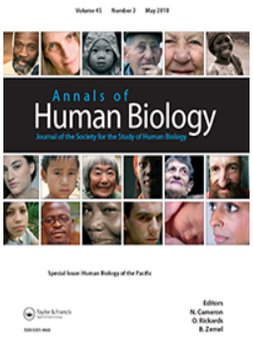

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RESEARCH PAPER

Body size, body norms and some unintended consequences of obesity intervention in the Pacific islands

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ABSTRACT

Background: Pacific Islanders have experienced over 50 years of obesity interventions—the longest of any region in the world. Yet, obesity-related non-communicable diseases (NCDs) continue to rise. 'Traditional' body norms have been cited as barriers to these interventions.

Aim: In this study, we ask: 'What is the relationship between health interventions, body norms and people's experience of "fatness"? How – and why – have these changed over time?' We study two nations with high rates of obesity: Nauru and Samoa.

Subjects and methods: Ethnographic fieldwork with people in everyday and clinical settings in Samoa (2011–2012; 2017) and Nauru (2010–2011).

Results: Body norms are not a single or universal set of values. Instead, multiple cultural influences—including global health, local community members and global media—interact to create a complex landscape of contradictory body norms.

Conclusions: Body norms and body size interventions exist in an iterative relationship. Our findings suggest that Pacific island obesity interventions do not fail because they conflict with local body norms; rather, they fail because they powerfully re-shape body norms in ways that confuse and counteract their intended purpose. Left unacknowledged, this appears to have (unintended) consequences for the success of anti-obesity interventions.

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Introduction: lessons from 50 years of obesity intervention in the Pacific islands

From 1975 until the end of the millennium, Oceanic peoples have experienced the largest rate of increase in adult BMI (body mass index) per decade (Finucane et al. 2011). Although they have subsequently had some of the lowest additional BMI gains of any world region, overall obesity incidences in Pacific countries remain some of the highest globally (NCD Risk Factor Collaboration (NCD-RisC), 2016, 2017). At the same time, Pacific populations are no longer outliers: the high incidence of adult obesity previously particular to Pacific populations is now roughly comparable to an array of countries in the Global North, Middle East and elsewhere.

As a result of this longer history though, obesity research, policies and interventions have for decades focused intensely on the small islands nations of the central Pacific, more so than any other world region. In Nauru, for example, the first ever weight loss clinic was launched by colonial authorities in Nauru in 1963–1964; locals later suggested authorities may have over-emphasised their efforts at the time, pointing out that 'such a clinic involved no more than 10 people, and lasted approximately 1 month' (Taylor and Thoma 1983). Concerns about malnutrition can be traced much further back again—prior to the rise of obesity as a global health concern—with dietary surveys recommending restricting sugar imports, reducing alcohol consumption and improving fibre availability on the island as early as the 1920s (Bray 1927; Kirk 1957). Despite this, persistently high premature mortality that is largely attributed to obesity-related NCDs has been of ongoing concern in Nauru and the Pacific region more broadly (Taylor et al. 2005; Carter et al. 2011), suggesting that many prior decades of interventions have failed to have an impact at scale.

In response, obesity interventions in the region have continued to multiply. Most interventions derive from public health models that emphasise individual-level behaviour change, focusing on improving diet and exercise (see also Ulijaszek and Mclennan 2016). For example, regional and national donors aim to change eating practices, encourage local agriculture and reduce sedentarism (McLennan 2017); major international strategies, such as the World Health Organization (WHO) Global Strategy on Diet, Physical Activity and Health, are similar. Such interventions are often enacted at the community level, for example through organised weekly walks and fun-runs, weight loss competitions, health education initiatives and advertising campaigns. These have been a part of daily life for decades in the urban areas of many central Pacific countries. However, all these varied

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interventions have also been largely unsuccessful to date at reducing obesity at the population level—even if rates have plateaued.

Ironically, while obesity interventions rarely consider social norms or culture as being important in obesogenesis (with obesogenesis being framed in public health and medicine as a fundamentally 'biological-behavioural' process), norms and culture are, nonetheless, often cited as reasons that obesity interventions fail in the Pacific. Of particular focus has been discussion of social preferences for fatness (Pollock 1995, World Health Organization Regional Office for the Western Pacific 2000; 2001; Sundborn et al. 2010). We would argue that, in this case, culture is represented as an immutable and universal characteristic of a society, and serves as a quick, convenient and enduring explanation for failed interventions (see Farmer 2003; Hardin 2015a).

Yet, if anything has changed dramatically in the Pacific islands since 1975, it is social values, relationships and cultures of 'fatness' (Becker 1995, 2004; Brewis et al. 2011; McLennan and Ulijaszek 2014). For example, Becker and colleagues have systematically demonstrated remarkable changes in body norms across recent decades in Fiji, where increasing social value has been placed on the tight control of weight as not-too-fat and not-too-thin (Becker et al. 2002, 2005). Teevale (2009) similarly identified inter-generational and/or regional differences in slimmer body norms; the preferred body size for Tongan adolescents, for example, falls into a category of 'physiologically healthy' that is both slim and muscular at the same time. Other researchers have simultaneously documented rising eating disorders, yo-yo dieting, stress about eating, fear of diet-related NCDs and concern about large body size in many Pacific island nations (e.g. regular WHO STEPS reports record that people fear developing diabetes, Government of Nauru, World Health Organization 2007; see also Becker 2004, 2017). This aligns with our own experiences as researchers in the field.

In the context of this Special Issue, our concern is what we can learn about the importance of body norms for obesity-related health outcomes from the half-century of obesity interventions experienced by the Pacific peoples. To do this, we compare and contrast two places in which we have extended ethnographic experience, and which have long been the focal areas of global efforts to address obesity: Nauru and Samoa. Our goal is to interrogate a contradiction that we have increasingly observed through our fieldwork: in theory, obesity interventions frame body norms as a fixed cultural trait that cannot change; but, in practice, interventions appear to have a powerful influence on body norms in the societies which they operate. The remainder of this paper asks: 'What is the relationship between health interventions, body norms and people's experience of fatness and health in these places? How—and why—have these changed over time?'

We answer these questions in two parts. First, we lay out evidence that suggests that body norms in the Pacific islands are not a single, universal or consistent set of values. We show that multiple cultural influences—including dominant biomedical health modalities, local communities and the global media—all interact to create a complex and changing landscape of multiple body norms that can be highly contradictory (see also Hardin 2015b). In turn, different body norms translate into different body experiences and these can ultimately exacerbate chronic health outcomes. For example, there is growing evidence that experiencing weight-related stigma heightens physiological and emotional stress—both of which elevate weight gain and chronic disease risks (Brewis and Wutich 2012; Brewis 2014). In this way, bodies and anti-fat body norms exist in an iterative relationship, where each shapes the other. Second, we suggest that interventions have histories that influence their effectiveness. In concluding, we bring these two bodies of evidence together to present the hypothesis that obesity interventions in the Pacific islands (and perhaps elsewhere) do not fail because they conflict with local body norms. Rather, they fail because they themselves may re-shape body norms in unpredictable ways; left unacknowledged, this may have negative consequences that counteract intended health gains of anti-obesity intervention efforts.

Body weight and body norms: some definitions

For the purposes of this paper, we follow the conventions laid out by McCullough and Hardin (2013) and define body size or dimensions as the physical characteristics of a body—the material and morphological description. Characteristics of this measurement are determined by the instruments or methods with which size is measured, for example, a measuring tape, set of scales or CT scanner. In everyday settings, body size is equally assessed in all sorts of other ways: a rising pencil mark on a doorframe, the amount of belly roll a person can grab with their hands, whether a person can fit into clothes they wore last year or a grandmother testing the upper arm of a child by curling her fingers around it (see also Yates-Doerr 2013, 2015). Interventions tend to focus just on this aspect of body size, although we know of no situation where body size is independent of body norms or purely 'objective'; as we will show, even the clinical measure for obesity, the BMI, carries significant implied moral judgement (Greenhalgh 2015; Trainer, Brewis, Hruschka et al. 2015; Trainer, Brewis, Williams et al. 2015).

In this same framework, body norms are differentiated as the sociocultural values associated with a body size—the social sense of whether particular bodily characteristics are good or bad, preferable or to be altered, normal or abnormal, attractive or disgusting. These values may be explicitly stated and/or reflected in social actions. In biomedicine, different body sizes are attributed with different moral values—fatness, for example, is attributed to individual failings and judged negatively (Boero 2013; Saguy 2013; Greenhalgh and Carney 2014). Further, implicit or unstated body norms can result in bias (perceived or actual) and/or discrimination (Brewis et al. 2011, 2017; Brewis and Wutich 2012; Brewis 2014). Importantly, body norms are not immutable. The fashion and entertainment industries, for example, have a long history of changing social and cultural values relating to body size, shape, and appearance (e.g. Longhurst 2001). Importantly, and as our evidence will illustrate, body size is

only one feature of the body that has social significance and a focus specifically on body size as an important body norm is not innate or common to all human cultures.

Bodily experience is our third core concept deployed herein. It refers to a person's deep lived reality—it is how a person experiences their own body (Becker 1994; Lambek 1998; Csordas 1999; Mol and Law 2004; Strathern 1994). Body size and norms can elicit strong feelings, from pride and satisfaction to abhorrence and hate. A person's feelings and emotions can, in turn, elicit tangible physiological and social outcomes, from stress hormones, mental health concerns and loneliness, to self-confidence, feeling strong and a sense of social belonging. These outcomes can, in turn, shape body size and norms, as well as health behaviours and practices.

Methods and background

The team drew upon independent fieldwork conducted by J.H. and A.K.M. to bring together a diverse dataset. Using this dataset, we derived shared cultural constructs for characterising the relationship between body size, body norms and bodily experience in two Pacific islands.

Samoa

Samoa is an independent nation that forms a larger island group with American Samoa, an unorganised and unincorporated territory of the US. Samoa was the first nation to gain independence in the Pacific in 1962—a source of pride each year during independence celebrations. Samoa comprises two main islands, which together measure ~1000 square miles: Upolu, where the capital city and majority of the population are located; and, the more rural 'big' island, Savai'i. The population was just under 200,000 people as of 2016; just under 20% of the population lives in the urban area of Apia. Most of the nation identifies as Samoan, some with mixed-European and/or Chinese ancestry. According to United Nations classifications, Samoa 'graduated' from a least developed country to a developing country in 2014; since 2008, poverty has been estimated at just over 20% of the population. The economy is supported by agricultural exports, foreign aid, remittances and tourism.

Ethnographic evidence was collected by J.H. in Samoa during 14 months of consecutive fieldwork in 2011–2012 and 2 months of follow-up in 2017.[1] Long-term fieldwork focused on the social and religious practices that urban and peri-urban Samoans used to address cardiometabolic disorders—that is, diabetes, hypertension and related conditions like kidney disease. This research was designed after extensive pilot research, which found that Christian prayer and other practices around fasting and healing were essential to how Samoans conceptualised sickness and suffering. The project, thus, focused on local ways of addressing a changing epidemiological landscape. Data collection included participant observation in churches, clinics and households, in-depth semi-structured interviews and review of public health archival materials and local media. J.H. conducted 86 semi-structured and open-ended interviews with community members of her two primary fieldsites, an urban and peri-urban village on the island of Upolu. The dataset also includes 59 interviews with diabetes patients and 99 interviews with healthcare providers or those working in allied fields.

Nauru

The Republic of Nauru is the world's smallest nation. It is a single coral atoll measuring approximately six kilometres long and four kilometres wide. Most of the island is made of high-grade phosphate from decomposed marine organisms. It has a complicated economic and social history, largely as a result of phosphate mining (see also Pollock 1996; McLennan and Ulijaszek, 2014; Teaiwa 2014, 2015; McLennan 2017). Mining began in 1905, and the majority of mining occurred under shared colonial administration of Australia, Britain and New Zealand. At this time, colonial authorities sold the phosphate at cost-price to themselves; they demonstrated a duty of care to the people of Nauru by providing rations, education and some housing, as well as importing and selling goods and services. They also imported Chinese mining labourers and significant racial segregation was enforced between the European, Nauruan and Chinese populations.

Nauru gained political independence in 1968 and celebrates its 50th anniversary of independence this year. Upon independence, the government of Nauru gained control over the phosphate mines and, at world market prices, national incomes soared. Nauru became known as the wealthiest nation in the world per capita, and people both imported goods from all over the world and travelled widely. However, this did not last, and after a slow decline through the 1980s and 1990s, the economy collapsed in the early 2000s. Today, the majority of the island's population of 10,000 people lives on a thin strip of land that measures less than four square kilometres in area. The rest of the island is uninhabitable, as a result of mining sites never having been rehabilitated.

A.K.M.'s research on Nauru consisted of 11 months of ethnographic fieldwork, between 2010 and 2011.[2] The research design began with the premise that obesity is a lifestyle disease. If this is the case, then understanding obesity requires understanding how lifestyles have changed. Medical fields tend to narrow 'lifestyle' to a range of discrete factors (e.g. diet, exercise, smoking). Anthropologically, however, lifestyle is a much larger concept (see McLennan 2015). As a result, the broad objective of this research was to understand lifestyle change and health in Nauru, in whatever way it was understood by local people. The main method of data collection was participant observation, including in people's homes and communities, as well as in the public health centre, foot clinic, dialysis unit, hospital, school nutrition classes and government offices. The research also included life history interviews (over 50 in total, of 2–6 hours duration each, with Nauruan people aged from 20–83 years old). This research was complemented by extensive archive searches in Australia, Nauru and the UK.

Data analysis

Although J.H. and A.K.M. conducted fieldwork independently of each other, each used congruent qualitative methods to handle both raw data and carry out analysis. All materials related to interviews were recorded, translated (where necessary), transcribed and stored digitally. Phase 1 of analysis included ethnographer's line-by-line coding of both fieldnotes and interview transcripts with NVivo software, using constant comparison and iteration of themes and working past a point of theoretical saturation. Phase 2 included each author reviewing convergent codes initially derived in Phase 1, including 'body image', 'fat' and 'obesity'. Phase 3, for this particular paper, was a collaborative comparison, identification of shared themes and recoding across the two datasets. This process resulted in identifying two specific recurring core meta-themes that resonated repeatedly across the sites.

Results

Meta-theme 1: body norms are relational

Body norms have not always focused on body size and shape in Samoa and Nauru. As food, body and care are linked, it becomes apparent that fatness was one bodily symbol among many, reflecting an aesthetic value of bodily care as a synecdoche for social care. Early records from Nauru indicate bodily beauty being related to a pleasant smell and good hygiene, with an emphasis on luscious hair and perfect teeth, as well as particular ornaments and decorations (Hambruch 1914, 1915; Petit-Skinner 1981; Wedgewood 1936a, 1936b; see also Mageo 1994 for a discussion of hair in Samoa). Beauty of this nature could be achieved through regular bathing in the ocean and the use of fresh flowers, plants and coconut oil for the skin and hair (ibid.). Likewise, body norms in Samoa are complex and ideas of beauty reflect a concern with bodily movement in dance or maintaining a tidy appearance (see also Alexeyeff 2009; Besnier 2011). In Samoa today, a woman can be both beautiful and fat if she is adorned properly, wearing a flower behind her ear, well-tailored clothing and/or attractive jewellery. In these cases, adorning the body supersedes any potential negative meanings increasingly associated with fatness.

Fatness has, over time, become associated with economic prosperity—in some situations it implies access to resources like money and time. This contemporary interpretation of fatness is reflected in present-day reminiscences of the past. For example, people in Nauru reminisced about the times when money flowed into the island as they sought to understand obesity emergence. Tiki[3] explained, for example,

> you know, the Nauruan people, they believe that fat people are healthy. That's what they think. Or otherwise, fat people are … you know, they've got a good life. I think that's what Nauruans believe. You're fat because you have good food and all of this … If you see people who are fat before, it's because they are from the noble family.

He grappled with mixed notions of fat bodies, talking about fatness and status as if the people he was remembering belonged to another society, a remembered one from 'before', but not his own, which knew that fatness 'really' meant 'obesity'. At the same time, it is important to note that the 'good life' is a complex concept. Linguistically, a 'good life' is closely tied to a feeling of fullness in the body. This feeling, *pwe duwen*, can come from being full of food or feeling the fullness of social relationships through being pregnant, having sex or being satisfied with the family (McLennan 2015). In this way, the good life is very much associated with the feeling of bodily fatness (being full of food) or physical fatness (in the form of pregnancy, for example).

Body norms in Samoa and Nauru are, thus, shaped by lived experiences of relationships and the cultural symbolism of body shapes. For example, the fatness of bodies can reflect the successfulness of one's feeding and caring for others. In Samoa, fatness reflects the degree to which people are cared for—reflecting the strength and power of families and communities. This is sometimes also the case in Nauru, although not consistently. Wealthy people in the urban area in Samoa, including government leaders, were often quickly identified as fat because they were wealthy—they ate all the 'best' foods, which were high in fat content (it is worth noting here that the conceptual link between fatty foods and bodily fat is strongly related to nutritional education). This relationship between status, fatness and the experience of well-being continues in the current food environment, where imported foods have taken on great prestige. For example, during funerals in Samoa a coconut (itself high in fat and sugar) has come to be replaced with a can of soda or bottle of wine, as a gift to consume for the titled chiefs who attend.

Despite the complex historical, social and economic factors that influence body norms, health education messages have largely focused on body size at the expense of other forms of bodily care. This singular focus on body size has also played a role in shaping emerging body norms. Health education programmes have emphasised that obesity is bad for health and carries with it considerable risk of illness and death. Messages about the riskiness of fatness and fatty foods surround islanders every day, from billboards and paintings at major road intersections in both islands, to constant messaging about island-wide weight-loss initiatives, fun-runs and competitions. As a result, in both field sites, people were shaping their habits—and so their bodies—according to these body and health norms (see also Heard et al. 2016).

In this context, there is a growing emphasis on gendered body size and experimentation with dieting in order to achieve it. Many Nauruan women sought to lose weight by experimenting with a range of diets and related decades of efforts with diets ranging from Atkins and fasting, to more recent 5/2 or carbohydrate-free diets. Many had successfully lost weight but struggled to maintain their new body shape. In Samoa, women would talk about how exercise could draw unwanted, often sexualised, attention to them. Exercising in public spaces, like the gym or walking in the village, placed women within the public eye. This kind of public attention raised questions about their fidelity; people might gossip and ask, 'why is she trying to lose weight? Is she looking for a

boyfriend?' As a result, married women would sometimes avoid exercise. This is one instance where a smaller body size, or the effort to lose weight, was associated with attractiveness, but was, nonetheless, not desirable.

Body fatness and norms are also in flux across the life course and in response to life events. For example, reproduction, from pregnancy through parenting, is a significant time for body norms to come to the fore (see also Longhurst 2001). Nurses, in particular, observed many changing body norms among young women in Nauru. One recalled before pregnancy how most women were a size 10 or 12, then their weight increased considerably afterwards.[4] Another explained that people change as soon as they get married. They stop going out, she explained, they just stay at home, look after kids, eat all the time. 'It's like that here', she says. 'You get married and you put on weight and stop wearing nice clothes'. She explained how some husbands liked that, though, because the girls would no longer be attractive to other men, and also because they liked larger ladies. 'But then', she continued, 'some men think they're [their larger wives are] disgusting and so cheat instead'. She was incensed by the whole thing: 'Why should they stop taking care of themselves once they get married?!' At other times, nurses discussed how hard it was to encourage weight loss after birth, because mothers tended to have the attitude, 'who cares about my weight, I'm a mother now'—this was echoed in the actions of mothers, who frequently put their children before themselves in making decisions about their daily activities. Loss of sexual attractiveness after childbirth also mattered. 'You don't need a good shape or nice shoes any more, because you're expired', women would say. They used the English term 'expired' to mean a woman who is married and/or has kids. At the same time, body norms were not limited to women. Being a young adolescent male was also a time when body size and norms came to the fore. Teenage boys in Nauru would talk about how important it was to be skinny. 'The bigger you are, the quicker you fall', they said, referring to the ever-more-frequent fist-fights and gang-fights on the island. These boys made it clear that it was important to be fit and strong, agile and quick—not necessarily big.

Body norms are contextually cued in everyday life. For example, in Nauru, the term for a big or obese person is *pwe duwen* (fat body). This is not necessarily insulting, but it could be, especially if a foreigner were to say it. On the other hand, a greater insult from another Nauruan person would be *neron duwen* (skinny body). In this context, skinniness is a signifier of a person's social embeddedness. As women joked about body sizes, for example, they chortled at the possibilities for insulting someone: 'you look skinny…!' exclaimed one. Her friend chuckled, joining in. 'You look starved! You look hungry!' They all laughed. 'Your mother's not taking care of you!' 'Yeah! That's what they say! Even today when the kids, you see them, they're very skinny …'. The mood dampened. They whispered amongst themselves about how many children were now becoming skinnier—even this term was somewhat contradictory, with international health agencies calling for weight loss, but stunting increasingly being evident in local children. Calling someone 'fat' was equivalent to commenting on how well their family cared for them, especially in the present resource-constrained setting.

In summary, the Nauru and Samoa data suggest that body norms historically focused on many other properties of the body beyond size and reflect a linking of social care with bodily care. Today, however, there is a much greater emphasis on body size. Slenderness is valued, especially amongst younger generations who have routine access to global media, but the sociality and state of being well-cared-for that is reflected by having a larger body is also important. While fatness is understood to be unhealthy and risky, it can also be seen as a sign of being well cared-for or wealthy. Gender and life-stage also matter.

Meta-theme 2: interventions and body norms are iteratively related

Cultural memory of body norms plays a large part in informing how healthy bodies are conceptualised. In effect, people today apply contemporary values onto old artefacts, looking past items of value, dress or other signs of status or bodily care, to focus specifically on body size. This underlines the growing tendency to focus on body size. Some people in Nauru would talk about looking to relatively recent photographs—from the 1950s and 1960s—only to observe that people looked fit, neat and tidy, and took pride in their appearance, unlike today. Further back again were photos from colonial times pre-WWII, where people equally exhibited bodies described as strong and slender. Older Nauruan people would describe the people in the photos as 'well-proportioned' or 'properly-proportioned' because they were 'all nice and slim'—invoking vocabulary reminiscent of the missionaries who dedicated their lives to teaching the people of Nauru to be 'civilised' (e.g. Delaporte 1920). Younger people would exclaim in awe at the same photos, smiling, 'they're all so skinny! And look how neat their clothes are!' In effect, they assessed bodies of the past with social values of the present—values that emphasise slender body size and shape. Similarly, many Samoans today invoke photographic images of Samoans from the initial period of contact—as early as the 1880s—as a time when Samoans were big but healthy and strong (Nordström, 1991). Ironically, however, remembering their ancestors as big made people sceptical of risks associated with elevated BMI. They could not align their bodily experience (feeling healthy) with the message that bigness is supposed to feel unhealthy. Obesity interventions, in this way, are problematic: they do not seek to address an immediate discomfort, and their success cannot be evaluated by a sense of improved wellbeing (see also Whyte 2012 for a discussion about the chronicity of non-communicable diseases). This lack of demonstrable progress can lead to distrust of interventions, especially if the interventions make people feel worse.

Obesity interventions emphasising the importance of body shape and BMI have had a powerful effect on these islands and their body norms, as well as on their trust for foreign health authorities and practitioners. People in both Samoa and Nauru have experienced a half-century of

interventions with no net reduction in obesity. Instead, there has been a rising intensity of moral judgement directed towards people living in island nations. Social media and the internet have made it ever more possible for Pacific islanders to know, understand and experience the moral judgement that results from being categorised using the BMI. Some of the earliest diabetes studies in the 1970s were done in Nauru, and researchers since that time have been perceived as coming to the island, taking people's measurements and life histories, publishing them to make international headlines (e.g. see Laurance 2011) and then not doing anything to address health issues (see also Hardin 2018). During life history interviews in Nauru in 2010–2011, participants who recalled the diabetes tests, for example, described distrust and fear of researchers. As one explained,

> Because he was in the research area [diabetes], [eminent epidemiologist name]. And he even … Nauru even volunteered as guinea pigs for his programmes! So it was announced in the world news that, 'oh, the Nauru President signed an agreement that the new drugs for that would be tested on the Nauruans'. Yeah (laughs). I remember that much, cos it was a … sort of a frightening thing to me. I said … cos I … every day, I tell some people, I said, 'you know what?! We're guinea pigs! You know what they did?! It's in the world news!' That his ah … multi-drug resistant to diabetes and all this new gadgets or drugs. We take it. We have to take it!

Fear reportedly kept many Nauruan people away from the researchers and they described hiding from the clinic to avoid participating. It is unclear how this may have skewed the sample or affected future health behaviours and trust in medical treatment and advice (see also McLennan et al. this issue). In fact, researchers like Paul Zimmet did make reports to the national government (pers. comm., see also Zimmet 1976), but these never made their way back to the local population and obesity levels continued to rise. Constant headlines in the global press have cited Nauru as the 'fattest nation in the world' (Laurance 2011). Even a leading *Nature* editorial heralded Nauruans as 'lazy' (Diamond 2003), while other ostensibly 'scientific' academic articles have similarly attributed obesity to 'gluttony and sloth' (Prentice and Jebb 1995). Thus, obesity is a very real moral judgement about body norms—not body size—that anyone with internet access can see.

Distrust can be further emphasised when body norms do not align with people's experience of their body size. In a diabetes clinic in Samoa, BMI posters hung on the wall so patients could see where they fell from underweight to obese once their BMI was calculated. Patients would often laugh as they saw that they fell on the overweight and obese spectrum. When asked why they thought this was amusing, people would dismiss the chart as inappropriate for Samoan bodies—reflecting a scepticism of these universal measures. Their bodily experience—largely positive—did not align with the message that they should be feeling bad, so they did not trust the measurement. Further scepticism of the BMI arose in Nauru when, in defiance of once again being labelled as a 'fat nation' in the international press, the government released a statement pointing out the contested use of BMI cut-offs in the Pacific islands (Government Information Office - Republic of Nauru 2010; Vatucawaqa 2010).

Obesity interventions are also delivered alongside other interventions with different implied body norms. According to health advice, early childhood growth and fatness are generally considered healthy and protective and poor child growth and/or weight are considered problematic, as they reflect deviations from favourable environmental conditions that support growth and development (de Onis and Yip 1996; Maupin and Brewis 2014; Wentworth 2016, 2017). This contradicts global health messaging about childhood obesity. Concerningly, stunting is an increasing concern in Nauru, where the distinction between clinical categories of 'thin' and 'stunted' is unclear in everyday practice, when the emphasis is on reducing body size rather than addressing malnutrition—whether this manifests in stunting and/or obesity. In older age, fatness can also be protective. People in Samoa and Nauru were well-educated on the idea that 'fat is bad', but they were also keenly aware that thinness is linked to health decline—older people and/or end-stage diabetic patients would often rapidly lose weight prior to dying and the fragility was very apparent. This paradox, making weight that is protective invisible and weight that is dangerous hyper-visible, can lead to disordered eating and other forms of suffering.

In Nauru, for example, many women had tried different weight-loss programmes. One woman said, laughingly: 'I want to get diabetes so I'll be skinny. I want to look nice and trim, instead of being … chubby!' She squeezed her belly and pointed to the compression shorts she wore to contain it. 'But my friends always say "if you want to get diabetes then you'll be skinny?" "Yes!" "Oh. But what about being sick and going on the dialysis?!" I wasn't thinking of that, I was thinking of being thin'. Another woman similarly explained that her yo-yo dieting had led to her diabetes and, that even though her sister had warned her that this would happen, she dieted anyway. In Samoa, young women could readily think of other young people who controlled their eating to the point of reducing nearly all consumption as a way to lose weight in order to be fit. While body weight reduction is considered positive for reducing risk for disease, often unconsidered are the ways that health promotion around weight can create disordered eating, anxiety about body image and stress. In interviews with urban women in Samoa, many joked about knowing someone who had either severely reduced consumption to the point of self-starvation or was known to vomit after eating. Neither of these things was described as eating disorders, only ways to control body size.

When interventions create a negative body experience—a feeling of stigma, ostracism, or being unfulfilled—people seek to counter this feeling in other ways. In Nauru, people diagnosed with diabetes continued to seek the feelings of well-being associated with social belonging, which they also associated with prestigious foods, economic and social success. As Manu explained one day,

> The people here, they just wanna see … really they're not educated in the … they don't use senses or common senses, they just use the feelings. They just wanna feel like a king or something. It's like now, you see the people having diabetes,

> because of even though when they're sick—I've seen some people like this!—when they get their money they have to drink, they have to eat in the restaurant. I've seen this guy eating after he got his royalty [payment] after 2, 3 years of hardship. I've seen this guy coming in, ordering so many food … The looks of this guy! He's so sickly, he's obese and he's short and he's limping. A friend of mine was like, 'hey! This guy he's coming to the restaurant, he's got a lot of money in his pocket!' I told my friend, 'what's the use of his money if he's not gonna …?' And the way he's eating his food, so fast … like he's acting out that he's really loving the food, but actually he's really sick, cannot get all the food in. You see, that's the problem with the Nauruans. The mind is over the matter! They never really … can't face the facts.

Such conspicuous eating and drinking was common in Nauru, but tinged with a bittersweet tension: people were confronted by the knowledge that food once meant celebration and social belonging, but also meant repugnance, greed and death. It is in such moments that the tension between health advice and the physiological feeling of fullness from delicious food became apparent. Similarly, in Samoa, diabetes patients would talk about their struggles of modifying their diets when the family generally shared a single meal. People struggled with insisting that the household members responsible for cooking should reduce salt, sugar or fat without imposing their individual will on the whole household. While these patients had the knowledge of what they needed to do to better control their glucose levels or their weight, balance in relationships was often prioritised over the bodily metrics. In this way, body norms are inseparable from the social relationships that shape eating, feeding and caring for others. These tensions have equally been noted by authors such as Ferzacca (2000, 2004), in his research on medical nutritional programmes in the US.

In summary, obesity interventions appear to have accompanied a change in body norms in Nauru and Samoa towards a greater emphasis on body size, with acknowledgement that fatness is risky and thinness is desirable. The negative moral value that accompanies health promotion on obesity—especially via medical categories—plays a clear role in shaping many islanders' body experience. However, as interventions fail to reduce obesity, many islanders' body experience becomes less-positive. This has the potential to have negative health consequences, by contributing to stigma, stress and fear. Concurrently, there is growing distrust of authorities and medical establishments as programmes continue to make people feel worse and not better. Whether intended or not—Foucault (1975–1976) and others might argue that fear is an important strategy to monitor and control bodies—this may limit the effectiveness of future interventions.

Discussion/conclusion

Our work is a reminder that body norms in the Pacific islands are not a singular or universal. In this sense, body norms are not a fixed variable or unit of analysis that can be defined as a 'factor' or 'risk factor'. These findings are counter to the widely-cited assumption that Pacific Islanders value large bodies universally. Instead, multiple cultural and physiological influences interact to shape a complex and changing landscape of body norms over time. Body norms, in turn, link to body experiences, ageing processes, distrust of medical practitioners, stigma and stress pathways.

Our overlapping analyses show how there has been a growing emphasis on body size as one of the most important features determining body norms and experience. People today judge old photographs by this, commenting on how slender people looked in the past, rather than emphasising other 'traditional' ideas of bodily value. However, fat has different meanings and elicits different experiences. Some people experienced fatness as negative, associated with undesirable age, lack of sexual attractiveness and even being diseased or near-death. Others associated fatness with healthiness, vitality, human connection and wealth.

Many of the body norms we encountered were, thus, highly contradictory and appear to result in equally contradictory bodily experience and so physiological outcomes. This phenomenon has been noted before in other fields of study (e.g. Maio et al. 2007); while such explanations have focused on psychology rather than cultural values as the 'mechanism', our conclusions concur with the broader message. Social psychologists describe this conflict between something a person 'knows' (e.g. that medical practitioners consider fatness to be unhealthy) and something a person 'feels' (e.g. a sense of pride at having a socially-desirable body size) as 'psychological ambivalence' (Maio et al. 2007). Ambivalence occurs in these fieldsites when there are conflicting ways of assessing what is considered a good body. Adorning the body, measuring BMI, the feeling of being full, are all features of the body upon which we pass moral or value judgement. People in both Nauru and Samoa had mixed experiences with each of these: some people associated fatness with health risk but also as a signifier of wealth or social connection; some saw thinness as positive, as reflected in the global media; others saw BMI as a foreign and inappropriate measure, derived by untrusted authorities, that was used to stigmatise islander bodies in the international press. This is not unique to Pacific islands: elsewhere in the world, we also observe a distrust of the metrics, reflecting a need to translate weight cut-offs in new ways (Warin et al. 2008). Ambivalence can be created and individual suffering amplified when the difference between body norms and bodily experience is experienced in everyday life and as biomedical body norms continue to carry moral judgement and stigma and so make people feel worse and experience worse health outcomes (Brewis and Wutich 2012; Brewis 2014). It has been argued elsewhere that interventions which fail to address this deep-seated ambivalence by only informing people of what they should *do* rather than also addressing how they *feel* may lead people to forming negative attitudes towards the intervention's message (Maio et al. 2007). This may involve social psychological, neurological, behavioural or sociocultural tools and interventions.

Further, obesity interventions themselves have actively shaped body norms and people's body experiences. Our fieldwork demonstrates that foreign categories of measurement, such as BMI, have become localised and have moved through the islands over time. The way that BMI has moved across space and time or changes across the lifecourse is not well understood.

Scholars and practitioners know even less about the (unintended) consequences of weight-focused health messaging, where disordered eating might be normalised and developing diabetes seen as a method of becoming thin.

The standard model of obesity intervention (e.g. diet/exercise) suggests a fairly straight attitudinal path to behaviour change: providing more information about the dangers of obesity will lead to changes in beliefs about and intentions toward diet/exercise; this, in turn, will lead to healthier behaviours and choices. However, as these ethnographic cases show, the ways people understand and respond to concerns around obesity are far more complicated. Interventions typically focus on body size, but fail to take into account body norms or the lived experience of body size. Likewise, they often also fail to take into account history or social change (McLennan and Ulijaszek 2014). This matters: it can lead to confusion and ineffectiveness of interventions, and it could cause harm and sow distrust of healthcare professionals and other members of society.

Contradictions can create suffering and affect health behaviours. Overall, our research suggests that obesity interventions do not fail because they conflict with local body norms; rather, they fail because they re-shape body norms in unpredictable, yet unacknowledged, ways. While so-called 'objective' and non-invasive measures might be easier to obtain from a practical perspective, focusing on BMI may be doing more harm than good. Especially as we see a growing dual burden of obesity and stunting in the region, it may be time to re-focus intervention onto malnutrition, rather than continuing to focus on people's body size (World Health Organization 2017).

Our research suggests that health interventions could benefit from incorporating multi-faceted data involving social, cultural and economic evidence, rather than assuming body size, norms and experiences are individual characteristics or 'factors' that are within an individual's power to control. Further, interventions that focus only on quantifiable body size may increase suffering and decrease their own effectiveness—and so may be part of the problem. How do we reconcile this with medical/human biological approaches that are focused on the health-driven goal of reducing obesity in the Pacific region? We outline some recommendations for intervention design, delivery and evaluation in Box 1. Overall, partnership with social researchers and local communities, to understand both the local context and the values and biases of those delivering an intervention, may improve health outcomes in the region.

Box 1. Recommendations for designing and implementing interventions in the central Pacific region.

1. Identify and align weight loss efforts against other competing practical and cultural goals in people's everyday lives (such as social obligations and economic constraints). *Relevant ethnographic observation*: People may be motivated to lose weight, but weight management may be only one of many competing goals. Align efforts with life goals, not body size ones.
2. Consider carefully how healthy weight goals are defined and discussed. Focusing on addressing malnutrition and nutritional status should have fewer unintended consequences than focusing on body size. Consider the terminology used to talk about fat. Work with a diverse group of speakers to test translatable terms, considering the benefits and costs of each. *Relevant ethnographic observation*: BMI is not culturally relevant or meaningful in how many people determine whether they need to lose weight or not; it is also laden with significant moral judgement, even when used in a seemingly 'objective' clinical setting. All body-related terms have powerful meanings attached to them.
3. Incorporate concern and awareness for 'too little' weight as well. *Relevant ethnographic observation*: people may be worried about being too small as much as too large for an array of social reasons. This can easily lead to confusion, ambivalence, stress or frustration.
4. Think about gender when encouraging a broad range of ways people can move more in their daily lives. *Relevant ethnographic observation*: exercise, particularly in public, can have severe social and practical risks for women.
5. Understand that individual-level dietary changes are very hard to sustain when they contradict other social obligation and economic concerns. *Relevant ethnographic observation:* sharing food and eating with others has profound social meanings from which people cannot (and should not) disengage. Consider how dietary recommendations fit within broader food-related obligations and costs and consider the risks of disengagement.
6. Plan for possible negative meanings of weight loss or weight lost in how behaviour change is suggested. *Relevant ethnographic observation*: Being too small or thin can have strong negative social meanings across the life course, and this creates complex tensions as people consider and act on the goal of weight loss.
7. Recognise that if an intervention is delivered, people will expect to see improvement. *Relevant ethnographic observation*: lack of sense that weight loss efforts are working promulgates damaging and effort-eroding stigma, body dissatisfaction and a feeling of helplessness. Plan for how evidence of success is presented to participants (when, how, what).
8. Plot carefully how the research design, goals and outcomes are presented online. *Relevant ethnographic observation*: participants will seek out websites, social media, etc., and how they read these they can greatly impact the intervention.
9. Design based on solid local knowledge of what interventions have come before and how people have understood and experienced them. *Relevant ethnographic observation*: participants are fully aware of a history of previous and current (mostly failed) interventions and their present practices are partly shaped by them. New interventions always layer onto previous ones, including the memories and cultural practices related to them.
10. Recognise any messaging you deliver is part of a cacophony. *Relevant ethnographic observation*: People feel constantly bombarded with an array of health messages that change often as governments, research or advertising trends change. This is confusing and can lead to a distrust of people carrying out interventions.

Notes

1. Material from Samoa is selected from the author's IRB approved research. Ethics approval for this research was granted by the Brandeis University Institutional Review Board. The proposal was also submitted to the Centre for Samoan Studies as the National University of Samoa. J.H. explained the research, risks and the ability of participants to refuse and withdraw at anytime. All clinic-based interviews included a signed consent form.
2. Some material in this paper is sourced from A.K.M.'s ethnographic research on Nauru. Ethics approval for the research was granted by the University of Oxford's Central University Research Ethics Committee (CUREC) and people participated with a good understanding of the research intent. A.K.M. also carried out a thorough risk assessment for the School of Anthropology before commencing fieldwork, to identify and mitigate risks to both researcher and participant safety. Complete details are provided in McLennan (2013).

3. Pseudonyms are used throughout this paper in order to conceal identities.
4. Epidemiological surveys broadly support this; according to the 2007 WHO STEPS survey on Nauru, for example, BMI and waist circumference increase significantly between the 15–24 and 25–34 year age categories (p. 76).

Ethics statement

Ethics approval for research and fieldwork in Nauru was granted by the University of Oxford's Central University Research Ethics Committee (CUREC) and in Samoa was granted by the Brandeis University Institutional Review Board.

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