HHS Public Access

Author manuscript

Soc Theory Health. Author manuscript; available in PMC 2019 April 17.

Published in final edited form as:

Soc Theory Health. 2018 August ; 16(3): 256–271. doi:10.1057/s41285-017-0055-0.

In BMI We Trust: Reframing the Body Mass Index as a Measure of Health

Iliya Gutin[a]

[a]The University of North Carolina-Chapel Hill, 155 Hamilton Hall, Chapel Hill, NC 27514

Abstract

Recent work in medical sociology has provided critical insights into distinguishing between obesity as a condition with severe individual- and population-level health consequences, and obesity as a socially undesirable, stigmatizing construct opposing thinness as the healthy ideal. Less often considered is the role of Body Mass Index (BMI) as the standard by which obesity and healthy weight are measured and defined. Addressing this issue, I begin by distinguishing between BMI as an empirical, objective measure of health, and BMI as an arbitrary, subjective label for categorizing the population. I further consider how BMI is empowered as a measurable quantity through the lens of medicalization and evidence-based medicine, and introduce the "performativity" of BMI as a superior framework for confronting the measure's conceptual limitations. Emphasizing key parallels between BMI and self-rated health as measures with high predictive validity, yet unspecified mechanisms of action, I propose an epistemological shift away from classifying BMI as a biomarker and toward a more flexible view of the measure as a holistic appraisal of health. In closing, I argue that researchers may continue to leverage BMI's ease of collection and interpretation, provided they are attuned to its definitional ambiguity across diverse research methods and contexts.

Keywords

BMI; Measurement; Validity; Performativity; Self-rated health

Introduction

Obesity has emerged as one of the defining public health challenges facing the contemporary global community (Bassett and Perl 2004). Associated with a number of chronic and debilitating diseases - including diabetes, hypertension, heart disease, and many cancers (Dixon 2010; Fontaine and Barofsky 2001) - obesity is perhaps the paradigmatic "disease of modernity"; indicative of how the "discrepancy between the modern environment" and the older, primitive evolutionary environment for which humans were originally adapted gives rise to numerous health issues (Hidaka 2012:206). Research consistently documents the dramatic increases in adult, adolescent, and child obesity over the last 30 years (Anderson and Butcher 2006; CDC 2010;), with many modern-day factors identified as contributing causes and/or underlying mechanisms. The decline of manual labour (Finkelstein et al.

Corresponding author: Iliya Gutin, igutin@live.unc.edu; 917-921-1958.

2005); changes to the built environment (Feng et al. 2010); hyperconsumption of cheap calories (Freund and Martin 2008; Nestle and Nesheim 2012); and increases in indoor time (Kimbro et al. 2011) have all been implicated in the obesogenic lifestyle changes defining recent decades, such as increased sedentary behaviour, declining quality of diet, and greater exposure to unhealthy environments at both work and home.

Less often examined, and of focal interest to this paper, is how the *definition* of obesity has become modernized as well, conforming to the empirical objectivity and authority valued by modern biomedical knowledge paradigms such as the evidence-based medicine movement, and its pursuit of quantified and standardized knowledge (Cambrosio et al. 2006; Jutel 2009). Supplanting such informal language as 'corpulence' or 'fatness', the Body Mass Index (BMI) is the current criterion by which to distinguish 'healthy' from 'unhealthy' weight - not only in scientific literature but in popular discourse and media as well (Saguy and Almening 2008). However, a central irony of the 'modern' usage of BMI is the measure's nearly 180 year-old history. Conceptualized by Adolphe Quetelet in *On Man and the Development of his Faculties, or Essays on Social Physics* (1842), BMI is a function of height and mass ($mass_{kg}$ / $height^2_m$) whose derivation originates from Quetelet's goal of identifying statistical laws governing the many dimensions of the average man, and how they were manifest in the population. Interestingly, the measure was largely unevaluated and unused by the research community until 1972, when Ancel Keys, a nutritional epidemiologist and physician, identified this ratio as a suitable proxy for determining body fat percentages within the population (Keys et al. 1972). Since 1972, over 150,000 articles in leading scientific journals have referenced "body mass index" in their text (Web of Science).

BMI's current adoption by the scientific community is illustrative of its emergence as a readily-available measure of health at the onset of an emergent health crisis. As Stuart Nicholls notes in his examination of the social process by which BMI became "reified… as *the* measure of obesity" (2013:10), much of its legitimacy is tied to the increasingly medicalized terminology used to describe obesity. Simultaneously viewed as a disease, risk factor, comorbidity, and epidemic, BMI proves versatile as a convenient clinical and epidemiological metric for identifying and monitoring national obesity prevalence (Frellick 2013). The relative ease of measuring and interpreting BMI has been integral in solidifying the *factuality* of obesity as an epidemic. As the "cornerstone of the current classification system for obesity," BMI is by far the simplest and most cost-effective option for tracking obesity at the population level (Prentice and Jebb 2001:141). Its continued use by medical professionals, health researchers, and governmental agencies forms the basis of collective knowledge about the epidemiology of obesity in the U.S. and abroad. The cultural authority afforded by its use in science and medicine is further compounded by the public's ability to quickly interpret research using BMI, such as maps showcasing the steady, geographical creep of obesity across the U.S. (Fletcher 2014). Even at the individual level, the widespread availability of BMI equations and charts across numerous forms of media and communications – such as personal health-tracking applications/devices – encourages the self-evaluation of one's health relative to their weight (Jutel 2009; Rich and Evans 2005), as the layperson is empowered to freely calculate their own BMI.

However, the contemporary push towards the standardization of obesity measurement and desire to link body weight and health is not indicative of BMI's ability to accurately *diagnose* obesity in individuals or populations. Consequently, sociologists and other researchers have been increasingly keen on critiquing the prevailing socially-constructed narratives surrounding obesity as a health crisis. For instance, Saguy and Almening (2008) consider how the mass media "reinforc[es] the stigma of fat bodies as diseased bodies" by prioritizing narratives about blame and responsibility in lieu of scientific research on health and weight (p.78). Monaghan and colleagues (2005; 2010) expand upon this notion of competing stakeholders in the social construction of obesity, providing a complex typology of "obesity entrepreneurs" encompassing the individual and collective influences on our social understanding of obesity as a public health threat. Critically, scholars have sought to refine our conceptualization of the obesity epidemic as a hybrid of both the biophysical and sociocultural forces shaping scientific and public discourse on the issue (Moffat 2010; Patterson and Johnston 2012). However, far less work has considered the unique role and power of *measurement* in complicating our understanding of the unhealthiness of obesity or excess weight. Within the framework of the sociology of diagnosis (Jutel 2009; Nettleton 2013), research considers how diagnostic tools, technologies, and terminologies are used in identifying health issues and categorizing them into known medical schema (Jutel and Nettleton 2011). BMI, however, serves as a surveillance mechanism setting a standard by which changes in population health can be tracked (Fletcher 2014; Nicholls 2013; Timmermans and Epstein 2010). The *diagnostic* characteristics attached to BMI are instead the result of BMI as a measure becoming confounded with 'healthy weight' as societal ideal.

To provide a sociological understanding of the feedback loop between the measures and definitions of health, the aims of the present study are threefold: (1) to specify how BMI as an empirical measure is distinct from critiques of obesity as a social construct; (2) to demonstrate that the epistemological turn towards evidence-based medicine, with its emphasis on quantification and standardization, empowers BMI as a measure; and (3) to explain how the sociological notion of "performativity" is applicable in the case of BMI and obesity, further challenging the conceptual validity of BMI. In addressing these aims, the paper shows how the popularity and perceived objectivity of BMI is interwoven with socio-scientific views on health and well-being. This issue of "measurement defining health" is not unique to BMI and its relation to genuine unhealthiness; most measures of clinical significance (e.g., blood pressure, Hba1c, cholesterol) are only meaningful when given the label of 'normal' or 'healthy'. The uniqueness of BMI stems from its continued popularity as a measure of individual and population health, despite ongoing debate concerning what BMI actually captures and the lack of clear pathways linking BMI to health. Thus, more *holistic* reappraisal of BMI is warranted, drawing parallels with self-reported health as a comparable measure lacking clear biophysical mechanisms of action, yet valued for its parsimony and high predictive validity across many health outcomes.

BMI's Dual Role in Obesity as Disease and 'Obesity' as Crisis

Much of the work challenging the biomedical definition of obesity as a diseased state asserts that the "meanings of phenomena do not necessarily inhere in the phenomena themselves but develop through interaction in a social context" (Conrad and Barker 2010: S67).

Consequently, obesity emerges as the exemplary socially-constructed illness, wherein obese individuals attain their 'sick' or 'diseased' status due to the interaction of their weight and the importance and moral value placed upon health, weight, and body image in modern society (Campos et al. 2006; Gard and Wright 2005; Oliver 2006). For instance, Jutel (2001) documents how prevailing narratives about health and weight in the U.S., Great Britain, and France place inordinate "value [on] homogeneity and visual aesthetics", guiding and universalizing "our judgments of what is good and healthy" and influencing the kinds of health policies these nations implement (p.238). Similarly, Rich and Evans (2005) provide an extensive overview of the social pathways through which obesity has been built up as both a moral and health crisis, arguing that public representation of obesity and excess weight as a "certain" threat to individuals' health legitimizes the government's role in protecting citizens from their poor health decisions and lifestyles. This sentiment is echoed by Coveney (2008) in his analysis of the childhood obesity, wherein this message is tweaked to legitimize society's role in protecting "innocent" children from their neglectful parents and the broader social forces engendering obesity-induced "moral social decay" (p.199).

This socially-constructed view of obesity is the result of a normative model of health premised on the existence of an ideal range of good health (and weight) that should be attained. Critically, these norms are not actionable without a measure like BMI to make them tangible and, by conferring a numerical quantity to these underlying beliefs, actively shaping them as well. Thus, whether framed as "healthy vs. unhealthy" or "moral vs. immoral", the central debate in the discourse on obesity and health is the issue of what is normal, abnormal, and how we distinguish between the two. However, it is vital to recognize that not everything about obesity is a social construct by association. As a measure, BMI precedes both the realist view of obesity as a medical condition, and the framing of 'obesity' as a faux-epidemic and source of moral panic (Crossley 2004). Consequently, it would be inaccurate to treat BMI itself as a social construct designed to substantiate the larger construct of 'obesity'. A BMI score carries no moral value as, from a mathematical and anthropometric perspective, it is simply a ratio of two observable facts about an individual (height and weight), whose population-wide distribution and associations with health outcomes can be reported. Given the ubiquity of these reports, researchers and laypersons alike may be tempted into committing the ecological fallacy of assuming that these population-level, correlational findings are indicative of individual-level causal mechanisms (Hu 2008), despite research suggesting that many individuals considered "unhealthy" based on their BMI enjoy favourable cardiometabolic health (Ross et al. 2015; Tomiyama et al. 2016). Thus, our concerns with the use of BMI do not stem from empirical inaccuracies in its calculation; rather, the problems emerge when BMI is *mis*used to promote specific narratives about weight and health.

Not All Evidence is Created Equal

Many issues arise in the interpretation or application of BMI – such as the arbitrariness of BMI cut-points for identifying health risks (Shah and Braverman 2012); its lack of demographic and cultural generalizability (Burkhauser and Cawley 2008); and individuals' distrust of BMI in evaluating the healthiness of their weight (Kwan 2012; Monaghan 2007). Despite these issues, the measure is not inherently "wrong", as per the operative term used

in various media reports. Rather, the problem is complacency surrounding its acceptance in medical and health research, ignoring the process by which BMI's validity is inflated. On the one hand, prevailing norms suggest that the widespread use of BMI reflects its status as a "gold standard" for empirical health measurement (Timmermans and Berg 2003). This positivistic outlook on BMI as a stable, valid measure of healthy weight supports its use in analytic models and provides confidence in the results. However, a more critical perspective would categorize this (over)reliance on BMI as an example of the false empiricism defining the evidentiary basis of modern health research. Specifically, the reification of BMI as an objective, *quantifiable* entity emerges from epistemological shifts in society's perception of medicine and science, and the degree to which we privilege statistical evidence in measuring and defining health.

Much of the power afforded to BMI is attributable to the linkage between power and knowledge in society – i.e. power-knowledge – whereby "regimes of truth" (e.g. accepted scientific knowledge) are a function of power relations among individuals and institutions (e.g. government, medicine, social norms) (Foucault 1977). Applying power-knowledge to BMI is a natural extension of the "medical/clinical gaze" that Foucault presents in *The Birth of the Clinic* (1963). Detailing medicine's transition from treating the soul towards treating the body, Foucault explicates the process by which medical practitioners came to regard their discipline, and its governing knowledge, as rooted in observational evidence. This push towards empiricism necessitated the disambiguation of the patient as individual and patient as a body – a body that could be measured, diagnosed, and treated. The adoption of this detached, medical gaze legitimized a power dynamic between the physician and patient, permitting the objective assessment of an individual's health by noting symptoms and situating them in the continuum of known departures from the biological norm (Arney and Bergen 1983).

Critical to understanding BMI are the inherently de-humanizing aspects of the medical gaze, distilling individuals into a set of measurable observations. This quantification of the individual has only intensified as techno-scientific innovations increase our ability to develop novel measures of health. Epistemologically, the increased quantification and normalization of medical diagnoses serves as the core principle underlying the evidence-based medicine (EBM) movement, whose goal of developing "standardised approaches to patient treatment" has become the "hegemonic way of thinking and practicing within the health sciences" (Ashkeim et al. 2016:1). EBM's origins are often attributed to a series of lectures delivered by epidemiologist Archie Cochrane in 1972 (notably the same year Ancel Keys advocated on behalf of BMI), promoting the systematic evaluation of clinical practices and emphasizing the development of "unbiased methods of evaluation" (Ashcroft 2004:131). Many scholars note how these central tenets of EBM presume that methods of inquiry can be "ranked" on the basis of their "susceptibility to bias" and perceived objectivity(Ashcroft 2004:131), propagating status hierarchies in the types of evidence and measurement privileged by biomedical research (Feinstein & Hortwiz 1997; Haynes 2002).

Consequently, the quantification of health and disease is prioritized, as "numbers" are placed higher in the "information hierarchy", seeing as they are the product of objective, scientific methods, rather than the subjective, and "distorted" information obtained from patients

(Jutel 2009:70). Extending this framework to the notion of "healthy weight" and disease, Jutel (2009) further demonstrates how the adoption of EBM contributed to the reclassification of overweight as a "disease status" (p.69). While the unhealthiness of adiposity and 'excess' body weight had been a contested issue for many years prior to the proliferation of EBM, the development of and reliance upon scales as objective, diagnostic instruments facilitated the "potential to track" the "distribution, prevalence and correlates" of weight, and thus "naturalize" our expectations of normal and/or deviant weight status (Jutel 2009:69). Seeing as weight, in its quantified form, is the focal input of BMI, it is clear that these same paradigmatic shifts in what constitutes *unbiased* medical knowledge serve to further empower BMI as a proxy for 'healthy weight' and validate its categorization into clinically significant categories like "morbid" or "class I/II/III" obesity.

While better measurement of health can help provide greater understanding and lead to improved outcomes, medical professionals, researchers, and critics of EBM express concern about trusting measures over direct patient interaction (Greenhalgh 2012; Greenhalgh et al. 2014). Some argue that even Cochrane himself cautioned against strict reliance on the results of random control trials and systemic analyses over clinical encounters (Ashkeim et al. 2016). Physician and medical theorist Abraham Verghese (2008) warns of the increasing "iPatient" phenomenon, as patients are reduced to a battery of vital signs and measures that physicians observe from afar. This "chart-as-surrogate-for-the-patient approach" can lead to "simple diagnoses and new developments [being] overlooked, while tests, consultations, and procedures that might not be needed are ordered" (p.2749), a reflection of the increased medicalization and over-measurement that has supplanted traditional physician-patient interaction and reduced quality of care (Reilly 2003; Welsh 2002).

Of course, one would be remiss to neglect guidelines offered by the medical community concerning appropriate usage of BMI in both adults and children (AACE, 2016; Daniels, 2009; Sesselberg et al., 2010), yet BMI continues to be invoked at the patient-level, as BMI thresholds determine eligibility for bariatric and other surgeries (ASMBS, 2016; Throsby, 2011). Furthermore, obesity research often involves no doctor-patient interaction, with the medical gaze doubling as a lens through which epidemiologists, sociologists, and other 'surveyors' assess population health. Whereas an in-person encounter allows for triangulation between BMI and other indicators of health in assessing individuals' wellbeing, BMI is often the *only* measure of health available in survey or epidemiologic data. Given these limitations, it is unsurprising that the use of BMI as a proxy for health bleeds into, and overtakes, the definition of health itself.

Performing BMI

The blurred boundaries between BMI and healthiness are evidence of the role language plays in shaping knowledge, demonstrating how we describe 'truth' through specific terminology. However, the specialized nature of medical knowledge constrains the ability of language to convey information, and the extent to which words represent scientific truth. Language thus takes on performative aspects, wherein the terminology defining health instead become a *substitutes* for health. BMI is quintessential of this performativity in

empirical health research, demonstrating how measures and models come to replace the social truths they purport to simulate.

Within the sociological literature, the best-known example of this performativity is Abbott's pointed critique of how continued use of the General Linear Model in analyses has progressively shaped our conception of reality as a system of linear relationships and trends (dubbed "General Linear Reality") (1988). Similarly, economics, in seeking to "describe an existing external 'economy'", simultaneously "bring[s] that economy into being" as "economics *performs* the economy, creating the phenomena it describes" through the widespread use of select models (Mackenzie and Millo 2003:108). Extending this argument to health, Greco (2012) argues that the medicine's inability to contend with "medically unexplained symptoms" (MUS) stems from an overdependence on medical classification. Namely, medical categories for diagnoses (e.g. mental illness, auto-immune disease) are performative, as these labels define strict boundaries for categorizing illness and disease. MUS unable to slot into these categories are thus *non*-medical, leading physicians and patients to question the 'truth' of the condition.

The logic of performativity provides an ontological objection to BMI's use, suggesting that the model and language of health has become the reality of health, with BMI serving a "dual role... simultaneously measure[ing] and defin[ing] the modern problem of excess body weight" (Fletcher 2014:338). Individuals are labelled obese, overweight, and normal weight based on their BMI potentially ignoring its limited accuracy in mapping weight to health risk. While a one-point difference in BMI has few repercussions for individual health, being labelled as "obese" rather than "overweight" is stigmatizing and laden with vastly different health implications (Puhl and Brownell 2003). Similarly, at the population level, the U.S. Department of Health and Human Services gradually shifted towards a lower BMI cut-off for "overweight" in the 1990s (from ≥27.8 for men and ≥27.3 for women in Healthy People 2000 [1990], to >25.0 for both in the 4th edition of Dietary Guidelines [1995]) redefining ~30–40 million Americans as "unhealthy" (Kuczmarski and Flegal 2000). Given its definitional arbitrariness, in using BMI we can only draw conclusions about BMI itself, limiting our capacity to understand the relationship between weight and health; i.e. the 'real' phenomena that BMI seeks to model.

Evans and Colls (2009) offer a compelling example of performativity manifest in obesity research/policy, and its consequences for individual and population health. Questioning the fundamental assumptions underlying a British public health initiative targeting childhood obesity through regular BMI checks, the authors highlight issue of external validity, as "the very act of measuring the body only highlights a body's inability to be captured solely by a measuring tool, in this case the BMI" (Evans and Colls 2009:1075). Namely, human health is complex and multi-dimensional; isolating a single metric further complicates, rather than simplifies, our understanding by yielding data of questionable value. BMI is thus an "abstracted representation of the body", fuelling a reciprocal and inaccurate narrative by which "data collected at the population level return to constitute individual bodies through a range of processes" (Evans and Colls 2009:1076), such as medical guidelines, government reports, and individuals' internalization of BMI. Consequently, using this inconsistent measure to track childhood obesity raises ethical concerns in designing health interventions

that have little chance of success, and potentially "detrimental effects on those involved" (Evans and Colls 2009:1076).

These "detrimental" and unintended consequences are not limited to children. In redefining our perceptions of health to conform around BMI – i.e. BMI performing 'healthy weight' – we neglect individuals for whom BMI is an especially poor model of reality. In a recent study, Tomiyama et al (2016) note the significant proportion of adults with "unhealthy" BMIs yet positive indicators of cardiometabolic health. Beyond discussing the issue of measurement error, the authors consider the consequences of "focusing on BMI as a proxy for health" in "contibut[ing] to and exacerbat[ing] weight stigmatization" (Tomiyama et al. 2016:2). Further, the macro-level "excessive focus on weight is likely to have detrimental consequences for the health and wellbeing of heavier individuals" (Tomiyama et al 2016:2), especially in health promotion efforts. This dual recognition of BMI as problematic in its measurement *and* in sustaining flawed social and scientific norms is an important acknowledgement that current research is lacking in recognizing performativity.

The Benefit of BMI

Despite spending the majority of this paper synthesizing existing critiques of BMI and offering new perspectives on its limitations as a measure of health, a more even-handed portrayal of BMI is warranted. Consider this obvious, if not commonly asked, question: Following Ancel Keys' praise of BMI due to "the simplicity of the calculation and… the applicability to all populations at all times" (Keys et al. 1972: 341), what has been gained from over 40 years of research using BMI? A key oversight in literature criticizing BMI is a lack of consideration for knowledge gained from its research applications, especially in demography, epidemiology, and public health. While body fat percentage, skinfolds, and/or waist circumference can help provide a better measure of individuals' adiposity, BMI continues to be the primary measure given its ease and low cost of collection (Burkhauser and Cawley, 2008). In fact, many critiques extend an olive branch to BMI in conceding it is a "quick, convenient and inexpensive marker of health" (Tomiyama et al. 2016:2), allowing for readily-available and consistent population-wide measures of obesity (Nicholls 2013). However, criticizing BMI solely for its imprecision and questionable validity is to isolate BMI from the larger issues of measurement error plaguing much of scientific research (Downing 2003; Downing 2004; Zeller and Carmines 1980).

For instance, despite the crudeness of BMI as a measure, it has clear empirical links to various health outcomes – especially in the case of high BMIs and their ability to demonstrate the significant health costs of severe obesity at the population level. There is a highly consistent relationship between severe obesity (BMI>35.0) and elevated mortality risk. In examining excess deaths in the U.S. associated with weight status, Flegal et al (2005) find that the highest number of deaths is associated with severe obesity, while Fontaine et al (2003) note a 22% reduction in longevity among severely obese men. These results are consistent across diverse data sets, with multiple meta-analyses observing a 20–30% increased risk of mortality for severely obese individuals (Flegal et al. 2013; McGee 2005). The robustness of the BMI-mortality relationship reflects the numerous health conditions and co-morbidities associated with an elevated BMI. Spanning a variety of chronic diseases

– from type-II diabetes and cardiovascular disease, to asthma and chronic back pain – a 2009 meta-analysis by Guh et al finds consistently elevated risk of co-morbidity for severely obese men and women. Thus, in light of the above evidence, BMI has proven validity as a convenient and simple proxy for modelling the population-level association between obesity and increased mortality and morbidity.

BMI and Self-Rated Health: Less than Kin, More of a Kind

While relying on BMI at the individual level is questionable, some of its shortcomings are outweighed by the insights gained from its use in aggregate analyses of population health. Although results may be misconstrued as implying high BMIs invariably increase risk for disease and/or early death (Heyman et al. 2010), the ultimate responsibility of interpreting population-level statistics lies with the researcher and not the measure. In this regard, self-reported health (SRH) – a widely employed survey instrument – serves as a model of how to adapt BMI for future research. Specifically, SRH is subject to many of the same criticisms as BMI, and yet is highly valued as the most parsimonious predictor of later health outcomes in population research (Desalvo et al. 2006; Idler and Benyamini 1997).

Just as with BMI, having individuals rate their health from poor to excellent yields clear and interpretable results. SRH is used in many studies, and has repeatedly demonstrated its value as both health outcome and health mediator. In fact, the strong, inverse relation between SRH and mortality is well-documented across different survey designs and settings (Benjamins et al. 2004; Singh-Manoux et al. 2007; Vuorisalmi et al. 2005). Yet there are concerns about the generalizability of SRH across sociodemographic groups (Bobak et al. 2000; Franks et al. 2003), just as with BMI. Most notably, not unlike BMI, the predictive power of SRH is not yet substantiated by a comprehensive understanding of its mechanisms of action (Bailis et al. 2003; Idler et al. 2004), with many social and biophysical explanations underlying the multifaceted nature of SRH at the “crossroads of culture and biology” (Jylha 2009: 307; Jylha et al. 2006).

Despite many similarities and the kinship between BMI and SRH as measures of health, they are ultimately different *kinds* of metrics, primarily as a function of their perceived diagnostic power under a biomedical/EBM paradigm. Unlike BMI, SRH is not viewed as a clinical or physiological metric, as it captures an individual’s subjective wellbeing rather than some objective component of their physical health. Critical analyses of SRH are careful to frame the measure as a holistic appraisal of health, shaped by numerous health mechanisms and biological processes that intersect with individual sociodemographic characteristics, psychosocial traits, and cultural/social norms. On the one hand, this complexity is valued by researchers, especially in understanding how individuals experience and define health and illness. Conversely, the lack of biomedical certainty regarding causal mechanisms linking SRH to mortality and morbidity, and the implication that social factors may confound the association between SRH and objective health (e.g. the stronger correlation between SRH and mortality among higher SES individuals [Dowd & Zajacova, 2007; McFadden et al. 2009]), has led some researchers to question the reliability of SRH as a ‘true’, unbiased measure of health (Groot 2000; Jurges 2007; Salomon et al. 2009).

These critiques of SRH – and other 'poorly' understood measures of health (including BMI) – reflect the discordance between the hard, objective evidence empowered under the allied paradigms of biomedicine and EBM, and a more open acknowledgement that subjective evaluations of health help reveal "limited understanding of what 'true' health is and an even poorer grasp of how to measure it" (Quesnel-Valleé 2007: 1163). Given the imprecision yet predictive validity of BMI, let us reframe the measure to mirror our views on SRH and the ongoing challenge of trying to capture 'true' health. Doing so would require stripping BMI of its privileged status (or 'depowering' BMI) as "quantified" data which "[do] not lie" and, through the lens of an "essentialist view of the body", are superior to the more qualitative SRH (Abend et al. 2016: 92). However, we can then reclassify BMI as a holistic measure of individuals' health relative to their weight, rather than a biomarker grouped with blood pressure, cholesterol, and triglycerides in analytic models.

Conclusion

Despite numerous headlines declaring the 'wrongness' of BMI as a measure of obesity and health, its widespread use in population and medical research shows no signs of abating, with over 8,000 articles referencing "body mass index" in 2017 alone (Web of Science). Along with being a convenient and simple measure – contributing to its frequent use in research – BMI is a *democratic* measure of health, as it allows individuals to assess their health independent of medical authorities. Yet a more critical perspective on BMI is warranted, as the measure's practical and theoretical limitations challenge its objectivity and reliability as a proxy for 'healthy weight'. For researchers and laypersons alike, this perspective entails acknowledging that: (1) BMI has helped define the obesity epidemic due to its ease of collection, analysis, and interpretation by scientists and the public; (2) the measure is imbued with substantial power and cultural authority stemming from the quantification of the human body in the name of scientific objectivity; and (3) the two factors above, in conjunction with language and classification schemas mapping BMI to health, allow the measure to shape our reality of health, weight, and 'healthy weight'. Accepting this perspective requires an ideological shift by health researchers, in training a more critical eye on BMI in surveys, models, and as evidence for interventions and policies. Freeing the measure of its alleged objectivity, yet preserving BMI's value as a genuine indicator of health – as per the example set by SRH – allows research to avoid the paradoxical practice of making definitive claims about BMI's relationship to health, while condemning BMI for its measurement issues.

Consequently, researchers and medical practitioners stand to benefit from being more attuned to the heavy social framing surrounding BMI as a measure of health. Thinking more critically about the relationship between weight and health, and the role of BMI as the dominant empirical model, is contingent upon recognizing the fallibility of diagnostic tools, understanding the limitations of the objective 'truth' they produce, and accepting a level of subjectivity and uncertainty in measurement (Gardner 2014). Extant definitions of health are varied and often multidimensional (e.g. the WHO definition of health as "physical, mental, and social well-being" [2006]), such that an individual's assessed 'healthiness' is contingent upon the selection of health measure(s). Healthy weight is equally fraught with definitional ambiguity. As a result of this conceptual flexibility, the research question and method (or

medical diagnosis and procedure) actively shapes the definition and use of BMI as a proxy for health.

For example, demographic analyses of racial trends in obesity are a case of BMI being strategically operationalized as a broad measure of *population* health, whose clinical utility is irrelevant. BMI is available for large nationally-representative samples, and is easily incorporated into a model. While some individuals are likely misclassified as 'unhealthy', measurement error is tolerated, especially if the goal is documenting racial-temporal disparities in health. Conversely, the definition of BMI is radically altered – highly *individualized* and medicalized – when used as a determinant of eligibility for a given medical procedure. While existing critiques of BMI warn against *any* application of the measure in a clinical setting (Tomiyama et al. 2016), such strawman arguments are specious, as clinicians are cognizant of limitations in using BMI for making diagnoses.

Ultimately, the goal is not to chronicle all possible permutations of how BMI is defined across various research contexts and disciplines. Sociological perspectives, most notably viewpoints proffered by sociologists of diagnosis, clarify the social framing and normative scientific paradigms of objectivity and standardization that allow diagnostic tools like BMI to ascend the knowledge hierarchy. Yet, oft-neglected is the loopback mechanism by which these diagnostic measures come to define and shape the reality of the very health phenomena they are intended to model. Importantly, this critical framework – if shared by sociologists, epidemiologists, clinicians, and others – can provide a common basis for recognizing the flaws of BMI, circumnavigating these issues, and thus preserving health knowledge gained from thousands of articles spanning decades of work. Hopefully both detractors and proponents of BMI can agree that the measure is imperfect – not unlike any other measure of health – but if and when better framed as a holistic assessment of health relative to weight, it can provide valuable insights into obesity as an individual and social condition.

References

Abbott A (1988). Transcending General Linear Reality. Sociological Theory, 6(2), 169–186.

Abend Pablo, Fuchs Mathias, Reichert Ramón, Richterich Annika, and Wenz Karin. (2016). Digital Culture & Society: Quantified Selves and Statistical Bodies, Vol. 2, Issue 1.

American Association of Clinical Endocrinologists. (2016). Guidelines for comprehensive medical care of patients with obesity – executive summary.

American Society for Metabolic and Bariatric Surgery. (2016). Who is a Candidate for Bariatric Surgery?

Anderson PM, & Butcher KF (2006). Childhood obesity: trends and potential causes. The Future of Children, 16(1), 19–45.

Arney WR, & Bergen BJ (1983). The anomaly, the chronic patient and the play of medical power. Sociology of Health & Illness, 5(1), 1–24. [PubMed: 10261305]

Ashcroft RE (2004). Current epistemological problems in evidence based medicine. Journal of Medical Ethics, 30(2), 131–135. [PubMed: 15082804]

Askheim C, Sandset T, & Engebretsen E (2016). Who cares? The lost legacy of Archie Cochrane. Medical Humanities, 43:41–46. [PubMed: 28228571]

Bailis DS, Segall A, & Chipperfield JG (2003). Two views of self-rated general health status. Social Science & Medicine, 56(2), 203–217. [PubMed: 12473308]

Banack HR, & Kaufman JS (2013). The "obesity paradox" explained. Epidemiology, 24(3), 461–462. [PubMed: 23549182]

Bassett MT, & Perl S (2004). Obesity: the public health challenge of our time. American Journal of Public Health, 94(9), 1477. [PubMed: 15359488]

Benjamins MR, Hummer RA, Eberstein IW, & Nam CB (2004). Self-reported health and adult mortality risk: an analysis of cause-specific mortality. Social Science & Medicine, 59(6), 1297–1306. [PubMed: 15210100]

Bobak M, Pikhart H, Rose R, Hertzman C, & Marmot M (2000). Socioeconomic factors, material inequalities, and perceived control in self-rated health: cross-sectional data from seven post-communist countries. Social Science & Medicine, 51(9), 1343–1350. [PubMed: 11037221]

Burkhauser RV, & Cawley J (2008). Beyond BMI: the value of more accurate measures of fatness and obesity in social science research. Journal of Health Economics, 27(2), 519–529. [PubMed: 18166236]

Cambrosio A, Keating P, Schlich T, & Weisz G (2006). Regulatory objectivity and the generation and management of evidence in medicine. Social Science & Medicine, 63(1), 189–199. [PubMed: 16455171]

Campos P, Saguy A, Ernsberger P, Oliver E, & Gaesser G (2006). The epidemiology of overweight and obesity: public health crisis or moral panic? International Journal of Epidemiology, 35(1), 55–60. [PubMed: 16339599]

Centers for Disease Control. (2010). Obesity trends among US adults between 1985 and 2009. Department of Health and Human Services.

Conrad P, & Barker KK (2010). The social construction of illness key insights and policy implications. Journal of Health and Social Behavior, 51(1 suppl), S67–S79. [PubMed: 20943584]

Coveney J (2008). The government of girth. Health Sociology Review, 17(2), 199–213.

Crossley N (2004). Fat is a sociological issue: Obesity rates in late modern, 'body-conscious' societies. Social Theory & Health, 2(3), 222–253.

Daniels SR (2009). The use of BMI in the clinical setting. Pediatrics, 124(Supplement 1), S35–S41. [PubMed: 19720666]

DeSalvo KB, Bloser N, Reynolds K, He J, & Muntner P (2006). Mortality prediction with a single general self-rated health question. Journal of General Internal Medicine, 21(3), 267–275. [PubMed: 16336622]

Dixon JB (2010). The effect of obesity on health outcomes. Molecular and Cellular Endocrinology, 316(2), 104–108. [PubMed: 19628019]

Dowd JB, & Zajacova A (2007). Does the predictive power of self-rated health for subsequent mortality risk vary by socioeconomic status in the US?. International Journal of Epidemiology, 36(6), 1214–1221. [PubMed: 17971388]

Downing SM (2003). Validity: on the meaningful interpretation of assessment data. Medical Education, 37(9), 830–837. [PubMed: 14506816]

Downing SM (2004). Reliability: on the reproducibility of assessment data. Medical Education, 38(9), 1006–1012. [PubMed: 15327684]

Evans B, & Colls R (2009). Measuring fatness, governing bodies: The spatialities of the Body Mass Index (BMI) in anti-obesity politics. Antipode,41(5), 1051–1083.

Feinstein AR, & Horwitz RI (1997). Problems in the "evidence" of "evidence-based medicine". The American Journal of Medicine, 103(6), 529–535. [PubMed: 9428837]

Feng J, Glass TA, Curriero FC, Stewart WF, & Schwartz BS (2010). The built environment and obesity: a systematic review of the epidemiologic evidence. Health & Place, 16(2), 175–190. [PubMed: 19880341]

Finkelstein EA, Ruhm CJ, & Kosa KM (2005). Economic causes and consequences of obesity. Annual Review of Public Health, 26, 239–257.

Flegal KM, Graubard BI, Williamson DF, & Gail MH (2005). Excess deaths associated with underweight, overweight, and obesity. Jama, 293(15), 1861–1867. [PubMed: 15840860]

Flegal KM, Kit BK, Orpana H, & Graubard BI (2013). Association of all-cause mortality with overweight and obesity using standard body mass index categories: a systematic review and meta-analysis. Jama, 309(1), 71–82. [PubMed: 23280227]

Fletcher I (2014). Defining an epidemic: the body mass index in British and US obesity research 1960–2000. Sociology of Health & Illness, 36(3), 338–353. [PubMed: 24640951]

Fontaine KR, & Barofsky I (2001). Obesity and health-related quality of life. Obesity Reviews, 2(3), 173–182. [PubMed: 12120102]

Fontaine KR, Redden DT, Wang C, Westfall AO, & Allison DB (2003). Years of life lost due to obesity. Jama, 289(2), 187–193. [PubMed: 12517229]

Foucault M (1973). The Birth of the Clinic: An Archaeology of Medical Perception. New York: Pantheon Books.

Foucault M (1977). Discipline and Punish: The Birth of the Prison. New York: Vintage Books.

Franks P, Gold MR, & Fiscella K (2003). Sociodemographics, self-rated health, and mortality in the US. Social Science & Medicine, 56(12), 2505–2514. [PubMed: 12742613]

Frellick M (2013). AMA Declares Obesity a Disease.

Freund P, & Martin G (2008). Fast cars/fast foods: hyperconsumption and its health and environmental consequences. Social Theory & Health, 6(4), 309–322.

Gard M, & Wright J (2005). The Obesity Epidemic: Science, Morality and Ideology. United Kingdom: Routledge.

Gardner J (2014). Let's send that to the lab: technology and diagnosis In Jutel A and Dew K (Eds.). Social Issues in Diagnosis: A Textbook for Students and Clinicians. Johns Hopkins University Press pp.151–164.

Greco M (2012). The classification and nomenclature of 'medically unexplained symptoms': Conflict, performativity and critique. Social Science & Medicine, 75(12), 2362–2369. [PubMed: 23043902]

Greenhalgh T (2012). Why do we always end up here? Evidence-based medicine's conceptual cul-de-sacs and some off-road alternative routes. Journal of Primary Health Care, 4(2), 92–97. [PubMed: 22675691]

Greenhalgh T, Howick J, & Maskrey N (2014). Evidence based medicine: a movement in crisis?. Bmj, 348, g3725. [PubMed: 24927763]

Groot W (2000). Adaptation and scale of reference bias in self-assessments of quality of life. Journal of Health Economics, 19(3), 403–420. [PubMed: 10977197]

Guh DP, Zhang W, Bansback N, Amarsi Z, Birmingham CL, & Anis AH (2009). The incidence of co-morbidities related to obesity and overweight: a systematic review and meta-analysis. BMC Public Health, 9(1), 1. [PubMed: 19121216]

Haynes RB (2002). What kind of evidence is it that Evidence-Based Medicine advocates want health care providers and consumers to pay attention to?. BMC Health Services Research, 2(1), 3. [PubMed: 11882257]

Heyman B, Alaszewski A, & Shaw M (2010). Risk, Safety and Clinical Practice: Health Care Through the Lens of Risk. United Kingdom: Oxford University Press.

Hidaka BH (2012). Depression as a disease of modernity: explanations for increasing prevalence. Journal of Affective Disorders, 140(3), 205–214. [PubMed: 22244375]

Hu F (2008). Obesity Epidemiology. Oxford University Press.

Idler EL, & Benyamini Y (1997). Self-rated health and mortality: a review of twenty-seven community studies. Journal of Health and Social Behavior, 21–37. [PubMed: 9097506]

Idler E, Leventhal H, McLaughlin J, & Leventhal E (2004). In sickness but not in health: self-ratings, identity, and mortality. Journal of Health and Social Behavior, 45(3), 336–356. [PubMed: 15595511]

Jürges H (2007). True health vs response styles: exploring cross-country differences in self-reported health. Health Economics, 16(2), 163–178. [PubMed: 16941555]

Jutel A (2001). Does size really matter? Weight and values in public health. Perspectives in Biology and Medicine, 44(2), 283–296. [PubMed: 11370161]

Jutel A (2009). Doctor's orders: Diagnosis, medical authority and the exploitation of the fat body. Biopolitics and the 'Obesity Epidemic'. Governing Bodies, 60–77.

Jutel A (2009). Sociology of diagnosis: a preliminary review. Sociology of Health & Illness, 31(2), 278–299. [PubMed: 19220801]

Jutel A, & Nettleton S (2011). Towards a sociology of diagnosis: reflections and opportunities. Social Science & Medicine, 73(6), 793–800. [PubMed: 21868144]

Jylhä M (2009). What is self-rated health and why does it predict mortality? Towards a unified conceptual model. Social Science & Medicine, 69(3), 307–316. [PubMed: 19520474]

Jylhä M, Volpato S, & Guralnik JM (2006). Self-rated health showed a graded association with frequently used biomarkers in a large population sample. Journal of Clinical Epidemiology, 59(5), 465–471. [PubMed: 16632134]

Keys A, Fidanza F, Karvonen MJ, Kimura N, & Taylor HL (1972). Indices of relative weight and obesity. Journal of Chronic Diseases, 25(6), 329–343. [PubMed: 4650929]

Kimbro RT, Brooks-Gunn J, & McLanahan S (2011). Young children in urban areas: links among neighborhood characteristics, weight status, outdoor play, and television watching. Social Science & Medicine, 72(5), 668–676. [PubMed: 21324574]

Kuczmarski RJ, & Flegal KM (2000). Criteria for definition of overweight in transition: background and recommendations for the United States. The American Journal of Clinical Nutrition, 72(5), 1074–1081. [PubMed: 11063431]

Kwan S (2012). Lay perspectives on the biomedical paradigm on 'obesity': Theorizing weight, health and happiness. Social Theory & Health, 10(1), 61–77.

MacKenzie D & Millo Y (2003). Constructing a market, performing theory: the historical sociology of a financial derivatives exchange. American Journal of Sociology, 109(1), 107–145.

McFadden E, Luben R, Bingham S, Wareham N, Kinmonth AL, & Khaw KT (2009). Does the association between self-rated health and mortality vary by social class?. Social Science & Medicine, 68(2), 275–280. [PubMed: 19028414]

McGee DL, & Diverse Populations Collaboration. (2005). Body mass index and mortality: a meta-analysis based on person-level data from twenty-six observational studies. Annals of Epidemiology, 15(2), 87–97. [PubMed: 15652713]

Moffat T (2010). The "childhood obesity epidemic". Medical Anthropology Quarterly, 24(1), 1–21. [PubMed: 20420299]

Monaghan LF (2005). Discussion piece: A critical take on the obesity debate. Social Theory & Health, 3(4), 302–314.

Monaghan LF (2007). Body Mass Index, masculinities and moral worth: men's critical understandings of 'appropriate' weight-for-height. Sociology of Health & Illness, 29(4), 584–609. [PubMed: 17498170]

Monaghan LF, Hollands R, & Prtichard G (2010). Obesity epidemic entrepreneurs: Types, practices and interests. Body & Society, 16(2), 37–71.

Nestle M, & Nesheim MC (2012). Why calories count: from science to politics. Health Affairs, 31, 9.

Nettleton S (2013). The Social Construction of Medical Knowledge The Sociology of Health and Illness, 3rd edition (pp.13–33). Cambridge: Polity Press.

Nicholls SG (2013). Standards and classification: A perspective on the 'obesity epidemic'. Social Science & Medicine, 87, 9–15. [PubMed: 23631773]

Oliver JE (2006). The politics of pathology: How obesity became an epidemic disease. Perspectives in Biology and Medicine, 49(4), 611–627. [PubMed: 17146144]

Patterson M, & Johnston J (2012). Theorizing the obesity epidemic: Health crisis, moral panic and emerging hybrids. Social Theory & Health, 10(3), 265–291.

Prentice AM, & Jebb SA (2001). Beyond body mass index. Obesity Reviews, 2(3), 141–147. [PubMed: 12120099]

Puhl RM, & Brownell KD (2003). Psychosocial origins of obesity stigma: toward changing a powerful and pervasive bias. Obesity Reviews, 4(4), 213–227. [PubMed: 14649372]

Quesnel–Vallée A (2007). Self-rated health: caught in the crossfire of the quest for 'true' health?. International Journal of Epidemiology, 36(6), 1161–1164. [PubMed: 18056123]

Quetelet A (1842). A Treatise on Man and the Development of His Faculties. Edinburg: W. and R. Chambers.

Reilly BM (2003). Physical examination in the care of medical inpatients: an observational study. The Lancet, 362(9390), 1100–1105.

Rich E, & Evans J (2005). 'Fat ethics'–the obesity discourse and body politics. Social Theory & Health, 3(4), 341–358.

Ross R, Blair S, de Lannoy L, Després JP, & Lavie CJ (2015). Changing the endpoints for determining effective obesity management. Progress in Cardiovascular Diseases, 57(4), 330–336. [PubMed: 25459976]

Saguy AC, & Almeling R (2008, 3). Fat in the Fire? Science, the News Media, and the "Obesity Epidemic". Sociological Forum, 23(1), 53–83.

Salomon JA, Nordhagen S, Oza S, & Murray CJ (2009). Are Americans feeling less healthy? The puzzle of trends in self-rated health. American Journal of Epidemiology, 170(3), 343–351. [PubMed: 19564169]

Sesselberg TS, Klein JD, O'Connor KG, & Johnson MS (2010). Screening and counseling for childhood obesity: results from a national survey. The Journal of the American Board of Family Medicine, 23(3), 334–342. [PubMed: 20453179]

Shah NR, & Braverman ER (2012). Measuring adiposity in patients: the utility of body mass index (BMI), percent body fat, and leptin. PloS One, 7(4), e33308. [PubMed: 22485140]

Singh-Manoux A, Guéguen A, Martikainen P, Ferrie J, Marmot M, & Shipley M (2007). Self-rated health and mortality: short-and long-term associations in the Whitehall II study. Psychosomatic Medicine, 69(2), 138–143. [PubMed: 17289825]

Throsby K (2012). Obesity surgery and the management of excess: exploring the body multiple. Sociology of Health & Illness, 34(1), 1–15. [PubMed: 21554331]

Timmermans S, & Berg M (2003). The Gold Standard: The Challenge of Evidence-based Medicine and Standardization in Health Care. Philadelphia: Temple University Press.

Timmermans S, & Epstein S (2010). A world of standards but not a standard world: toward a sociology of standards and standardization. Annual Review of Sociology, 36, 69–89.

Tomiyama AJ, Hunger JM, Nguyen-Cuu J, & Wells C (2016). Misclassification of cardiometabolic health when using body mass index categories in NHANES 2005–2012. International Journal of Obesity.

Verghese A (2008). Culture Shock-Patient as Icon, Icon as Patient. The New England Journal of Medicine, 359(26), 2748–2751. [PubMed: 19109572]

Vuorisalmi M, Lintonen T, & Jylhä M (2005). Global self-rated health data from a longitudinal study predicted mortality better than comparative self-rated health in old age. Journal of Clinical Epidemiology, 58(7), 680–687. [PubMed: 15939219]

Welsh GA (2002). Evidence-Based Physical Diagnosis. Mayo Clinic Proceedings, 77(2).

World Health Organization. (2006). Constitution of the World Health Organization Basic Documents, 45th edition, Supplement.

Zeller RA, & Carmines EG (1980). Measurement in the Social Sciences: The Link between Theory and Data. CUP Archive.