shame-nurture-infrastructure nexus appears equally important in future research, following earlier work on care.

Finally, while those four priorities focus on research, there is also much relevance to praxis. Recommending changes to policy have not been a focus of this paper and yet given the engagement with public health, the shortcomings of policy and the wider political economy of nurture have never been far from the themes considered here. Activism around the UK's painful defunding of its network of children's centres (an infrastructure of nurture as clear but as troubled as any other), or the growth in emergency food provision and food banks in many countries that had previously dismantled that critical infrastructure, are amongst those examples where the concepts explored might be fruitfully applied to pick up this wider conversation. Without forgetting the priority outlined above to engage further with shifting the burden of shame from affected families, a more public debate then might ensue, aligned with wider discussion of social infrastructures and the burden of reproductive nurture (see Hall 2020).

Notes

1. I am influenced here in charting the multiple socio-materialities by the works of Boyer (2010) and Newell (2013) – see the section on infant feeding, below.
2. Roughly translated: defining each other's boundaries and effects on each other in the moment of their coming together in a way that can't be fixed and known beforehand (Barad 2007).

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ORCID

Nicholas Nisbett http://orcid.org/0000-0002-9558-2263

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