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# Cardiovascular Disease and Obesity Prevention in Germany: An Investigation into a Heterogeneous Engineering Project

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## Abstract

Cardiovascular diseases present the leading cause of death worldwide. Over the last decade, their prevention has become not only a central medical and public health issue but also a matter of political concern as well as a major market for pharma, nutrition, and exercise. A preventive assemblage has formed that integrates diverse kinds of knowledges, technologies, and actors, from molecular biology to social work, to foster a specific healthy

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lifestyle. In this article, the authors analyze this preventive assemblage as a heterogeneous engineer, that is, as an attempt to order complex everyday life into an architecture of modernism. This article draws on research conducted as part of the interdisciplinary research cluster “preventive self” (2006-2009) bringing together analyses from social anthropology, history, linguistics, sociology of knowledge, and medicine. The authors report here primarily from ethnographic investigations into biomedical research, primary care, and educational practices in kindergartens. The authors conclude that the preventive assemblage largely fails to install any kind of singular order. Instead, it is translated into existing orderings producing heterogeneity of a different nuance.

**Keywords**

cardiovascular risk, prevention, heterogeneous engineering, ordering, overweight

**Introduction**

Cardiovascular disease, that is, primarily atherosclerosis, myocardial infarction, and stroke, present the leading cause of death worldwide (World Health Organisation [WHO] 2009) and are strongly associated with comorbidities such as overweight, obesity, and type 2 Diabetes mellitus. These comorbidities themselves have gained in prevalence and incidence such that national and international bodies are now warning of the medical and economic consequences of an “obesity epidemic” (e.g., WHO 1998, Power and Schulkin 2009, but also see Gard 2005). Medical research is painting a complex etiological picture of cardiovascular disease implicating vastly different “levels of analysis” from the molecular and cellular to lifestyle (Anderson 1998). Some aspects of this etiological picture can be managed reasonably well with drugs that have become global blockbusters, for example, blood pressure or lipid regulators.<sup>1</sup> Other important aspects of the etiological picture, however, such as appetite, fat uptake, or metabolic rate, are far less amenable to pharmaceutical solutions. The biomedical understanding of these aspects is currently insufficient to enable safe and effective pharmaceutical interventions. This inability to deal with cardiovascular disease by technoscientific means alone is one important reason for a recent marked increase in the interest in prevention and health promotion. The second important reason lies in the perceived economic and political risks associated with an obesity epidemic. In an aging society, a growing number

of chronically ill people at an increasingly early age are seen to pose a serious threat to the stability of the welfare state. Cardiovascular disease as a societal rather than an individual health risk has startled national governments that have been quick to respond with health promotion campaigns and prevention programs (e.g., Schorb and Schmidt-Semisch 2008).

Prevention and health promotion have always played a significant role in cardiovascular disease management. This latest surge in initiatives and research programs is thus nothing new in principle. Yet, we like to point out three aspects that we believe deserve further attention: (1) The latest interest in prevention ties together an extraordinarily large number of actors across a wide range of sectors. It is not merely a medical issue but has rapidly become a political matter and a huge market from pharma to nutrition and exercise. This has resulted in what we refer to as a *preventive assemblage* (Rabinow 2003), that is, a complex network of practices integrating various actors, knowledges, and technologies. We use the analytical concept of the assemblage to emphasize the distributed nature of agency in this multiplicity and to mark a particular epistemological status: rather like a Foucaultian notion of discourse, the assemblage is an analytical concept that maps onto an existing network of actors in the real world but at the same time also goes beyond this traditional notion of the network. It does so not only in the symmetrical sense of an actor network (Latour 1996). It also points beyond the immediate network of actors to broader changes, for example, the emerging notion of the “embedded body,” which shape the assemblage without being under the control of any singular actor or even group of actors. (2) This preventive assemblage, heterogeneous as it may be, is currently firmly centered on *lifestyle* as a modifiable risk factor. Within it, the concept of lifestyle as shaped and fixed early in life has taken shape and accordingly early prevention in kindergarten and schools has become a major priority. The preventive assemblage aims<sup>2</sup> to produce healthy ways of living so that they become “natural” rather than letting bad habits take hold. (3) Beyond early childhood, lifestyle is seen within the assemblage as a matter of—mainly cognitively driven—individual choice, knowledge, and willpower. Individuals ought to be self-observant, health-conscious, well-informed, and capable of and willing to intervene in their own bodies on a daily basis: such a “preventive self” is the imaginary of the current preventive assemblage.<sup>3</sup>

This article investigates this preventive assemblage as a case of *heterogeneous engineering* (Law 1987; Law and Mol 2002). Heterogeneity, according to John Law and colleagues, has everything to do with centering and ordering manifold or complex systems and phenomena (Law and Mol 2002). It is a thoroughly modern project in the pursuit of monolithic order

(Law 1994). Heterogeneous *engineering*, then, focuses our attention on the designer, the control, or the center as well as the coordinated pulling of strings to select from possible futures, to reduce alterity, and to construct stability and rigidity on what appears as continuous and contingent ebbs and flows. We argue that the preventive assemblage's modes of action and its self-descriptions and self-understandings are indeed thoroughly modern: the preventive assemblage thrives on producing scientific knowledge and evidence; it purifies nature from culture; it searches for technoscientific solutions; and it ultimately tries to reduce the complexity of everyday life to particular lifestyles in order to minimize risk. It strives toward singularity. It does so, because each actor follows a modern logic thus contributing to heterogeneous engineering as an emergent pattern of practice rather than a reflexive or strategic operation.

This article investigates whether the preventive assemblage's practices live up to their own modernist aspirations. It asks how current transformations in the preventive assemblage really do bring or fail to bring order to the heterogeneous patterns of practice of everyday life. In order to do so, this article integrates diverse kinds of "data" gathered from 2006 to 2009 predominantly from Germany but including comparative pieces from the United States and Canada: ethnographic data from labs, clinics, and prevention programs, expert interviews in science and politics, content, discourse, and metaphor analyses of relevant grey and scientific literature, archive analysis, analysis of doctor-patient interaction in primary care and clinical settings as well as medical data from health checkups. The article spans the work of five research projects from anthropology, linguistics, sociology of scientific knowledge, history, and medicine, each running for three years. We have distilled only a small part of our findings into this article and have hopefully taken sufficient care to contextualize and reference what has been left out so that the reader will be able to follow the overall narrative of this integrative and interdisciplinary effort.

In a first section, the article situates cardiovascular prevention and the "preventive self" in the past and present German context. Three empirical sections then analyze different modes of heterogeneous engineering in biomedical research, primary care, and two kindergartens in Berlin. We briefly highlight an emerging concept of the "embedded body" before discussing different kinds of "remaindering" (Strathern 1991) as a necessary disturbance to the apparent order of the preventive assemblage. We conclude that a situated, close-up analysis of this assemblage reveals patterns of practice that are far less modern than the powerful critique of regimes of governmentality has often suggested.

## Situating the “Preventive Self” in Post-War Germany

The epidemiological transition and the rise of risk factor epidemiology after WW II with the Seven Countries and Framingham studies has been well documented (e.g., Aronowitz 1998); so has the apparent rise of obesity from the status of one risk factor among others to a full blown global obesity epidemic (e.g., WHO 1998; Power and Schulkin 2009; Gard 2005). With the beginning of the twenty-first century, the management and particularly the prevention of overweight and obesity has become a major challenge for biomedical research as well as for public health and primary and secondary care across the Western world and beyond. Significant proportions of national health budgets are today being spent on treating obesity-related diseases and symptoms.

This is also the case in Germany. Yet here, health policy and public health measures are a matter of the federal states, that is, the Bundesländer. National government can only provide framework legislation.<sup>4</sup> And it has unsuccessfully tried to do so several times over the last few years. Prevention and health promotion, though seen as an obvious priority in the “battle” against chronic diseases, thus continue to be left to an incredible patchwork of local and federal short-term programs financed largely by one of the over 250 public and private health insurance companies. The impact of the majority of these programs in promoting long-term lifestyle changes and sustainable weight loss is small to nonexistent. Health insurers more or less openly admit that they use such programs as marketing strategies to win new customers and do not expect them to do anything more than that. Attempts to systematically evaluate and improve these efforts have so far been scuppered primarily by the fragmentation of the German health system. Largely for historical reasons, this system denies any one actor, for example, the Department of Health, a leading or at least steering role. Instead, it has institutionalized mediation and compromise to a degree that oftentimes has paralyzing effects. While any large system of organizations will appear to suffer from inefficiency and fragmentation, most analysts agree that the German system stands out in international comparison as displaying an unusual diversity of actors and decision-making structures (e.g., Rosenbrock and Gerlinger 2004).

This high degree of fragmentation conflicts with the idea of a controlling center implied in heterogeneous engineering. Fragmentation and compromise tend to dilute any attempts at installing a singular order. As a consequence, German policy makers and medical practitioners alike constantly

bemoan the lack of national prevention programs or best practice guidelines. Yet, this does not mean that German health policy and practice somehow stands outside the preventive assemblage. While disagreement persists over specific actions, a common framing of the problem exists: lifestyle lies at the heart of the problem and lifestyle is an *individual modifiable risk factor*. This framing in itself already flattens heterogeneity in three important ways: First, this perspective is implicitly underpinned by the notion of the autonomous subject prevalent in Western science, economics, and philosophy including medical ethics (Sahlins 1996). The autonomous subject, or as we have specified it, the preventive self, is a dominant figure in cardiovascular risk discourse and one that is firmly inscribed into the technologies and artifacts of diagnosis and intervention. Second, biological and social aspects remain clearly separated rather than being understood as interdependent—as alternative social theories suggest (e.g., Latour 2005; Barad 2007) and as other disciplines imply in their analyses of illness and disease (Lock 2001; Timmermans and Haas 2008). Third, lifestyle is a modular and behaviorist concept. It is the *psy* disciplines that inform and shape this very specific understanding of everyday life (Rose 1998; Klotter 2009) that many anthropologists and social scientists take to be subject to much more differentiated and ambivalent knowledge practices (e.g., Lindenbaum and Lock 1993; Lock and Nguyen 2010).

In Germany, the figure of the preventive self has acquired an ambivalent prominence mainly for historical reasons. During the National Socialism of the 1930s and 1940s, public health policies were turned into far-reaching technologies of racist population management and eugenics, which negated and ideologically veiled the very concept of disease. In their pursuit of the advancement of the Aryan *Volkskörper*, these policies promoted individual health in order to maintain and increase efficiency at home (as wives and mothers), at work, or in the army. The total submission of the individual to the (alleged) interest of the Aryan people lay at the heart of the Third Reich not only with respect to health care. This legacy has significantly shaped the post-War development of the health systems in Germany—albeit in West and East Germany in very different ways. In the German Democratic Republic (GDR) distance to National Socialism was sought through reconnecting to the Social Hygiene movement as it had developed in the Weimar Republic.<sup>5</sup> This movement had carried strong leftist connotations and interlinked closely both conceptually and in terms of personal connections with Soviet approaches during the interwar years (Moser 2002). This tradition could be resurrected after 1945 with the support of the Soviet occupation forces, which in part even reinstated German personnel

that had been ostracized in the years of the Nazi-Regime. At the same time, centralization efforts reformed the health system fundamentally, for example, restructuring the relationship between doctors and patients as well as the medical profession and the state. The GDR put significant energy into setting up an expansive and inclusive welfare and health care system. The constitution stipulated the right to free medical care for everybody, which was distributed within state-owned factories and by local health care centers. Based on the tenet that socialist society would reduce disease prevalence, the communist party promoted population-wide prevention of chronic cardiovascular disease relatively early. However, the constant lack of resources limited success although the effective treatment of the chronically ill as outpatients in dispensaries guaranteed some success. Nevertheless, prevention was applied predominantly as early detection and care before a change in paradigms accommodated a new focus on primary prevention from the end of the 1970s.

In contrast to the GDR, the Federal Republic of Germany (West Germany) rebuilt the traditional German welfare system. Although the fragmented state of the health system striving for a balance of power has older roots, the experience of the “Third Reich” is an important reason that prevention aimed at populations has had very little traction in the Western part of Germany after the end of World War II. Here, American re-civilizing efforts strongly encouraged politicians and the medical profession to break not only with the national socialist past but also distance themselves from experiences within the Weimar Republic (Lindner 2004; Süß 1998). For example, the allied forces counteracted many efforts to revitalize public health logics from the Social Hygiene movement within the Weimar republic. In addition, medical practitioners for a long time opposed state involvement in preventive care as a matter of professional interest politics (Lindner 2004). They claimed that prevention could only be made to work effectively by individualistic approaches based on the one-to-one relationship between the general practitioner and the patient. Thus, while the early outcomes of Framingham and the risk factor discourse reached West Germany already in the 1960s, in the mainstream medical system, they were largely translated into individual risk factors. Public or community health did not play a significant role and continue to be marginal today (see Madarász 2010a; Madarász 2010b for further details).

This brief historical sketch reveals why the figure of the preventive self is treated with a certain ambivalence in Germany. Latent historical sensitivities and their structural legacy stabilize the autonomous individual as the central target of preventive medicine. Collectivizing approaches continue to be highly unpopular in many areas of health care. Yet the very reasons

for this structural individualization also produce a very high degree of fragmentation in health administration. This lack of centralized competences and decision latitude leaves individual physicians with a large degree of *therapeutic freedom*. As will become more obvious in the following sections, this freedom enables approaches to care that are more aware of an individual's social context than many evidence-based approaches tend to be. Thus, the lack of structural investment in population and community health may well be counteracted through a more contextual treatment of individual patients at the level of individual physicians' practices.

## Heterogeneity in Cardiovascular Research

The risk factor model was implemented in Germany with a strong emphasis on its individual rather than its population component. In this section, we turn to biomedical research in order to argue that the risk factor model itself is undergoing change. Its underlying notion of individual autonomy is challenged by an emerging concept of what we call the "embedded body," that is, a molecular body heavily impregnated with its own past as well as its social and material environment. With this "embedded body," the allocation of responsibility for overweight and cardiovascular risk to the individual may have to be renegotiated. This analysis is primarily based on ethnographic work in molecular biology labs in Canada, interviews among basic and clinical researchers in Germany, and an extensive analysis of the relevant literature.<sup>6</sup>

The rise of technoscience, a molecular vision of life in biology (Kay 1993) and an increasing biomedicalization of everyday life have been well documented (cf. Clarke et al. 2003). Biotechnology has not only begun to change "what it is to be human" but also "what it is to be biological" in many arenas (Landecker in Rose 2007). A hallmark of these developments is an increasing molecularization of life itself (Rose 2007; Franklin 2000). While this shift has been diagnosed on the basis of investigations of the new genetics, it holds true in principle for most of biomedicine and thus also includes chronic conditions such as cardiovascular disease.<sup>7</sup> Thus, from the late 1980s onward, the risk factor model originally rooted firmly in epidemiology has also been increasingly molecularized and connected to questions of mechanism. The so-called metabolic syndrome (Reaven 1988; Kahn et al. 2005; Hanefeld and Leonardt 1981) epitomizes this development. The metabolic syndrome marks a statistically significant clustering of metabolic changes,<sup>8</sup> which allegedly contribute to an increased risk of cardiovascular disease. The ontological status of this syndrome is currently



far from clear and its clinical utility remains heavily disputed (Alberti 2008; Gale 2005, 2008). Besides its contested scientific status, its use in practice also ranges from being seen as useless to acting as an instrument for patient education (Moebus and Stang 2007; Reaven 2005; Zimmet et al. 2005). The commentary by a head of a German research group concerned with the links between obesity and vascular effects illustrates just how unhelpful some think this new syndrome is: “You can have lice and flea but that does not mean that you suffer from insect syndrome” (Pfeiffer and Stumvoll 2006). Others phrase their doubts equally clearly by speaking of “The Myth of the Metabolic Syndrome” (Gale 2005). Many are convinced that pharmaceutical and personal interests, disease mongering (Payer 1992), and skilled guesswork are the main drivers of the comet-like rise of the syndrome over the last ten to fifteen years (Grundy 2006; Goetz 2006; Roche, Phillips, and Gibney 2005). Yet, despite these controversies and the continued lack of conclusive evidence, a number of prominent professional associations<sup>9</sup> are lobbying to include some form of the concept of the metabolic syndrome as a standard diagnostic practice for patients in primary and secondary care.

The relevance of the metabolic syndrome for molecularizing risk factors lies in the fact that the syndrome has helped to shift the focus of attention from treating risk factors alone or in combination to unraveling causal links and interactions between the risk factors. The syndrome has intensified the search for an underlying pathophysiology. Research in this area currently reaches from genomics to neuroendocrinology. For the sake of brevity, we highlight four important areas that have a particular impact on biomedicine’s understanding of risk factors and that have been producing the “embedded body:”

- *Fat cells have desires too:* Current research on the endocrinology of metabolism has begun to reveal that visceral fat cells act as an endocrine organ. They secrete hormones affecting metabolism in such a way so as to protect themselves, that is, maintain existing fat reserves (Hutley and Prins 2005; Blüher and Paschke 2003). The body is also suspected to maintain a metabolic memory, whereby fat cells remember their own and their neighbors’ original size.<sup>10</sup> Fat cells that have been reduced in size through restricted energy input strive to regain at least their original size when put back on a normal diet. This delivers a molecular explanation why dieting often leads to rapid short-term weight loss followed by a rapid weight gain to at least the original weight. Recent findings on fat cell turnover in humans suggest that in order to circumvent this memory effect, restricted energy input would have to last for

at least ten years. (cf. Spalding et al. 2008; Klötting, Stumvoll, and Blüher 2007).

- *It is the brain, stupid*: Increasing work on metabolic regulation reveals the neurobiological basis for energy maintenance (Knecht, Ellger, and Levine 2008). Appetite regulation, insulin activity, and so on are all shown to have connections to central nervous regulatory centers integrated into highly redundant circuits that have so far proved elusive to safe interventions (cf. Zheng et al. 2008; Banks 2008; Banks, Farr, and Morley 2006). This central role of the brain also provides an important link between the neurobiology of stress and metabolic performance (cf. McEwen 2007; Rosmond 2005).
- *Ghosts from the past*: These molecular and mechanistic findings are underpinned by an evolutionary narrative. The so-called thrifty genotype apparently conferred a selective advantage in the hard times of the Stone Age, when food was scarce and Saber-toothed tigers plenty. Now that food is super-sized and tigers all but extinct, people with those thrifty genotypes are more likely to accumulate unhealthy fat reserves and increase their cardiovascular risk (cf. Chakravarthy and Booth 2004; Neel 1962; Bellisari 2007). The developmental origins of adult disease hypothesis (DOAD) adds to this the “thrifty phenotype” (cf. Gluckman et al. 2007; Kajantie 2006). It argues, largely still on the basis of epidemiological findings, that pre-, peri-, and neonatal conditions, for example, stress or slow growth, prepare the early child for a particular environment. If the child for some reason grows up and lives in a different environment, this semistable material imprinting may turn out to be maladaptive and thus increase disease risk.
- *You are what your Mum ate*: Recent research on epigenetics has lent further credibility to the DOAD hypothesis at molecular level. The social and material environment, particularly in early life and through maternal care, plays an important role in the epigenetic regulation of gene expression (cf. McGowan et al. 2009). The epigenome currently appears to be a highly dynamic layer of regulation that is extremely sensitive to external stimuli, such as changes in nutrition or stress levels. Epigenetic markings seem to be stable but reversible phenomena that can be transmitted to following generations without altering DNA sequence (cf. Szyf, McGowan, and Meaney 2008).

This very brief sketch of some of the most recent developments in biomedical research with relevance for cardiovascular disease and the metabolic syndrome indicates that risk factors are indeed being molecularized. This is

of little surprise, as the methods used in current research target first and foremost the cellular and molecular level. Yet, the changes are more far-reaching and ambivalent. The style of thought is moving away from singular risk factors toward a more systemic and dynamic understanding of changes in physiology (Lusis 2008). Markers are becoming more akin to states of interactive networks and to degrees of up/down-regulation and there is talk of shifts “from obesity to the disease” (Barabási 2007). Most importantly, however, the molecular body is not produced as an autonomous, skin-bound individual body any longer. Mainstream molecular research now produces a body that is deeply embedded in different temporal dimensions and imprinted by events in evolutionary, generational, and metabolic time (Niewöhner 2008). And it is a body that is heavily embedded in the sociomaterial environments within which it dwells: obesogenic or leptogenic environments, stressful or supporting environments, familial or strange environments, and so on. In an almost paradoxical movement, then, the increasing focus on the molecular causes of cardiovascular disease reveals an increasing number of links to the importance of social and environmental contexts. Molecular research produces an embedded body—a materialized form of resistance against attempts to pinpoint the causes of cardiovascular disease at the molecular level.

This “embedded body” produces significant changes at the level of research practice. So far, molecular biology labs have been fairly hermetic spaces. The experimental systems of the last twenty years have been dominated by cell lines and cultures, by knock-out animals, polymerase chain reaction (PCR), and related technologies of augmentation and a set of imaging technologies such as gels and blotting techniques. One informant commented during one of our ethnographic lab studies that for the last twenty years, “you did not have to think in biology.”<sup>11</sup> The experimental system was stable. The developments sketched above are introducing a new quality of heterogeneity at two crucial points. First, the data needed to investigate the embedded body is not only molecular. Behavior, socioeconomic status, nutritional status of previous generations, and so on all force the established experimental system to open up. Cooperation across disciplines is needed and this stretches not only to behavioral psychology and other disciplines traditionally close to biology. It also requires work with epidemiologists, historians, and social scientists. Second, the effect size that is being investigated is becoming smaller. Epigenetics is a pertinent example: rather than working with clonal cell lines that produce black and white, yes and no answers in expression analyses on blots, epigenetics research is faced with much subtler effects. Suddenly, material needs to be prepared

differently, study designs need to be adjusted, and validation techniques have to increase their sensitivity. Analytical imaging techniques result in shades of gray, the significance of which is difficult to determine with statistical analysis alone.

New data and experimental systems as well as forms of cooperation and audiences need to be reassembled into operational and stable platforms (Keating 2000). Molecular researchers respond in their usual vein of pragmatic reductionism (Beck and Niewöhner 2006) by looking for standardized, ready-made and stable forms of environment and behavior, for example, in the animal models of behavioral psychology or in the socio-economic status data of epidemiological cohorts. Correlating these data on behavior and social structure with molecular phenotypes produces a research practice that historian of science Hannah Landecker has aptly described as an emerging “molecularisation of the environment” (Landecker 2010), that is, a highly selective scanning of the socio-material environment in order to make snippets of it available for experimental work at the molecular level. The sociomaterial environment and increasingly everyday life itself is framed and ordered in terms of its effect on molecular processes in the body.

## **Overweight in Primary and Secondary Care**

The previous section has shown that molecular research on cardiovascular risk is beginning to produce an embedded body, which brings a new level of heterogeneity to experimental design and lab work. Our work with overweight and obesity management strategies among primary care physicians shows that they too deal with embedded bodies, that is, patients as they come through the door of their practice. Yet while this is not new to them, they still struggle to contain the heterogeneity with which they are confronted within doctor–patient consultation sessions. The strategies they develop to do so need to be understood within the local structures of the health care system. A typical check-up of common risk factors in Germany will include two visits to the GP practice:<sup>12</sup> one to collect the standard lab parameters through a nurse and one session with the GP to discuss the results and receive a counseling talk. Our analysis is based on a cross-sectional study of twelve GPs working in single surgeries in and around Berlin and included participant observation, repeated interviews and questionnaires with GPs and patients, audio-recorded overweight consultation sessions, and standard laboratory parameters for cardiovascular risk (see Heintze et al. 2010; Heintze et al. 2008b for details).

A qualitative content analysis of counseling talks clearly shows that patients attribute their overweight to diverse causes, which their GPs address insofar as they asked about patients' views. The counseling sessions are relatively open and time extensive in character. This facilitates in a large number of cases a dialogical tailoring of weight loss measures. By gathering information about their patients, many physicians give their patients the opportunity to offer their own explanations for overweight and obesity (Heintze et al. 2010; Heintze et al. 2009; Heintze et al. 2008a; Metz et al. 2009). There were considerable differences in the lengths of the audio-taped consultations. Male GPs expose a tendency to reduce individual risk counseling by giving a short overview of individual laboratory tests without any further exchange of information. Many female GPs took the opportunity to conduct complex counseling talks about lifestyle changes. All physician-patient counseling talks focused primarily on dietary advice and increased physical activity. Recommendations appear to be more specific to the individual and differentiated if patients are given the chance to reflect on possible causes of their overweight during the counseling talks.

This brief sketch of the findings illustrates that extensive and dialogical risk counseling can form a bridge between laboratory parameters, body, behavior, and everyday life. A shared narrative between patient and physician may help tailor medical advice to personal circumstances. This, of course, does not necessarily lead to lifestyle changes. Yet, it is one way of translating between the very narrow understanding of a patient on the basis of lab parameters to the far more heterogeneous patient that is eating and exercising in his or her everyday life. Building a shared narrative and exploring commonly used metaphors thus helps GPs to handle the heterogeneity of patients' everyday lives (Döring et al. 2009). German internal medicine refers to such approaches as "narrative medicine," which it sees as an approach complementary to evidence-based medicine. Rather than looking to medical research to deliver the means with which to handle heterogeneity, that is, evidence for or against certain treatments, narrative medicine focuses on dialogical practices to integrate patient perspectives into the search for treatment choices. This approach goes some way toward the notion of translation (Callon 1999), as it attempts to open the dyad of doctor-patient communication to consideration for a broader actor network.

It is worth noting that the practice of narrative medicine requires time, that is, a slot that allows physicians to openly talk to patients. The fragmented German medical system unintentionally may be doing this form of narrative medicine a great favor by being ill suited to centrally enforce a tightly audited regime of homogeneous best practice. This, of course, does not

occur without conflict. First, particularly younger doctors feel the economic situation putting pressure on their time with patients. Second, the narrative and metaphorical dynamics create a number of difficulties. While the communication of the lab parameters is easy to handle and largely routinized for both doctors and patients, the narrative part brings to the practice a whole set of issues, which are by no means easy to handle within a medical setting; for example, food preferences and recipes, hobbies, family stories, peculiarities of the neighborhood, and so on. Our analysis of the counseling sessions reveals a typical choreography where doctors need to carefully navigate the boundaries of their own competence (Niewöhner 2010; cf. Ariss 2009; Taussig 1980). The further they delve into overweight and risk as everyday life, the less clear their legitimacy to intervene and “treat” becomes. This is evidenced by the kind of language that is being used: less directive, less forceful, less routinized, and saturated with metaphors. GPs constantly balance the need to get advice across with the need to remain in touch with the patient.

Our point here is that narrative medicine, while creating its own set of structural and substantive problems, marks a strategy of dealing with heterogeneity that differs significantly from research and evidence-based medicine. GPs are faced with an “embedded body.” Yet rather than being able to parameterize and thus control the environment as a laboratory may be, GPs are forced to deal with the “environment” as it comes through their door in the form of the patient. Narrative medicine and biomedical research expose very different strategies of dealing with bodies in context. While research purifies parameters out of the heterogeneity outside of the lab and can afford the luxury of considering everything else epiphenomenal, GPs cannot exert that sort of control. They cannot separate the body from “life as such” (Fassin 2009). The visceral fat and high lipid count is entangled with the friends from the bowling group that they would not want to miss; it has to do with the new fence across the field that cuts right across the path where they used to walk or with the fresh fruit in the garden that certainly cannot go to waste. Of course, doctors constantly try to reign in this heterogeneity and extract what seems relevant information in medical and corporeal terms. They do everything they can to keep patient accounts short and to enter their own advice as soon as possible. Unfortunately for them, however, they cannot offer any real treatment for overweight. They can only diagnose and talk: care not cure. They cannot exert a great deal of control over their patients’ lives. And they are very aware of that fact. Patients’ lives in all their heterogeneity are at the heart of primary care practice, which is more often than not about long-term care rather than short-term,

technoscientific intervention. In such an approach, patient lives are not epiphenomena of risk factors or biomarkers as they are in the biomedical labs. They are necessarily present in an uncontrollable manner. Thus, GPs have to be heterogeneous engineers of a different kind and narrative medicine is a tool helping them to balance the different demands in overweight management.

## Prevention in Kindergartens

We have illustrated some of the difficulties that arise from the embedded body in primary care practice. Medicine and public health have recently started to deal with these difficulties by focusing on cardiovascular preventive interventions in kindergartens and schools. A myriad of prevention programs fueled by the biomedical shifts analyzed above are now targeting kindergartens and schools. The following section is analyzing on the basis of ethnographic data what happens when such a prevention program is rolled out in two kindergartens. Such programs are, of course, not a new phenomenon. Children's physical development and health have always played an important role in Western concepts of education. Yet, new knowledge—the emerging findings on epigenetics and imprinting discussed above as well as the continued failure of many kinds of prevention programs—has created a different platform from which to push for prevention in early childhood. Kids have to be steered toward healthy eating and exercising patterns before any habits manifest themselves that increase the vulnerability for cardiovascular disease. This appears doubly important, as epidemiologists also point out so-called tracking effects, that is, the continuation of a risk trajectory from child- to adulthood. Biomedical research has been primarily interested in the biological foundations of such tracking effects, that is, imprinting effects hard-wired into the soma. It has been less concerned with the immensely stabilizing role of sociomaterial contexts within which an individual dwells and is anchored. It is primarily the notion of “lifestyle” as a modifiable risk factor that introduces this individualistic perspective. “Lifestyle” carries a behavioral understanding of child development seen from the adult's point of view, which excludes the children's corporeal, hybrid, active, and political aspects (Prout 1999; Walkerdine 1993).

This logic is translated into specific prevention programs designed to change patterns of practice in kindergartens. Usually, such programs combine cognitivist, behaviorist, and setting approaches. Bringing together these approaches can be seen as the main heterogeneous engineering that takes place in kindergartens. Sometimes children are considered a

“population” that needs easy access to playgrounds or fruits. Other times in the same kindergarten, the same teacher treats children as active subjects that can be informed about healthy food (by means of specific toys, songs, and narrations) and make decisions about how much or what to eat. And in yet other instances, pedagogical practices follow a behaviorist thinking and use awards, punishment, or rituals in order to achieve the desired behavior. These different and often contradictory approaches are firmly embedded within a long cultural history of pedagogical practices not only in Germany. They are not easily altered through the arrival of a new prevention program. Rather, such programs need to be translated into the kindergartens’ everyday routines often producing different results in different kindergartens.

Our ethnographic study investigated two kindergartens in the former East and West Berlin, respectively (see Kontopodis in print for details). The neighborhood in East Berlin is well known as a working class neighborhood with low migration rates. In the neighborhood in West Berlin, migrants from Arabic countries, Turkey, and Poland make up the bulk of the population. These two kindergartens were selected because they belong to an association of kindergartens in Berlin (Kinder in Bewegung: Children in Motion), which apply a so-called preventive policy to child education. In this context, a program named “TigerKids” was used in both of these kindergartens.<sup>13</sup> Created by one of the main health insurance providers within the national health cover in Germany, TigerKids was designed to support the prevention of obesity in children and is the most widespread project of its kind in Germany. It included heterogeneous interventions such as modifications of playground architecture, discussions about home nutrition, continuous provision of fruits and water at the kindergarten, and informing children by means of toys, songs, and pictures about food and health.

Our analysis of the fieldwork suggests that in the course of these interventions, children have come to be seen as being *at risk* (Burri and Dumit 2007). While principally all children were at risk, some children were considered more so than others and for different reasons. In the kindergarten in the former East, *overweight* children were considered most at risk. Their overweight was seen as their individual responsibility. On the contrary, in the former West, children *of Turkish or Arabic ethnicity* were considered most at risk. Here responsibility was attributed to the social environment within which the children grew up and not to the children as individuals. While teachers in the East controlled the food intake of overweight children and used behaviorist or cognitivist approaches teaching children how much to eat, the focus of attention of teachers in the West was on children eating “healthy food,” symbolized mainly by restricting access to white bread in



favor of wholemeal bread. What was “the same” prevention program at the beginning, at the end focused more on how *much* children ate at the one kindergarten and more on *what* children ate at the other kindergarten. These distinct foci have been reflected in teachers’ conflicts with particular children or their parents, different modes of teacher supervision, different arrangements of plates, tables and rules of movement, and so on.

Already this necessarily cursory glance illustrates the important point that these preventive medical interventions do not unfold in a vacuum. Rather *in practice*, interventions always confront and transform already existing cultural–historical practices (Chaiklin and Lave 1993) that are not necessarily related to health or prevention but reflect pedagogical values and traditions more generally. To give just one example: in the former GDR, children were not supposed to serve themselves at all. Food dispensation was a collectivizing practice—something that has been carried through until today by kindergarten staff educated and socialized in the old system (Weinberg and Töpfer 2006). In contrast, eating has been an individual matter in the former West. Children served themselves and continue to do so. Yet, the Western kindergartens were highly concerned with collectivizing practices when it came to ethnic differences; an issue of little relevance in the former East. The category of ethnic difference has played a significant role in the West since the 1960s and kindergartens carefully controlled the recognition of such difference (Zehnbauer 1980). Ethnic difference was predominantly framed as a matter of language, more specifically of being able to speak German, and so were many other issues from learning difficulties to social integration. Today, prevention programs are carrying a very different discourse into kindergartens. Risk is not the risk of failed integration through not speaking German, it is the risk of long-term health effects from acquiring unhealthy habits. This provides in principle a very different discourse of child development and education; a discourse based more on the biomedical research discussed above than pedagogy or social policy. Yet our investigation of practices illustrates that everyday life in kindergartens has not changed dramatically as local *practices* do not change overnight but rather reframe existing issues in terms of new programs. They are highly stable, their logic enfolded in multiple material–semiotic practices and they are not amenable to short-term change injected from outside expertise.

## Discussion

We have discussed three different instances of heterogeneous engineering that are apparent in the field of cardiovascular prevention: biomedical

research, primary health care, and childcare. In all three instances, scientists, physicians, and kindergartners, respectively, are trying to order heterogeneity in order to produce healthy bodies. All three instances mark enactments of a particular form of cardiovascular prevention and all three grapple with a heterogeneity that spans the entire spectrum from soma to society. The engineers share the desire to flatten this heterogeneity and install an order that is more akin to their own practices' logic than that of the practices, which they try to order. They try to fold heterogeneous patterns of practice into their own architecture of modernism (Law and Mol 2002). It is in this lack of sensitivity toward other ordering principles and practices that heterogeneous engineering becomes a matter of power/knowledge. This lack of sensitivity is not primarily a matter of individual choice and thus not a statement about an individual scientist's or clinician's character and moral capacity. It is largely a result of the preventive assemblage, which makes certain choices, actions, and patterns of practice more plausible than others. And at the same time, the individual engineering efforts help reproduce and stabilize the assemblage. In paying too little attention to existing and ongoing orderings, the assemblage then reveals its careless side. And it is this carelessness that produces alternative orderings and reterritorialization within the sets of practices subjected to attempts at installing singularity. These effects appear on different levels:

- In kindergartens, prevention programs are often almost disregarded. Failure is immanent in practice. Kindergarten staff deal selectively with the knowledge presented to them, remodel it against the backdrop of their own routines and thus arrive at a translated set of activities that in many cases has only little to do with the intentions of the original engineer.
- In primary care, cardiovascular prevention is delivered through the physician. Doctor–patient communication works well as long as sufficient time is granted to unfold a narrative approach and tailor messages. In the particular situation, prevention can be fitted to patients' lifestyles. Yet, if we zoom out a little from the dyad of doctor–patient to bring into focus patients' lives, failure quickly looms large, as patients simply do not change their lives in the way intended. Heterogeneity can be contained in the face-to-face interaction, yet as soon as the immediate situation passes, the broader analytical view reveals that the engineer loses its grip, lifestyles turn into lives and intended ordering devices fail. While narrative medicine may be a step

in the right direction in that it allows a more careful approach to other orderings, it does not go far enough.

- In biomedical research practice, failure appears strangely absent at first sight. Biomedical research is continuously expanding, producing new knowledge and new markets. At the level of individual labs, experimental designs seemingly succeed in ordering heterogeneity, that is, integrating different levels of analysis from soma to society, so that results may be published in high-profile journals. Yet in a modern world, scientific knowledge is not merely a matter of accurate representation. We moderns only believe to know a thing if we are able to change it (Hacking 1983). Scientific knowledge must enable intervention. Technoscientific interventions into cardiovascular disease, however, remain illusive. While research is able to deliver more and more accurate representations of many elements of human physiology, this does not translate into clinical applications. Soma in its different contexts retains significant degrees of latitude and freedom.

We have argued in this article that cardiovascular prevention as a preventive assemblage appears to operate, and is often analyzed, as an engineer attempting to fold heterogeneity into an architecture of modernism. Situating this assemblage in Germany, we have used brief vignettes from our ethnographic work in three different fields to illustrate that the preventive assemblage largely fails to deliver a new singular order. While many actors engage in heterogeneous engineering according to a modern logic, the preventive assemblage as a whole still displays a multitude of practices. Within the assemblage, existing practices are significantly reshaped. This, however, results neither in singularity nor even in less heterogeneity. It results in a different kind of heterogeneity. We have illustrated the different forms in which existing practices escape centering attempts. Only in a few cases is this a matter of conscious resistance or “outside politics” (Stephenson and Papadopoulos 2006). In most instances, our ethnographic analysis shows what social anthropologist Marilyn Strathern has referred to as “remaindering,” that is, knowledge practices always reduce complex worlds into words, diagrams, or models. Yet, this necessary reduction always produces a remainder. The same holds true for the preventive assemblage. Trying to install a preventive self, directing lifestyle and altering concepts of the body never unfolds without cutting existing ties, reshaping networks, and excluding elements that have been important to someone or something in another set of relations. Engineering produces remainders. Putting these remainders in relation to each other—remaindering—marks

an attentiveness and sensitivity toward these remainders; a practice and ethos for which the engineers in the preventive assemblage have little time.

In turning remaindering onto our own work, we conclude that situated, ethnographic analyses emphasize the remainders of engineering practices. They thus form an important balance to the dominant social scientific analyses that have understood assemblage less in a practice mode and more akin to regime. It is no doubt important to keep this latter sense of engineering in focus to be able to analyze governmentality, that is, changing modes of biopolitical control, identity, and sociality (Rose 2007; Novas and Rose 2000). Yet the more we situate our analyses and the closer we investigate patterns of practice ethnographically, the more heterogeneous they become and the less happy we become with the governmentality register of critique. This is not to say that such analyses are not important. We ourselves publish in this vein (Niewöhner and Kontopodis 2011; Niewöhner, Kehr, and Vailly 2011). Yet an analysis of cardiovascular prevention as a technology of health (on the verge to life itself) emerges most strongly in a methodological mode of “modest empiricism” (Rabinow and Rose 2006). Situated, ethnographic analyses emphasize the multiplicity of everyday practices, that is, they bring to the fore that which needs to be cut off in analyses of governmentality in order to be able to produce a coherent narrative. While our ethnographic knowledge does not dispute the important biopolitical shift from health to life itself as the object of knowledge and intervention, we do suggest that this shift occurs in many fields, registers, and modes and thus support the idea of a more faceted *multiple* politics of life (Raman and Tutton 2009). And our ethnographic knowledge points to the importance of attending to the very real consequences of changes in modes of governance, that is, to the changes to the way lives are lived from birth to death or *life as such* (Fassin 2009).

By way of concluding, we would like to point out that the disciplinary heterogeneity within the project and author team has produced its own challenges. We never had the security of homogeneity that comes with a singular theoretical or disciplinary perspective. One author’s remainder was always already part of another author’s central argument: cut the network or chain of analysis here and you are missing the whole point! This is an enormously productive analytical process that forces everyone who takes part to give up that comforting place from which heterogeneity is so easily visible. It is also an unnerving process that does not lend itself to producing a linear, homogeneous text for an international journal. We initially thought to preserve the analytical styles and priorities, theoretical backgrounds, and styles of thought in the text in order to illustrate the heterogeneity of

heterogeneity. It did not work. We gave up and tried to turn it into a conventional article, which turned out to be difficult enough. It took a thorough, and luckily for us, appreciative peer-reviewing to get the article back on track. The careful reader will still have no trouble retracing the original heterogeneity, but we hope that despite its hard-won messiness, most readers will take something from it.

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### **Notes**

1. While the majority of physicians agree that these drugs have improved the management of conditions such as high blood pressure, significant disagreement persists among biomedical researchers as to the exact capabilities of these drugs to significantly reduce the risk of suffering from a cardiac event. Longitudinal endpoint studies remain rare and often deliver less than clear results.
2. If we treat the assemblage as if it were a singular actor, we only do so to make the text more readable not because we want to suggest that the assemblage has the capacity to act as “one.” We ask our readers to always think of these processes as emergent within practice, with agency distributed and only coordinated to a degree between different kinds of actors.
3. Those who are not seen as capable of such self-management are readily collectivized as problematic milieu—conceived socioeconomically or ethnically—and subjected to rather imposed and desubjectified forms of prevention (Niewöhner and Kontopodis 2011).

4. Nationwide programs, such as the check-up 35+, which plays a central role in our investigation of primary care, are instigated not through national legislation but through a so called joint committee, the top body of the German self-regulated administration of the health system made up of representatives of the medical professions and the health insurers and including as observers and commentators patient representatives.
5. The Social Hygiene movement has its roots in the mid nineteenth century when physicians such as Rudolf Virchow argued for the improvement of living and working conditions in the interest of better health.
6. We are not suggesting that scientific knowledge is universal. Canadian molecular biology is thus not per se relevant to cardiovascular prevention in Germany. Yet, the interviews with German researchers and clinicians show that the Canadian work cited here is taken on board and translated into the relevant medical associations. It translates into the German context.
7. For a discussion of cardiovascular prevention as a technology of life itself see (Niewöhner and Kontopodis 2011).
8. Namely, increases in visceral fat (fat around the organs in the central abdomen), increased blood pressure, dyslipidemia, and increased fasting glucose.
9. For example, the International Diabetes Foundation, the U.S. National Cholesterol Education Programme, the Sixth Joint National Commission for blood pressure treatment, the American Diabetes Association, the American Heart Association/American College of Cardiology, the National Institutes of Health Obesity Initiative, and the German Adiposity Society,
10. Ongoing and as yet unpublished work. Interview with a German clinical researcher.
11. Fieldnotes 050209/MON.
12. For more detail on the German check-up 35+, see Heintze et al. 2008b.
13. [www.tigerkids.de](http://www.tigerkids.de) accessed June 25, 2010.

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