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博士論文

The Paradigm Shift in Obesity Research and Its Ethical and Cultural Implications

肥満研究におけるパラダイム・シフト
とその倫理的及び文化的意味

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1 Introduction

In recent years, obesity has become one of the top issues in public health. Once regarded as an individual problem, if it was considered a problem at all, obesity is now said to be 'epidemic'. Health authorities all over the world, including the World Health Organization (WHO), voice their concern over the growing numbers of overweight and obese people. Not only is their weight itself seen as a health problem, but also the many diseases attributed to 'excessive fat accumulation'. These include cardiovascular diseases, diabetes and cancer, all life-threatening diseases that render obesity a problem requiring urgent action.

Furthermore, due to the disabling and chronic nature of the diseases attributed to obesity, it is not only a physical but also an economic threat. Besides direct costs caused by the treatment of obesity and its related diseases, absence from work or invalidity cause indirect costs. While estimates are considerably high already, those costs are expected to grow significantly over the next decades because of the anticipated rise in obesity rates. For example, Finkelstein et al. (2012) estimate for the US an increase in obesity by 33% and in severe obesity by 130% during the next two decades, which means that more than half of the US population would be obese by 2030.

It is therefore no surprise that many governments have included obesity in their public health agendas already and many more are following suit each year. Since obesity is widely believed to be caused by a positive energy balance, i.e. consuming more energy than needed to maintain bodily functions and perform the activities one is engaged in, such agendas typically contain measures to curb energy consumption and increase physical activity to spend more energy. In short, the common policy says: 'eat less, move more'.

However, such agendas are nothing new. Public health campaigns addressing nutrition or encouraging physical activity have been in practice since the 1970s. At that time, chronic and especially heart disease was a major concern for public health and the consumption of animal products – especially saturated fat – and lack of exercise were identified as some of its major causes. Since then, health authorities have told us to watch our energy balance, to avoid saturated fat and to be physically active. Overweight was believed to reflect the bad influences of our lifestyle habits,

which had changed due to the industrialization. Thanks to automation and rationalization physical labour was less required and everyday life had become more sedentary. Food, however, was more abundant than ever. There was little doubt that we get fatter in such an environment, because our bodies are programmed to store as much fat as possible to survive in times of hunger. But what was once a survival mechanism turned into a curse now that we rarely experience hunger and led to all sorts of diseases. Therefore, it seemed only logical that we have to create hunger artificially by dieting if we are gaining weight. And if we were more physically active, too, we would lose the excess weight even faster, thus reducing the risk for disease.

Before the 1970s, weight had already gained the attention of insurance companies, which noticed that people with higher weights died earlier than others at the beginning of the twentieth century. Due to their campaigning, the perception of fat as a sign of vitality, prosperity and beauty changed gradually into the opposite and people gradually started to perceive the fat body as unhealthy and ugly. Within a short period of time, adverts for products that should lead to weight gain were replaced by those that promised weight loss. They were accompanied by various mechanic and even electronic treatments and of course by dietary and exercise recommendations.

But even before that, obesity was not unknown to medicine. Even Hippocrates, the Ancient Greek physician, prescribed diets and exercise for weight loss and later physicians followed his example throughout history. This shows that obesity is not a new phenomenon, but has been known at least since antiquity. Despite this long history of obesity, its main treatment has hardly changed over time and still consists of diet and exercise. The energy balance theory has been the paradigm of obesity treatment for hundreds of years and physicians around the world have developed their weight loss regimen based on it. They may differ in their contents concerning what to eat and how to exercise but they are all based on the same paradigm that explains overweight as the result of a positive energy balance.

Following this paradigm, countless diet and fitness crazes could be observed in the past, especially since the 1970s. People followed the dietary advice to reduce their fat consumption and were catered by the food and drink industry (FDI) with low-fat and fat-free products. What fat they still consumed they changed from ‘dangerous’ saturated fats to margarine and vegetable oils touted as the healthy alternative. They counted calories to keep their energy intake in check and embraced

low- or zero-calorie products. They joined fitness clubs and weight loss programmes. And as a result, the world today is fatter than before. How did this happen?

Although the energy balance paradigm is widely accepted and overconsumption of food seen as the cause of obesity, many agree that obesity is a complex phenomenon that requires multiple approaches. For example, there is much controversy about whom or what is responsible for consuming too much energy. Many blame the obese people themselves for their excessive weight. According to this view, obese people are too weak-willed to control their bodies and too lazy to exercise. If only they would control their bodies and not give in to their appetite, they would lose their fat and rid themselves of all health risks associated with it.

A position somewhat more in favour of obese people blames their environment. Energy-dense food was too cheap and too readily available while cars and escalators prevented people from getting the necessary exercise to stay slim. Especially in areas without access to fresh food, so-called 'food deserts', people had no other choice than turning to fast-food restaurants or convenience stores. Often these areas also lack safe spaces for exercise and therefore only those who could afford the membership fees of a fitness club could exercise. Typically, those living in such environments have little income at their disposal so that obesity is now often associated with a low income, which contradicts the traditional perception of obesity as a sign of affluence.

Hardly anyone imagines poor people as being overweight let alone obese. Poor people tend to be underweight because they struggle to buy enough food to survive. If someone claims to be poor but appears to be fat it seems hard to believe him. Instead he may be blamed for his poverty, too. If only he would eat less he could surely save money and would not need to be poor. To be poor and fat seems paradoxical but as a matter of fact, this phenomenon is getting more common worldwide although its prevalence varies among different countries (cf. Popkin 2011).

It may seem even more paradoxical, but hunger and obesity can also exist simultaneously in one family, which poses a new challenge for public health (cf. Garret/Ruel 2005; Doak et al. 2005). It is feared that programmes targeting obesity or malnutrition could place some family members at a disadvantage when recommendations on nutrition are made for the whole family without being aware of the existence of so-called 'dual burden households', i.e. households with underweight as well as overweight or obese members (cf. Garret & Ruel 2005; Doak et al. 2005).

Therefore, programmes should target individuals instead, but in fact it is even possible to be an obese individual and malnourished at the same time (cf. Kaidar-Person et al. 2008a, b). In this case, it is presumed that the overconsumption of energy- but not nutrient-dense foods is to be blamed for this paradoxical situation, which leads to a discussion about the FDI's responsibility for obesity.

While FDIs claim that they merely cater to consumers' palates and point to the fact that they are actively encouraging physical activity, e.g. by sponsoring sport events, they are also accused of designing foods and beverages precisely so that they are excessively consumed. Although the controversy on the role of FDIs in the 'obesity epidemic' is continuing, some countries or cities have already tried to ban very large portion sizes or to tax certain foods similar to taxes on tobacco, in order to curb their consumption.

However, regardless of the measurement taken in the name of public health, their common goal is the behaviour change of obese individuals. In the end, they have to lose weight by diet and exercise. So whether public health authorities are targeting individuals directly with advice on nutrition or exercise programmes or indirectly by changing their environment or imposing taxes to 'nudge' them into changing their behaviour is merely a matter of strategy. The question for public health authorities is always how to make obese people change their behaviour to eat less and move more. From a medical perspective, nothing might be wrong with this, but with growing concern about the 'obesity epidemic', obesity has also become a topic of ethical concern.

To begin with, the term 'obesity epidemic' itself is questioned as some think there is merely a 'moral panic' about obesity. It is therefore questionable, whether public health should be concerned about obesity at all. Traditionally, public health deals with hygiene and the diseases that originate and spread because of a lack thereof, especially communicable diseases. For most of the time, nutrition has been a concern to public health in the context of malnutrition and recommendations told people to eat *more* to overcome dietary deficiencies (cf. Nestle 2003). The first recommendations to eat less of certain foods are those from the 1970s mentioned above, which were introduced to prevent heart disease. Only since obesity became to be regarded as 'epidemic' in the late 1990s, did weight become a public health problem. Especially the presentation of obesity as spreading like a virus across the US convinced public health authorities that they should deal with it (cf. Oliver 2006).

However, obesity is not contagious[1] and except for 'morbid obesity' it was not considered to be a disease until the American Medical Association classified obesity as a disease in 2013. And yet there are many obese people who are healthy despite their fat. To classify them, too, as ill remains controversial. Furthermore, public health programmes targeting obesity typically target overweight people as well to prevent them from becoming obese. The goal of their interventions is always the 'normal' weight but in fact, studies have shown that mortality rates are lowest in the overweight category (cf. Flegal et al. 2005, 2013), which questions the concept of 'normal' weight as the ideal.

Consequently, there are also concerns about the treatment of obesity. These question the necessity of obesity treatment, i.e. diet and exercise, and point to the fact that it actually fails in many cases. Often, the last option for treatment is bariatric or weight loss surgery, which can be performed using several methods, all with the goal of reducing the size of the stomach to limit energy consumption. Of course there are also risks involved with bariatric surgery and doubts are raised about whether the risks ascribed to obesity justify surgery on healthy organs.

Also, some make the criticism that the current discourse on obesity focuses too much on the individual and the energy balance paradigm, while other factors, which contribute to obesity as well, such as socio-economic status (SES) and living and working conditions or certain medications, are largely ignored. One reason for this might be found in the widespread bias against obesity. There is a considerable amount of stigma attached to fat and obese people experience discrimination in all aspects of everyday life, but especially in medical contexts. Studies show that health care professionals tend to be biased towards obese people, which in turn poses an obstacle for obese people in seeking healthcare (cf. Puhl/Heuer 2009).

Finally, ethical questions are raised regarding obesity and the just allocation of health care resources. These questions circle around the problem of responsibility. If it is true that obese people got obese because of their own lifestyle choices and if it is true that their obesity is the cause of their disease, some argue that obese people are

[1] Proponents of 'social contagion theories' argue however, that obesity does spread among members of a certain group. Some claim that this is because members of the same group often share similar lifestyle habits so that they tend to gain or lose weight together. Another interpretation of social contagion theory sees the reason for spreading obesity in the acceptance of obesity in a group, which is growing the more people are obese. Obesity then spreads to members of the group who are not obese yet because they do not fear exclusion from the group. (cf. Christakis & Fowler 2013)

responsible for their disease. Therefore, it would be fair to favour patients who got sick without being responsible for their disease when scarce health care resources have to be allocated. With regard to the costs ascribed to obesity, some even think that it would be right to force obese people to lose weight.

But do obese people really choose to be obese? Would it really be that easy to lose weight if they only wanted to? There are several reasons to believe that this is not the case. Hardly anyone chooses to be obese. It is true that not every obese person seeks weight loss and that obese persons can be happy and healthy, too. However, many would like to lose weight, which is reflected in the huge market for weight loss products that includes dietary supplements, food products, various devices etc. Advice on how to lose weight has been one of the main topics of magazines and TV shows for nearly a hundred years and has not ceased to spark the interest of readers and viewers. So it is hard to believe that people would not want to lose weight. Rather it seems like they struggle to lose weight despite all advice. The fact that more and more people have to rely on bariatric surgery as a last resort also reflects this. Why is this? Are they not trying hard enough? Or could it be that the advice they are given is wrong?

Recently, opinions claiming that the latter is true are becoming more common and point to a paradigm shift in obesity research. While there are still many questions surrounding obesity, which require more research, it is becoming clear that the energy balance paradigm is too simplistic to explain obesity. Neither does it explain why people become obese nor does it offer a solution for those who want to lose weight. There is, however, a new theory, which solves these problems and is very likely to become the new paradigm of obesity research: hormonal obesity.

This theory introduces hormones into the discourse on obesity, which are – except for weight gain related to thyroid diseases – a completely new factor in this discourse. According to this theory, obesity is caused by hormones, which are released when certain foods are consumed, so that it does not matter, how much food is consumed but rather what kinds of food. The hormonal obesity paradigm takes into consideration that not all foods are metabolized equally and that therefore a calorie is not a calorie, which contradicts the energy balance paradigm, according to which it does not matter whether a calorie is consumed in form of a carrot or that of a cheeseburger, because all that counts is how many calories have been consumed and how many spent, i.e. the energy balance.

Currently, all public health interventions targeting obesity and its related diseases are based on the energy balance paradigm. Although there are different approaches for how to make people consume less energy than or at least equal the amount that they spend, public health authorities do not question that energy balance is the key to understanding obesity. Some ethicists have criticized that obesity is a more complex problem and cannot be solved that easily, but lacking a better theory they tend to argue against any intervention. Now that there is a new theory, obesity treatment and prevention need to be reconsidered, not only from a medical perspective but also ethically. This is what I want to attempt with this thesis.

1.1 Materials and Methods

To do so, I firstly want to summarize the current discourse concerning obesity and ethics in chapter 2 based on a systematic review of articles published in scientific journals. There is also a small, but growing number of books or book chapters on obesity and ethics, which have been published in recent years, many of them specifically referring to the 'obesity epidemic' and some by the same authors who have written on obesity and ethics in scientific journals before, but due to temporal and financial restrictions these books had to be excluded. Nevertheless, reviewing the accessible literature in scientific journals will show how obesity is defined and treated under the energy balance paradigm as well as the ethical concerns involved. I shall describe three topic clusters, which define the ethical discussion of obesity, more in depth: the discourse on obesity, interventions against obesity and responsibility and justice.

Secondly, I want to introduce the paradigm shift in obesity research in chapter 3 based on the paradigm theory Thomas S. Kuhn described in his book *The Structure of Scientific Revolutions* in 1962. Although it was translated into at least nineteen languages and has been very influential, Kuhn's work has often been misunderstood (Hoyningen-Huene 1989: xv-xvii; Sharrock/Read 2002: 1-2). Sometimes, it is even declared that Kuhn's paradigm concept would not mean anything, but several authors have tried to reconstruct the theories discussed in *The Structure of Scientific Revolutions* in order to refute this claim. I shall refer to the work of Hoyningen-Huene

(1989) as well as Sharrock and Read (2002) in particular if deemed necessary to clarify the meaning of Kuhn's theories. I shall explain how the energy balance paradigm works as what Kuhn calls 'normal science', how it came into being and how it is changing into the hormonal obesity paradigm due to crisis, which in this case is the 'obesity epidemic'.

Much of this chapter is based on one of the most comprehensive summaries of obesity research: *Good Calories, Bad Calories. Fat, Carbs, and the Controversial Science of Diet and Health* written by science journalist Gary Taubes in 2008. He has also published an abbreviated version *Why We Get Fat and What to Do About It* in 2011. Taubes' findings are largely confirmed in the 2014 book *The Big Fat Surprise: Why Butter, Meat, and Cheese Belong in a Healthy Diet* by Nina Teicholz, who is also a journalist. Both authors have re-evaluated scientific articles on obesity mainly from the past century in order to describe how current ideas in obesity research developed. They show that certain researchers and politics were very influential in forming these ideas despite lacking evidence.

Thirdly, I want to have a closer look at Sweden where the paradigm shift in obesity research is beginning to show first results and describe its new paradigm in chapter 4. Due to the timeliness of the paradigm shift in obesity research, the available literature is very limited. The physician Andreas Eenfeldt gave a first account of the paradigm shift in Sweden in his book *Low Carb, High Fat. Food Revolution. Advice and Recipes to Improve Your Health and Reduce Your Weight*, which was first published in Swedish in 2011. He also maintains a blog where more up-to-date information can be found and which became an important source for this thesis. Although I have tried to draw on internet resources as little as possible, most of the information on the current paradigm shift in obesity research has yet to be published and is often only available in oral form, e.g. in online lectures by physicians. I used these sources when no other material could be found.

Furthermore, I shall attempt to reconsider obesity and ethics under the new paradigm in obesity research. In particular, I shall look at the meaning of the new paradigm regarding justice and responsibility for obesity and its related diseases as well as interventions against them. As we shall see, culture plays an important role in reconsidering the ethical implications of the hormonal obesity paradigm, which is why I chose to include the cultural implications of the paradigm shift in obesity research in the title of this essay. In order to re-evaluate possible ethical pitfalls of

preventing obesity and its related diseases based on the new paradigm, I use the ethical framework introduced by Ten Have et al. (2012). This framework contains eight questions that should be considered to avoid ethical pitfalls in obesity prevention and I shall attempt to answer these questions for the promotion of a LCHF (*Low Carbohydrate High Fat*) lifestyle, which could be a tool for health promotion under the new paradigm in obesity research.

Finally, I shall summarize the findings of this thesis in chapter 5 and point to the broader meaning of the paradigm shift in obesity research for medicine and health promotion as a whole.

2 Obesity and Ethics

To learn about how obesity is currently discussed in the field of ethics, I conducted a systematic review of the literature published in scientific journals. Although searching for combinations of the keywords "obese", "obesity", "overweight" or "fat" and "ethics" in several databases and scientific journals related to (medical) ethics or health care and medicine yielded hundreds of results, many of them did not have obesity and ethics as their main topic. Therefore, I limited the search to include only articles, which contained the aforementioned keywords in their title or abstract. The resulting articles where then checked one by one for relevancy, which led to 155 articles. Since the search included only English keywords it resulted mostly in articles written in English except for three articles written in German, which had English abstracts.

The resulting 155 articles have been published between 1981 and 2015 (see figure 1), but most of them after 2004. Hardly any articles on obesity and ethics were published until 1998, when obesity became a topic in public health and it took six more years before it became more widely regarded as a topic of ethical concern. From 2004 the number of published articles has risen almost every year peaking in 2010 with 27 articles. Since then it seems that interest in obesity and ethics is slowly dwindling. There is only one search result for 2015 but this may be due to delays in accessibility. However, it appears that obesity is a rather new topic in ethics.

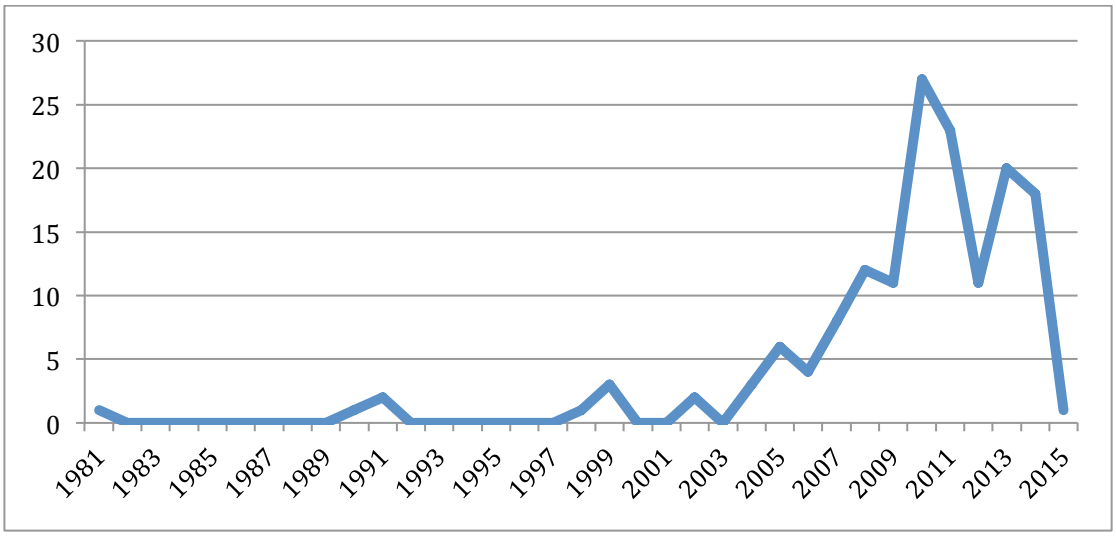

Figure 1: The number of articles related to obesity and ethics published between 1981 and 2015.

The articles deal mainly with interventions against obesity, i.e. its treatment and prevention (see figure 2). Either they concentrated on this topic alone or they looked into certain problems concerning intervention such as responsibility for or consent to intervention. Therefore, the numbers in Figure 2 do not simply add up to cover all articles related to obesity and ethics but show topic clusters, which sometimes overlap in the articles. The topic clusters I could identify besides interventions (67 articles) are responsibility (28 articles); stigma and discrimination (18 articles); discourse (18 articles); allocation and justice (14 articles); law and (human) rights (10 articles); autonomy and liberty (9 articles); harm and well-being (9 articles); morality and virtue (9 articles); and solidarity/fat acceptance (5 articles). Further, while some articles dealt with interventions against obesity in general, others dealt with specific interventions such as bariatric surgery (14 articles).

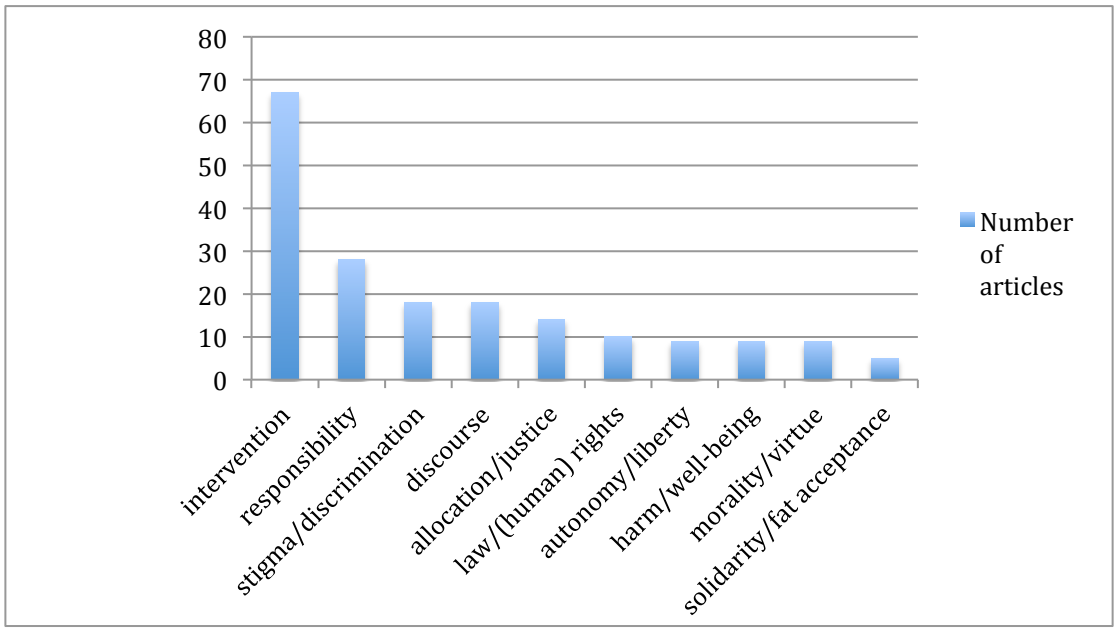

Figure 2: The main topics in articles related to obesity and ethics.

It is also possible to identify other topics, which are often discussed in the context of obesity and ethics but do not fit into the topic clusters above. Here, the most discussed topic is children and adolescents with 24 articles. Again, this topic overlaps with others, so that for example interventions against obesity in children or the responsibility of parents for preventing obesity in their children is discussed. Compared to articles about children, obesity and ethics, articles that specifically deal

with women, men or gender (6 articles) are relatively rare. Therefore, gender does not seem to be of much importance for the ethical discussion of obesity. Given that all articles, except the ones specifically dealing with children, implicitly have adults as their topic, age seems to be more relevant.

However, in this thesis I shall focus on adults only and refrain from debating the ethical issues involved in interventions against obesity in children and adolescents. To map out the field in which adult obesity is discussed based on these articles, I first want to give a chronological overview to see how obesity evolved as a topic in ethics. Then, I shall give a closer examination of the different topics clusters, in which obesity is discussed ethically in the rest of this chapter.

The earliest result of my review of scientific journals is Fitzgerald's "The Problem of Obesity" published 1981 in the *Annual Review of Medicine*. Although this article was published long before 'obesity epidemic' became a buzzword, she cites Ayers, who wrote in 1958 that obesity was the number one health problem of the times, but Fitzgerald questions this view. Summarizing the research on obesity and its associated diseases, she points to its flaws and concludes: "In view of the conflicting data, the patent cultural biases under which we labor, and the possible harmful effects of therapy, it seems best that physicians examine the problems of obesity with the same keen scepticism and science they apply to other unsettled issues" (Fitzgerald 1981:8). This one sentence puts the problems concerning obesity in a nutshell.

Firstly, there is conflicting data surrounding the question of whether obesity is actually harmful or not. Secondly, there exists considerable cultural bias against obesity and obese people, not least among health care professionals, as we shall see later. Thirdly, there is reason to think that the treatment of obesity might be more harmful than obesity itself, leading to the question of whether it is ethical to offer obesity treatment under these circumstances. And fourthly, Fitzgerald demands scepticism in dealing with these problems, which is unfortunately often lacking in obesity research.

After Fitzgerald's article there seems to be a gap, because the next search results appear almost ten years later. In 1990, Bray's article "Obesity: historical development of scientific and cultural ideas" was published in the *International Journal of Obesity*. Like the title suggests, Bray gives a historical overview on how obesity was explained according to the various medical models that existed since Hippocrates. He notes that while obesity was still a symbol of fertility in prehistoric

times, Hippocrates and subsequent physicians regarded obesity as a disease. Although their interpretations of the nature and causes of obesity differed, their recommendations for treatment were quite similar and sound – except for considerations about the importance of cold baths – familiar: diet and exercise. Besides other reasons, obesity was mostly seen as the consequence of too much food and too little exercise and therefore, the obese were blamed for their disease. In addition, obesity was often linked to moral weaknesses and stigmatization of obese people therefore common from antiquity at the latest.

In the following year, two short articles concerning obesity and ethics were published in the *Journal of the American Dietetic Association*: Lustig's "Weight Loss Programs: Failing to Meet Ethical Standards?" and Pace et al.'s "Ethics of obesity treatment: implications for dieticians". They criticize the treatment of obesity, but while Lustig deals with weight loss programmes in general, Pace et al. focus on treatment by dieticians. Both point out that common obesity treatment is unsuccessful in the long-term and offers hardly any benefit but comes with considerable risk for psychological as well as physiological harm. Therefore, Lustig claims that obesity treatment should be regarded as experimental rather than validated treatment and argues that even as experimental practice, it would not suffice ethical standards (1991: 1252-1253). Pace et al. argue that current obesity treatment conflicted with several principles of the Code of Ethics for the Profession of Dietetics (hereafter the Code), which was adopted by the American Dietetic Association in 1988. Continuing treatment approaches with such low success rates was inconsistent with principle 7 of the Code saying that dieticians should base their treatment on "scientific principles and current information" (1991: 1258), but according to Pace et al. dieticians would "merely repeat[…] what has been said in the past" (ibid.) instead of being open to new theories and techniques with regard to obesity treatment (ibid.).

Furthermore, both articles note the absence of informed consent in obesity treatment. While Lustig names lacking supervision and standard of disclosure as a reason, Pace et al. point to principle 10 of the Code, which says that "the dietetic practitioner provides sufficient information to enable clients to make their own informed choices" (ibid.), but they question the conduct of dietetic practitioners when obesity is discussed. Their conduct also contradicts principle 1 of the Code demanding objectivity and "respect for the unique needs and values of individuals" (ibid.). With respect to this principle, Pace et al. suggest that weight loss should not

necessarily be the goal of obesity treatment, especially if the client has a family history of obesity or seeks weight loss for emotional reasons (ibid. 1259). In the latter case, dieticians should adhere to principle 9 of the Code, which says that "[t]he dietetic practitioner recognizes and exercises professional judgement within the limits of his/her qualifications and seeks counsel or makes referrals as appropriate" (ibid.). Finally, Pace et al. point to principle 5 of the Code according to which dieticians should "remain free of conflict of interest while fulfilling the objectives and maintaining the integrity of the dietetic profession" (ibid.). Thus, Pace et al. recognize problems of obesity treatment with 5 of the 19 principles of the Code and to overcome these, they endorse the report of the Task Force to Establish Weight Loss Guidelines formed by dieticians and other health care professionals in Michigan, which promotes "individualized treatment with a multidisciplinary approach" (ibid. 1260) focusing on exercise and placing "as high a priority on helping clients maintain weight loss as they do in helping clients lose weight" (ibid.).

It takes again a few years before more articles on obesity and ethics appear. In 1998, the *International Journal of Obesity* published Stunkard et al.'s "Stigmatization of obesity in medieval times: Asia and Europe", a short article using examples from art history to demonstrate that stigmatization of obesity has existed in medieval times as well. Although the title promises to compare Asia and Europe, it is actually a comparison between Japan and Europe – or rather Buddhist and Christian accounts of stigma. They show that obesity was linked to moral misconduct and therefore stigmatized in both medieval cultures. What is different is that "[i]n the Buddhist culture, stigma was ascribed to popular views of karma, which saw in suffering the inevitable retribution for moral failure in this or previous lives. In a Christian culture, by contrast, the stigma was ascribed to transgressions against the authority of an omnipotent god" (Stunkard et al. 1998: 1143).

Moral misconduct is also the topic of Burry's article "Obesity and virtue. Is staying lean a matter of ethics?" and Proietto's article "Why staying lean is not a matter of ethics" published 1999 in the same issue of the *Medical Journal Australia*. Burry claims that "[s]elf-control of one's own weight might be described as a form of bioethics" (Burry 1999: 610) and suggests that everybody, but especially leaders in society such as medical practitioners, politicians and moral philosophers etc., should aim at a body mass index (BMI) between 22 and 25 because this would reduce "[t]he burden of illness and the need, demand and costs for medical services" (ibid. 609).

Although he cites authors who wrote about the difficulty if not impossibility of obesity treatment, he argues that "[c]ontrol of weight […] remains a matter of self-control and personal responsibility" (ibid. 610) and points to Aristotle's *Nichomachean ethics*, when he finally suggests "a BMI of 22 to 25 as a "virtuous mean" to which we should all aspire" (ibid.).

Proietto opposes Burry's suggestion and stresses the role genes and hormones play in the aetiology of obesity. According to Proietto severe obesity can occur only if there is a defect in the body's mechanisms to regulate weight, which are "highly complex and tightly controlled" (Proietto 1999: 611). The consequence of such a defect would lead to a constant feeling of being hungry in obese individuals that is almost impossible to resist in the presence of abundant food. Therefore, Proietto concludes that "[i]t is grossly unfair to punish the obese for not having the strength to fight hunger" (ibid. 613). Proietto also argues directly against Burry, pointing out that there are differences in the distribution of fat and the associated risks to health, so that "we can exclude those fortunate women who put on weight around their hips from being bound by Burry's proposed ethical rule that we should maintain a BMI of 22-25. Thus excluded will be about 80% of women with a BMI between 25-30" (ibid. 611).

The third article published in 1999 is "Genetically determined obesity in Prader-Willi syndrome: the ethics and legality of treatment" by Holland and Wong in the *Journal of Medical Ethics*. Holland and Wong discuss whether it might be justified to restrict food consumption in persons with Prader-Willi syndrome (PWS) touching on the problems of free will, addiction and mental illness. They argue that under certain circumstances restricting the access to food might be in the best interest of PWS patients and that "[a]llowing serious weight gain in the absence of careful consideration of these issues is an abdication of responsibility" (Holland & Wong 1999: 230).

Groarke argues in a similar fashion in his article "Paternalism and egregious harm: Prader-Willi Syndrome and the importance of care." published in the *Public affairs quarterly* in 2002. Groarke discusses and criticizes different liberal theories, which oppose paternalism under any circumstance. He argues that "paternalism has some place in a compassionate society" (Groarke 2002: 203) if it is used to prevent egregious harm, for which he gives the example of PWS. According to Groarke's description, PWS patients will do everything to obtain food even if they have to lie,

steal or offer sexual favors (ibid. 225), but since they "may literally eat themselves to death" (ibid. 222) not restricting their access to food would be equal to neglect or even "a form of abuse" (ibid. 223). However, he fails to comment on how far paternalism should go in preventing PWS patients to eat. Since Groarke himself describes how PWS patients would even commit crimes or sell their bodies for food, would restricting their access to food not push PWS patients into this kind of behaviour? In other words, if paternalism was justified to spare PWS patients the harm of over-eating would it not be necessary to confine PWS patients in order to control their access to food without pushing them into crime or prostitution? Unfortunately, Groarke does not elaborate these questions.[2]

In the same year, Roehling introduces the topic of discrimination into the discussion in his article "Weight Discrimination in the American Workplace: Ethical Issues and Analysis" published in the *Journal of Business Ethics*. According to Roehling, overweight and obese people face discrimination in every aspect of employment "including: career counseling, selection, placement, compensation, promotion, discipline, and discharge" (2002: 177). He discusses existing laws against discrimination in the US and points out their limits in protecting overweight employees or job seekers. Therefore, weight-based discrimination may be legal, but Roehling doubts that it is ethical and proposes minimal ethical obligations for employers.

As outlined earlier in this chapter ethical issues concerning obesity were discussed rather sporadically in scientific journals before 2004. Much of the discussion focuses on obesity as a moral problem and its stigmatization – historically and currently. Remarkably, there are already critical articles, which point out the fact that obesity treatment is largely ineffective and therefore ethically questionable. Also free will, paternalism and responsibility are already discussed, but mostly in the context of a specific form of obesity: Prader-Willi Syndrome.

After 2004 the discussion of obesity and ethics slowly but steadily gains momentum until it peaks in 2010. From 2005 onwards, the term 'obesity epidemic' enters the discussion of obesity and ethics in the context of obesity discourse. This is almost a decade later compared to the first mentioning of 'obesity epidemic' in the

[2] Note that contemporary approaches to care for PWS patients emphasize their autonomy. Although they might not leave all choices concerning food to the patient alone, they try to find "meaningful solutions together, supported by others" (Van Hooren et al. 2007: 509).

medical discussion of obesity (see figure 3). In the following year, more critical articles on obesity discourse are published, which support the idea of a 'moral panic', but after 2007, affirmative voices of an 'obesity epidemic' become louder and discuss questions about the responsibility for disease and its prevention and the allocation of health care resources. They are interrupted only by articles on stigma, weight bias and discrimination – sometimes in historical perspective – and further articles on obesity discourse.

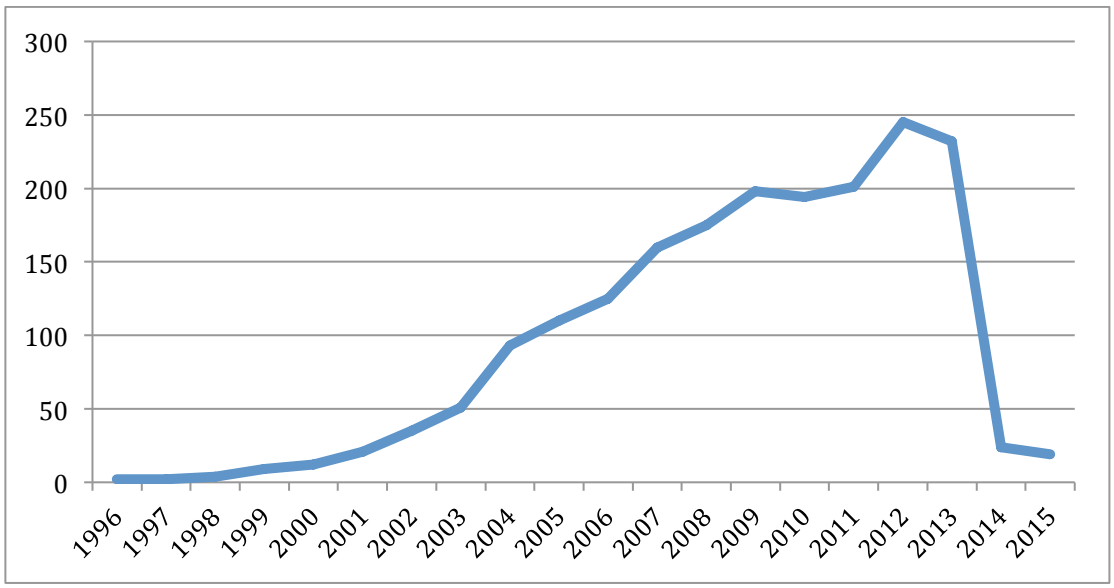

Figure 3: The number of articles mentioning the term 'obesity epidemic' published on PubMed.[3]

Thus, we can identify three major topic clusters, which define the discussion of obesity as an ethical problem today: Firstly, there is the discourse on the medicalization and moralization of obesity and the question of whether there is an 'obesity epidemic' or rather a 'moral panic'. I shall begin by summarizing this topic cluster, because it will also shed light on the history of obesity and the question what obesity is medically as well as socially. Secondly, there is a discussion on treatment and prevention of obesity and the question of how ethical they are. Summarizing this topic cluster shall give an overview about current interventions against obesity including its risks and ethical pitfalls. Finally, there is the discussion of responsibility

[3] The rapid rise in the number of articles mentioning the term 'obesity epidemic' parallels that of the number of articles on obesity in general. Although the WHO had declared obesity a major health concern already in 1985 (cf. O'Malley & Stotz 2011) there was only a very slow increase in articles on obesity compared to that after obesity became an 'epidemic', which shows the impact this term had on obesity research.

for obesity and interventions against it, which is linked to questions of justice regarding the allocation of health care resources and access to health care. For a schematic overview of the topics discussed concerning obesity and ethics refer to figure 4.

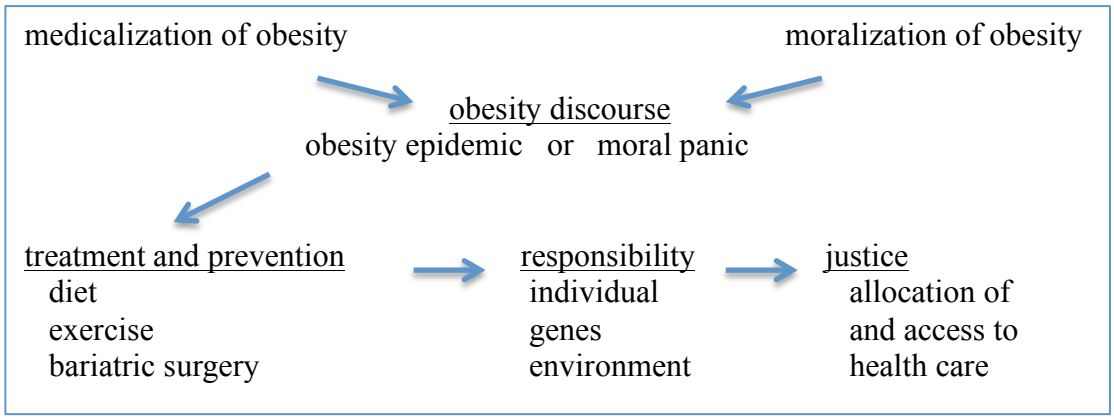

Figure 4: Mapping the ethical discussion of obesity.

2.1 Obesity Discourse: 'Obesity Epidemic' or 'Moral Panic'?

Virtually everybody has heard of the 'obesity epidemic' by now and knows the messages that come with it: obesity is a major public health problem; we are getting fatter and fatter; obesity causes all kinds of diseases – and therefore healthcare costs; we need to watch our weight and lose weight if deemed necessary; obesity rates are especially on the rise in younger generations, making them face a shorter life expectancy than their parents – a circumstance, which is unheard of in human history. Messages like these are frequently repeated in the media and may seem self-evident for most of their recipients. However, there is also a growing body of critics questioning the validity of these claims.

The earliest articles dealing with this obesity discourse among the results of my systematic review were three articles published in the journal *Social Theory and Health*. In "Discussion Piece: A Critical Take on the Obesity Debate" Monaghan (2005) focuses on the "war on obesity" especially regarding the discourse on men's weight problems in England. Aphramor argues in "Is A Weight-Centred Health Framework Salutogenic? Some Thoughts on Unhinging Certain Dietary Ideologies", "that the current weight-loss schema helps to naturalise a fatness discourse that not

only represents large people in offensively stereotyped ways but also fails to integrate people's lived experience as gendered, situated bodies in an inequitable world" (2005: 315). And Rich and Evans criticize in "'Fat Ethics' – The Obesity Discourse and Body Politics" the 'certainty' and 'authority' with which the obesity problem often is depicted and argue that the discourse on the 'obesity crisis' is in fact a 'moral panic' doing more harm than good by leading some people to ill-health (2005: 341). They ask questions such as: Is obesity really the dreaded risk factor for disease it is so often said to be? Is it really responsible for hundred thousands of extra deaths a year? Is it really a condition caused by weak-willed individuals themselves, because they are not able to control their body and its appetites? Is the 'obesity epidemic' rather a construct of our moral and aesthetic ideas? According to Rich and Evans these questions are rarely discussed in public discourses on obesity despite the vast media coverage obesity enjoys (ibid. 341). Rather, the public discourse talks about risk and responsibility for disease and consequential costs "with minimal discussion as to the ethical implications of the ways in which this discourse may impact upon the social identities and lives of people, and wider cultural understandings of health, weight and 'fat'" (ibid. 342).

In what Monaghan calls the "dominant understandings of obesity" (2005: 303-304), claims are based on scientific 'evidence' in order to appear certain and true, but if we take a closer look at this 'evidence' we recognize that there is little certainty to be found there (Rich & Evans 2005: 342). Nevertheless, only a few researchers "reflect upon the methodological limitations, ambiguities, uncertainties and contradictions that reside in the databases of the primary research field" (ibid. 343). The majority of research results finds their way into official documents of the various health organizations, health policies and the media unquestioned as long as they fit into what is already common sense, namely that fat is bad and that there is an 'obesity epidemic', thereby perpetuating thinness as a universal value and creating a 'moral panic' around health issues supposedly originating in fat (ibid.). Rich and Evans argue that "the warnings around rising levels of obesity may be linked as much to moral beliefs around 'normality' and weight, as they are to actual health risks" (ibid. 344).

The dominant discourse on obesity tends to normalize a particular body shape, stereotypes obese people in negative ways and produces feelings of guilt and shame while a culture of concern for one's health (sometimes referred to as 'healthism') and

individualism evolves (ibid. 344-345). According to Rich and Evans, these effects of the obesity discourse are neglected, because its primary concern is "to develop concrete scientific evidence to understand the causes of and treatment for the obesity epidemic" (ibid.) However, since there is so little reflection of research as described above, it remains questionable how sincere this concern is. Rich and Evans criticize that the dominant discourse leaves out the consequences of concentrating on the biomedical perspective on obesity (ibid. 345) and observe that what we really have here is "the reassertion of a rational ascetic […] over more humanistic approaches to the body and health" (ibid. 344).

This also implies the endorsement of 'thinness' or 'slenderness' as intrinsically good. Rich and Evans note that 'thinness' and 'weight loss' have become "universal good[s]" (ibid. 346) in the 'obesity epidemic' discourse, which has led to another discourse that "encourages all of us to achieve an 'ideal weight'" (ibid.). According to them "[t]he health industry (health education experts, government agencies and academics) has wholeheartedly embraced the questionable concept of ideal weight" (ibid.) – a concept, which ultimately reduces health and longevity to a weight-height-ratio (ibid.). And since height is presumably determined by genes and therefore not changeable, the only factor, which can possibly influence health then is weight. But it is rarely considered that weight, too, is at least to a certain extent determined by genes and other factors or – as Rich and Evans put it:

> The problem here is that 'health' and 'weight' are infinitely more complex than is suggested in the body-as-machine explanations that are to be found in the obesity discourse, which rely on universal ideas of optimum weight, and a mechanistic view of the body: that it will respond in the same way as long as we rightfully equate calories consumed with energy expended. (Rich & Evans 2005: 348)

This equation seems to have become dogmatic for health care professionals, but they tend to overlook that there are many other factors, which influence health and weight. For example, Aphramor names the following factors associated with obesity:

> [S]leeping disturbances, poor housing, use of anxiolytics and anti-depressants, low degree of life satisfaction, low physical activity (the opportunity to exercise is socially graded), high rates of TV watching (associated with living

> in areas with unsafe streets), low education, unemployment, problems at work when employed and childhood social class. (2005: 323)

These are also related to the most cited factor, which is social-economic status (SES). Unfortunately, this factor is mostly "suffocated by fat" (Monaghan 2005: 308), although the negative influence on health of low SES is better established through research than the link between fat and illness, apparently because healthcare professionals and policy makers shy away from its complexity (ibid.). Aphramor says,

> there is already a significant (but to who?) body of work explicating metabolic alterations (affecting the cardiovascular, immune and neuroendocrine system) that increase the so-called 'allostatic load' among low SES groups and people living with chronic stress (eg caregivers) and have a role in the aetiology of obesity and its related conditions. (2005: 323)

But questions of social inequality are difficult to address and are rarely the topic of public health policy. Fat, on the other hand, is usually simplified to serve as an easy measure for health, by using the BMI for example, and losing weight is promoted as a panacea (Monaghan 2005: 308). So, instead of education and financial help, those affected most by obesity are told to just shed a few pounds and all their health problems will be solved. This is certainly an easy way to deal with public health, but whether it is effective or even efficient is another question.

Furthermore, to neglect socio-economic inequalities and only look at an individual's behaviour rather than its environment can trigger other negative discourses, which reinforce each other. Negative stereotypes of low SES groups then become also stereotypical for fat people so that they are said to be fat because they are poor, lazy, lack knowledge, willpower or motivation (Aphramor 2005: 326). Yet, this view overlooks that behaviour is linked to the social and cultural environment and restrained by economic factors. In Aphramor's words, the 'obesity epidemic' discourse "fails to integrate people's lived experience as gendered, situated bodies in an inequitable world" (ibid. 315) and serves to manifest negative stereotypes of overweight people (ibid.). Campos et al. find that obesity is more likely to be blamed on unhealthy behaviour in the context of stigmatized groups:

> Articles that reported on blacks or Latinos were over eight times more likely than articles that did not to blame obesity on bad food choices, and over 13 times more likely to blame it on sedentary lifestyles, while articles reporting on the poor were four times as likely as other articles to blame obesity on sedentary lifestyles. Such findings lend support to the theory that talk of an 'obesity epidemic' is serving to reinforce moral boundaries against minorities and the poor. (Campos et al. 2006: 58)

Therefore, Campos et al. support the view that the 'obesity epidemic' discourse is in fact a 'moral panic'.[4] According to them "[m]oral panics are typical during times of rapid social change and involve an exaggeration or fabrication of risks, the use of disaster analogies, and the projection of societal anxieties onto a stigmatized group" (ibid.). Regarding the situation in the US, they claim that

> discussions of the supposed obesity epidemic usually take place within the context of a larger discussion, which assumes that the increasing weight of the population is a sign of increasing moral laxity and that overweight and obesity are playing a significant role in driving up health care costs. (Campos et al. 2006: 58)

This is despite the fact that nobody has explained *why* people are becoming heavier yet. As Campos et al. remind us, rather than a loss of morals the opposite could as well be the case. They name smoking cessation as a possible reason for weight gains and argue that this would indicate that people care more about their health and bodies, i.e. they became *more* moral (ibid. 59).

But the fear of obesity is also related to the concerns of those on the political left side, which tend to see the 'obesity epidemic' as "both a by-product and a symbol of rampant consumer overconsumption and greedy corporations" (ibid. 58) and use this discourse for their aims. An example that Oliver gives is that of Marion Nestle, a well-known American nutritionist who claims:

[4] Note that the term 'moral panic' has not been without criticism either. Fraser et al. who discuss emotional aspects of obesity discourse, name four main limitations of the 'moral panic' theory, which lie in the fact that it "1. oversimplifies agency and power; 2. tends to treat the media as monolithic and audiences as passive; 3. underplays the role of order in reactions to events, overplaying panic or chaos as the necessarily destructive or inappropriate element; and 4. tends to denigrate and seek to exclude emotion" (2010: 200).

> Obesity is the most serious dietary problem affecting the health of American children . . . the blatant exploitation by food companies of even the youngest children raises questions about the degree to which society at large needs to be responsible for protecting children's health. (Nestle, cited after Oliver 2006: 620)

Unlike many proponents of the 'obesity epidemic' Nestle does not receive funding from the pharmaceutical industry, but as Oliver explains, "[b]y claiming that obesity is an epidemic, Nestle can argue that the political power of Big Food is adversely affecting Americans' health" (2006: ibid.).

Despite all their arguments, the critics of the dominant obesity discourse agree that it should not be about whether fat is bad or good for health, but unfortunately, this is exactly how the discourse tends to be perceived. As Monaghan makes clear – as well as most other critics of the dominant obesity discourse – he is "not 'taking sides' and claiming 'being fat' is beneficial to health" (2005: 303). Rather than 'taking sides', he wants to point out the lack of debate concerning the dominant discourse of obesity and "sociological concerns" (ibid. 303-304). Still, the discourse is often framed in a pro and contra style. In an earlier article Monaghan wrote for the *Men's Health Forum* (Monaghan 2005b) his view was contrasted with that of Haslam (2005), a General Practitioner (GP) who advocated for the dominant view of obesity being a serious risk to health in itself (Monaghan 2005: 302-303). The magazine published these two articles under the headline 'taking sides' and limited their format greatly so that Monaghan deemed it necessary to write an expanded version, which was then published in *Social Theory and Health*. In this article, Monaghan reminds us that attempts to criticize the dominant view of obesity are widely neglected because "questioning dominant understandings sometimes annoys 'right thinking' people who 'know' obesity is a serious problem" (2005: 304). But he correctly remarks that "[i]f fatness is discredited on a massive scale despite highly equivocal science, then this speaks volumes about social values, vested interests and power" (ibid.). In fact, discourses on obesity often rely on quasi-religious arguments – also indicated by Rich and Evans use of the term 'ascetic' – that do not allow critical thinking or in Monaghan's words: "The crusade against fat is aligned with the powerful secular religion of health and my critical take could be considered blasphemous" (ibid.).

In their attempt to theorize the 'obesity epidemic', Patterson and Johnston argue that there exists a divide between realist and constructionist poles in obesity discourses, the former dealing with obesity as "a biomedical fact endangering the health of individuals and society in general" (Patterson & Johnston 2012: 266) and the latter treating "obesity as a socially constructed scourge based on collective stigma about fatness" (ibid.). Critics of the former, dominant view usually advocate the latter and describe what advocates of the former see as 'obesity epidemic' as a mere 'moral panic'. They give several reasons to support the constructionist view.

The first reason is that, as Campos et al. note, there might not be such a huge rise in the obese population as is often claimed:

> In the US, to take a much-cited example, the so-called 'obesity epidemic' is almost wholly a product of tens of millions of people with BMIs formerly in the 23–25 range gaining a modest amount of weight and thus now being classified as 'overweight', and, similarly, tens of millions of people with BMIs formerly in the high 20s now having BMIs just >30. (Campos et al. 2006: 55)

Campos et al. argue that there have only been subtle shifts in weight overall which is concentrated in the populations that were already heavier a generation ago, while those weighing less did gain little or nothing at all (ibid.). Although these shifts did not go unnoticed by health care professionals and it had long been known that people were getting heavier, there was little concern over this fact since obesity was regarded as the consequence of individual lifestyle choices only and not something the public had to be protected from. The idea that obesity was spreading like an epidemic was not born until the way of presenting the shifts in weight over time was changed by an US-American paediatrician named William Dietz (Oliver 2006: 613).

Dietz was convinced that obesity was not self-inflicted but caused by the environment and therefore a public health issue (ibid. 614). He joined the American Centers for Disease Control and Prevention (CDC) to promote this view, but lacked the right tool to raise the interest of his colleagues (ibid.). Therefore, he and Ali Mokdad, also a CDC scientist, thought of another way to demonstrate the rising prevalence of obesity and used a series of PowerPoint slides to convey Dietz' idea of a virus-like spread, which presented America's weight gains much more dramatically than if they were shown in a table (ibid.):

> On each slide, a map of the United States was shown with different colors signifying different rates of obesity (defined as a BMI of 30 or more) for a given year, starting in 1985. States with the lightest blue hues had the lowest obesity rates (less than 10%), states with a darker blue had more obesity, and when a state's obesity rate went over 20%, it became red. […] As the slides progress from 1985, more and more states ominously begin to change from light to darker blue. Then suddenly, in 1997, the first three "red" states dramatically appear, quickly followed by six more in 1998, and 11 more in 1999. Rather than simply showing a trend, the maps conveyed something far more urgent—a spreading infection. As the redness moved from one state to others nearby, it seemed to demonstrate that obesity was infecting the population with virus-like speed. (ibid.)

The slides were effective in changing the way obesity was perceived by health care professionals. After the slides were first shown in 1998, the notion of obesity as a serious problem became widely accepted, not least thanks to the fact that Dietz shared them on a CDC website so that they became known publicly (ibid. 616). As Oliver notes, the slides became a virus themselves and were spread by everybody who saw and used them in their own presentations, which made the 'obesity epidemic' perfect (ibid.).

However, Oliver also points out some flaws in Dietz' slides:

> To begin with, the maps only show the percent of people in each state with a BMI of 30 or more; they do not show the spread of a disease. By using state boundaries, the maps also exaggerate the extent of obesity, because the geographic size of a state doesn't relate to the size of its population: North Dakota is pictured as the functional equivalent of Pennsylvania, even though it has a fraction of the Keystone State's population. The colors on the maps are also overly evocative, going from cool blues to hot reds as the obesity rates increase, thus giving the impression of increasing danger from an epidemic "hot zone." Finally, picturing the rise of obesity in this geographic way makes it seem like it is some type of spreading infection, like a virus that migrates from one state to another. In reality, weight gain has been most highly concentrated among certain portions of the population, particularly the poor

> and minorities. The reason the first "outbreaks" of obesity were in Mississippi, Alabama, and West Virginia was not because they were near some viral source, but because these states are largely rural and poor. (Oliver 2006: 616-617)

This reflects Dietz' view that obesity is influenced by the environment rather than individual choices, but unlike the idea of obesity's virus-like spreading, this view did not spread as much. Thus, today we often hear of the 'obesity epidemic' as caused by wrong lifestyle habits or – to use another religion-related expression commonly heard in this respect – the epidemic-like spread of 'gluttons and sloths'.

Another way to put it is that we now have a combination of 'obesity epidemic' and 'moral panic', which is also what Patterson and Johnston argue for:

> Obesity is neither a biomedical fact, nor is it reducible to an immaterial social construction – it does not exist outside the mind nor does it exist only in the mind. Rather, obesity and the obesity 'epidemic' are hybrid constructions produced through the dynamic interactions between human agents, the body's biophysical actants and the external socio-environmental conditions within which bodies consume and expend energy. (2012: 269)

For others, such as Lobstein, the obesity discourse is neither a debate about an epidemic nor panic, but about human rights (Lobstein 2006: 76). Campos et al. had criticized certain groups, which propagated the 'obesity epidemic' because it aided their political and economic interests, for harming those who consequentially get blamed and stigmatized (2006: 59). In response to this, Lobstein writes that the interests of groups who profit from this discourse are "at least as legitimate in the development of public health policy as are those of the academic epidemiologist, political scientist, or lawyer" (2006: 75). Considering for example the life insurance industry, Lobstein argues that it "can raise different and important questions, which might not otherwise get asked" (ibid.). Lobstein sees the real problem in the fact that those who according to Campos et al. are harmed by the 'obesity epidemic' discourse are rarely part of the discourse themselves (ibid.). [5] For Lobstein, this is an "opportunity for change" (ibid.) and he cites

[5] A rare example is Kwan's (2012) study based on semi-structured interviews with laypeople who identified as overweight or obese. She found that although the biomedical view on obesity resonates

> [t]he Ottawa Charter for Health promotion[, which] states [that] 'Health promotion is the process of enabling people to exert control over the determinants of health and thereby improve their health' not only individually but through, for example, the social provision of education and economic advancement and the development of social capital to create health-supportive environments. (Lobstein 2006: 75)

If these factors were given, he argues, obesity prevention could empower communities instead of beating them with "moral sticks" (ibid.). What is needed then is a policy forming process, which is transparent and open to all stakeholders involved, but he acknowledges that "[a]t present, much of this process has been hidden (e.g. in the political lobbying process) and inequitable (being led by those with the deepest pockets)" (ibid.). Finally, taking the same stand as Monaghan above, Lobstein says that the obesity discourse should move beyond the question on which side one stands and open the debate for all instead (Lobstein 2006: 76). It should be recognized "that 'obesity epidemic talk' is inseparable from social, cultural, political and economic concerns and therefore the exercise of power" (Monaghan 2005: 309). Therefore, Monaghan demands a more critical:

> take on the obesity 'debate' [which] would read like this: the highly publicized war against fat is about moral judgements and panic (manufactured fear and loathing). It is about social inequality (class, gender, generational and racial bias), political expediency and organizational and economic interests. For many everyday people, including men and boys (but more often women), it is about striving to be considered good or just plain acceptable in a body-oriented culture. (Monaghan 2005: 309)

And in Aphramor's words, we should think of the 'unwholesome narratives' fuelled by the weight loss imperative, which says

> that everyone who is fat is unhealthy and would be healthier and feel better if they lost weight; that weight-loss behaviour is risk free; that sustained weight loss is always and equally achievable with suitable changes and commitment

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with laypeople, they might reject rigid concepts like the BMI as a measure for health and embrace other factors like psychosocial well-being instead. In order to promote health, she therefore argues that healthcare providers should consider laypeople's perspectives as well.

> at an individual level; that it is primarily the duty of the individual to fit and not an obligation for the more powerful in society to challenge narratives and address inequity, including size-based discrimination. (Aphramor 2005: 317)

To sum up this section, whether obesity is an 'epidemic' or merely a 'moral panic' is not that important in addressing the problem that obesity indeed is for some – be it a biomedical, moral or aesthetic one. Various interests and values play into this discourse so that the answer will vary according to whom is asked. Like Patterson and Johnston said, obesity is rather a 'hybrid' of both positions – realist and constructionist – and therefore a real medical problem, although speaking of an epidemic might be exaggerated and misleading. Since it is a moral problem as well, value-free perspectives on obesity are rare even among scientists, who should take a neutral stance towards their research. For such scientists, it seems to be difficult to recognize this aspect of the obesity discourse, as the opinion of the aforementioned GP Haslam shows, who thinks that obesity has become such an important issue solely for medical reasons and has nothing to do with moralizing or social judgements (Haslam 2005: 9). The reason for this difficulty may lie in the fact that the way obesity is discussed today has quite a long history. Therefore, some articles on obesity and ethics deal with the history of obesity to point out how obesity became the problem it is today. They describe the medicalization as well as the moralization of obesity, which I will summarize in the following two sections.

2.1.1 The Medicalization of Obesity

To decide whether obesity is a real or only a constructed problem it is necessary to define what obesity actually is and whether it is harmful or not. The realist view argues that obesity is at least a risk factor for diseases while some even claim that obesity is a disease in itself. Constructionists on the other hand, purport that obesity is nothing more than an accumulation of fat that has little – if anything – to do with the diseases that are commonly attributed to it. To decide which view is right, it is helpful to have a look at historical descriptions of obesity, which show how obesity was medicalized to become the dreaded condition it is today.

We tend to think that obesity is a recent phenomenon and did not exist in the past, but the perception of fat as risky or unhealthy is in fact not new at all. It is already present in ancient and medieval texts written by medical authorities such as Hippocrates, Galen and later Avicenna, but also by Aristotle. They all agreed that very fat or thick people aged and died earlier than lean people, while Aristotle added "they tended to be sterile" (Stolberg 2012: 371). Galen also expressed clearly the pathological status of obesity, describing it as a "preternatural, morbid state, a disease" (ibid.) and consequently its cure as "ridding the patient of excessive fat" (ibid.) by "exercise, dieting and various medicines" (ibid.). Avicenna and many physicians after him based their descriptions of obesity and its cure on these early writings, so that they all agree more or less with each other. But none of the early writers paid much attention to obesity (ibid.). Avicenna for example spent less than one page on obesity and the same amount of text on how to get rid of it (ibid.). It seems like the case of obesity was that clear to them, they did not bother a deeper investigation.

Although descriptions of obesity and its consequences became more detailed and extended in early modern times, they offered little new insights besides giving new examples for cases of severe fat accumulation (ibid. 372). These include cases of adults and children weighing several hundred pounds, which shows that people that heavy are not a recent phenomenon, as it is often believed.

However, most of these writings were "repetitive and redundant" (ibid.), which is due to the fact that early modern physicians were not genuinely interested in obesity. For them, writing on obesity was rather a mean to acquire their doctorate or to demonstrate their ability and expertise as physicians, because it showed their understanding of ancient and medieval authorities as well as the functioning of the body and "their skills in tailoring a 'regimen' to a patient's individual history, lifestyle and bodily constitution" (ibid. 374). Obesity also served to legitimize the need of professional advice from physicians, since only physicians were able to explain that "[o]bese people might look perfectly healthy, and others might even praise them for their good looks. Yet a deadly danger lurked inside their bodies" (ibid.).

What differs between the past accounts of obesity and the contemporary is that the former where only interested in extreme cases of obesity. They did not possess the idea of 'overweight' let alone 'ideal weight', but judged a person to be obese solely

by how she looked (ibid. 375-376). This is also reflected in the meaning of 'obesity' and the other names used to describe 'excess body fat':

> The ancient Greek authors, such as Galen, tended to use the term (polysarkia) [sic], meaning 'much flesh'. In Latin 'obesus', 'pinguetudo' and 'corpulentia' might refer to a person with excess body fat, though in the case of 'pinguetudo' the word mostly referred to food, while 'obesus' could be translated as 'coarse'. By the eighteenth century 'corpulence' had become the dominant term […]. (Sawbridge & Fitzgerald 2009: 60)

The focus on appearance was in part because there were simply no means to precisely measure weight or body fat but also because of the different medical concepts used to define and explain obesity. For most of the time, obesity was seen as a problem because of its negative effects on everyday life, especially concerning movement, but also breathing and fertility. But with new medical theories emerging in early modern times, obesity was explained differently: In the eyes of early modern physicians, obesity was problematic because it put pressure on the body and its vessels, thus preventing them from functioning sufficiently and hindering the flow of blood, humours and spirits, which caused all sorts of disease (Stolberg 2012: 376). Contrary to the contemporary view that fat is 'flabby' or 'loose tissue', the early modern physicians regarded the excessive accumulation of fat as tightening, because they imagined the body as limited in space (ibid.). Therefore, the more fat filled this space, the tighter the body would become.

This view changed gradually in the eighteenth century into the familiar contemporary one, namely that the obese body is flabby and boundless (ibid.). Now, what caused stagnation in the various bodily flows was too little compression instead of too much and fibres and vessels were said to be unable to contract sufficiently due to the fat, which dissolved the borders of the body (ibid.). However, it was not before the early twentieth century that the idea of 'normal' or 'ideal' weight emerged, largely driven by the insurance industry, which noticed soon that obese policyholders had increased death claims (Eknoyan 2008: 47).

Eknoyan (2008) describes how insurance companies searched for statistical means to define normal weights. According to Eknoyan, Louis I. Dublin (1882–1969), a statistician and vice president of the Metropolitan Life Insurance Company,

played a leading role in this search as he developed weight tables in relation to height (Eknoyan 2008: 47). In doing so:

> he noted a rather wide range of weights for persons of the same sex and height, which he attributed to differences in body 'shape' or 'frame'. To resolve the problem, he divided the distribution of weight at a given height into thirds, and labelled them 'small', 'medium' and 'large' frames. The average weights of those thirds were then termed 'ideal' weights, later less presumptuously labelled 'desirable' weight, for each of the three frame types […]. For purposes of insurance, undesired weight was considered at 20–25%, and morbid obesity at 70–100% above the desirable weight for a given frame. (Eknoyan 2008: 47)

Thus, in contrast to the Body Mass Index (BMI), which is commonly used to classify weight today, Dublin allowed more variation in weight per height due to his 'frame types'.

At the same time, the Life Extension Institute, a private organization whose goal it was to lengthen the life expectance of Americans, promoted the importance of annual health examinations to prevent diseases, an idea that appealed greatly to insurance companies, who turned out to be the institute's biggest clients (Veit 2011: 91). The advocates for annual health examinations argued in a similar way as the early modern physicians did to ascribe disease to seemingly healthy individuals, saying that "doctors were able to identify signs of developing disease that might remain hidden from laypeople for years" (ibid.). Parallel to health examinations, the Life Extension Institute published "a fantastically popular health manual called *How to Live: Rules for Healthful Living Based on Modern Science* [in 1915], essentially a how-to book for living a long life" (ibid. 92) of which a third dealt with eating and digestion (ibid.). The book was written by Eugene Lyman Fisk and Irving Fisher, who lamented the fact that American diets had been "matters of accident, of imitation, not of science" (Fisher, cited after Veit 2011: 92) for too long. According to Veit, it became a bestseller because many Americans agreed, although obesity was still associated with good health and beauty among the public (2011: 92). But thanks to the work of physicians and insurance companies this perception had changed by the 1920s (ibid.).

After the Second World War, interest in obesity as the presumed cause for cardiovascular diseases and diabetes rose and stimulated a new search for an index of normal weights (Eknoyan 2008: 47) so that the Quetelet-Index, named after Adolphe Quetelet (1796–1874), who developed the index in 1832 as the weight in kilograms divided by the square of the height of a person, attracted the attention of researchers (ibid. 48). Quetelet's interest in developing the index lied not in linking obesity to disease, but in averages and defining 'normal man' (ibid.). He found that the weight to height relationship would not fit into a Gaussian curve, so that he conducted a study observing the growth of new-borns to adults, which led him to his index (ibid.). In the 1960s, several studies confirmed its validity and it became widely used after 1972, when Ancel Keys (1904-2004) described the index as the BMI mentioned above (ibid.).

However, defining obesity universally and by BMI alone has been criticised[6] and there remains doubt about whether the BMI is also valid to determine disease or risk. As Monaghan notes "[t]he basic idea of 'over' or 'excess' weight – where 'weight' serves as an inexpensive proxy for adiposity – does not correspond with epidemiologic evidence" (Monaghan 2005: 305) and proves this with a study published by Flegal et al. in 2005, which did not find an association between overweight as defined as a BMI of more than 25 and higher mortality. This finding was recently reinforced by Flegal et al.'s (2013) systematic review, which found that only grades 2 and 3 obesity (BMI $\geq$ 35) were associated with higher mortality compared to normal weight (BMI 18,5 < 25), but grade 1 obesity (BMI $\geq$ 30) was not. Furthermore, overweight (BMI $\geq$ 25) was associated with a significantly lower mortality than normal weight (ibid.), which raises questions concerning the validity of these weight categories. Indeed, as Campos et al. remark, "the 'ideal' weight for longevity [is] 'overweight'" Campos et al. 2006: 56) according to the evidence even if compared globally (ibid.). Monaghan adds that the idea of an 'ideal' weight has been rejected by some researchers already and "[h]eight–weight tables have […] been dismissed as 'arbitrary, random, and meaningless'" (Monaghan 2005: 306). But "[n]onetheless, millions of people […] throughout the world, are currently defined as

[6] Humphreys (2010), for example, points out that Quetelet developed his index for Belgians. But since ethnic groups vary in their body composition, there should be different cut-off points for obesity as well. In addition, the BMI mostly ignores changes in body composition due to age, like for example bone density loss.

overweight or excessively overweight in the case of obesity" (ibid.) and consequently deemed unhealthy, while the health risks of thinness receive far less attention.

Furthermore, Campos et al. criticize that studies concerning BMI and mortality rarely consider the negative influence of treating obesity, like weight cycling or diet pills for example (2006: 56). Instead, it is taken for granted that losing weight will provide health benefits for anybody, "even though being thin may not have any more health benefits than being 'overweight' and moderately active" (Rich & Evans 2005: 347). Monaghan, too, challenges the assumption that fat people cannot be healthy by citing a study, which showed that "[m]en who were obese (measured by body fat and waist girth rather than the crude BMI) and fit (measured by treadmill exercise) had cardiovascular and all-cause mortality rates that were similar to those who were lean and fit" (Monaghan 2005: 307). Another study he cites goes even further in saying that "active obese individuals actually have lower morbidity and mortality than normal weight individuals who are sedentary" (Blair & Brodney, cited after Monaghan 2005: 307), a claim, which was refuted by GP Haslam in the aforementioned 'taking sides' article who says:

> Sedentary lifestyle is one of the many factors that lead to obesity. However, obesity and inactivity can be viewed as two separate risk factors for illness, in particular cardiovascular disease. A lean, fit individual has neither risk factor. Obese-active, and lean-sedentary people have one risk factor each. Obese-sedentary have two.
>
> Telling an active individual that it is okay to be obese is exactly the same as telling him its [sic] okay to smoke, or have high blood pressure. (Haslam 2005: 9).

However, the studies cited by Monaghan do not support Haslam's view and he counters that:

> if, after controlling for smoking and other variables, physically fit people have similar mortality risk independent of body composition […], why should clinicians tell a physically active person with a relatively high body fat percentage that this is unacceptable? Is it because body fat has become a highly visible, often enduring, deeply personalized corporeal marker for

> inferior social status in a way that smoking and hypertension are not? (Monaghan 2005: 310)

In this respect, Monaghan refers to "research on 'fat bigotry' in the medical profession" (ibid.) and notes that in the case of obesity the cure is often "worse than the condition" (ibid.).

Interestingly, Haslam, like so many physicians before, also mentions the "ancient Greeks" (2005: 9) to back up his claims, while he elides more recent evidence that challenges his view; a behaviour which is often seen in supporters of obesity as a 'real' problem. On the other hand, as Campos et al. remark, 'non-conforming' findings as well as findings that in certain cases fat may be beneficial for health remain largely ignored (Campos et al. 2006: 57). It shows that rather than body mass or weight, the fat distribution or shape is indicative of health risks (ibid.). Also "[i]t is quite possible, and even likely, that higher than average body fat is merely an expression of underlying metabolic processes that themselves may be the sources of the pathologies in question" (ibid.). However, "[t]he claim that adiposity is itself pathological is also belied by the results of interventions that remove body fat from their subjects" (ibid.). If interventions to lose weight improve health indicators, it is more likely that the reason lies in the intervention itself rather than the weight loss. Many studies show that a healthier diet and exercise influence health positively regardless of how much – if any – weight is lost (ibid.).

If we take this critique seriously, we see that there is little evidence to support the realist position claiming that obesity is a disease per se. Such claims are in large parts based on assumptions, often referring to what other scientists have said again and again since ancient times. It seems like the repetition of these claims alone is enough evidence for many scientists to justify ignorance towards contrary positions. But such behaviour can hardly be called scientific. Scientists are supposed to be objective and need to rethink their theories if they fail to explain reality correctly. Since there are many studies, which contradict the dominant obesity discourse scientists should research the reason for this. However, many scientists see the reasons for results, which do not fit their theories, in bad study design or non-compliant participants, so instead of re-examining their theories they call for better studies (cf. Aphramor 2005). Rail et al. call this "the fabrication of 'evidence' in obesity research" (Rail et al. 2010: 259), which

> constitutes a good example of micro-fascism at play in the contemporary scientific arena. Favoring a particular ideology and excluding alternative forms of knowledge, obesity scientists have established a dominant 'obesity discourse' within which obese and 'at-risk' bodies are constructed as lazy and expensive bodies that should be submitted to disciplinary technologies (for example, surveillance), expert investigation and regulation. (ibid.)

Similarly, Daneski et al. claim that "[t]he practices of Evidence Based Medicine (EBM) have seemingly taken second place to the more generalized discourses of modern healthcare such as lifestyle modification and global health promotion that come under the rubric of 'surveillance medicine'" (Daneski et al. 2010: 731). This indicates bias against study participants and obese people in general.[7] In fact, obesity is a highly stigmatized condition in many cultures today and being fat is mostly perceived as the sign of food overconsumption and a sedentary lifestyle. Therefore, it is no surprise that many articles on obesity and ethics also deal with the moralization of obesity and the resulting stigma and discrimination, which will be the topic of the next section.

2.1.2 The Moralization of Obesity

As we have seen, obesity has been medicalized for hundreds of years and was not unknown to past physicians. Many critics of the dominant obesity discourse point to this fact, in order to show that the 'obesity epidemic' is only the constructed result of a 'moral panic'. Some scholars went even further and have tried to find a starting point for the moralization of obesity, which they thought to be "a specifically modern problem which can only have existed in recognisable form from the nineteenth century onwards" (Sawbridge & Fitzgerald 2009: 59).

However, Sawbridge and Fitzgerald argue that "the human body has never been culturally neutral and there was never a 'time before fat'" (Sawbridge &

[7] Sometimes bias also "arises from financial conflicts of interest" (McPartland 2009: e5092), while Azétsop and Joy "show that anti-fat discrimination, in many industrialized countries, is the result of a general bias of anti-intellectualism that tends to set common sense against insights that require scientific investigation analysis" (2011: 1).

Fitzgerald 2009: 68). Rather they think that the current perception of obesity "originated in the social and scientific climate of the Enlightenment through the combination of three key themes; obesity as conspicuous consumption, associations with suspect morals and excess, and as an outward representation of the soul" (ibid. 59), which evolved much earlier. Tracing the origins of these themes, Sawbridge and Fitzgerald show that there have always been positive as well as negative perceptions of obesity, often existing side by side. In ancient Greek, for example, there were the Epicureans, who "saw the pleasures of belly as the origin of all good" (ibid. 60), as well as "Plato, Aristotle and the Stoics [who] saw the primordial appetites as an evil to be conquered by the power of the rational mind" (ibid. 60-61). This sounds familiar since the idea of controlling ones appetites is still part of the dominant discourse on obesity today. Yet looking at definitions of obesity at the time, Sawbridge and Fitzgerald claim that:

> despite some indications of a negative stigma attached to such a body shape, there does not seem to be an assumption that everyone with a fat body shape was overindulgent, as in medical terms an obese body was defined more by its subjective morbidity and 'harmfulness to function' […]. (Sawbridge & Fitzgerald 2009: 61)

In medieval times, the perception of obesity remained ambivalent as well. Following the teaching of Galen, who saw some forms of obesity as natural, physicians thought it "unhealthy to fight too heavily against a natural disposition" (ibid. 62). Socially, however, 'gluttony' became a topic of art and literature often describing "obesity as a physical manifestation of excessive luxury, drunkenness and the associated sin of lust" (ibid.). But still, the difference between classical/medieval and more modern perceptions of obesity according to Sawbridge and Fitzgerald:

> is that the negative personal characteristics and obesity were not as automatically associated with appearance as they were to be become. To be seen as 'obese' was explained by temperament, therefore a person might grow fat because of gluttony, sloth and selfishness but these traits were not assumed purely on outward form, whereas in recent times a person might be seen as 'obese' and these pejorative labels be implicitly attached to them. (Sawbridge & Fitzgerald 2009: 63)

As described in the previous section, medical explanations for obesity changed with the advent of early modern medicine. But Sawbridge and Fitzgerald note that obesity was also "increasingly identified as a moral, social and religious issue" (ibid. 63) during this time. They identify a Scottish physician and author of *An Essay of Health and Long Life* from 1724 named George Cheyne as a decisive figure in installing a "nascent fear of fat" (ibid. 64). Although Cheyne struggled with obesity himself he expresses "self-disgust" and uses religious elements in his reasoning:

> Cheyne's attitudes display the importance of maintaining the dignity of the rational soul by commanding the body, as well as the concept that gluttony is a form of self-abuse and therefore a sin directly against God. […] these themes are beginning to come together in the moral philosophy of the period, linked to obesity via a Calvinistic view that, through nature, God punished immoderation with diseases, along with an associated tendency to judge others on the basis of their afflictions. (Sawbrigde & Fitzgerald 2009: 65)

This view stands in contrast to the new mechanics-based medical models, for which the body was morally neutral, but Cheyne's views seem to have struck a chord and spread widely through quotations in popular media (ibid.). During the eighteenth century, several:

> [p]ublically circulated papers, such as *The Spectator* and the *Gentleman's Magazine*, delivered frequent narratives about corpulence with a view to social commentary. These stories usually either resulted in the death of the person described or their redemption through dieting and moral rectification. (Sawbrigde & Fitzgerald 2009: 66)

In addition:

> [t]he rise of the novel […] also played a role in disseminating an awareness of body shape, including changing ideas of what was normal and allowing body shape to seem more like something of a personal choice than a result of inborn temperament, while supporting contemporary moral attitudes. (Sawbrigde & Fitzgerald 2009: 67)

Satirists visualized the increasing social stigma concerning obesity, thereby reinforcing existing negative associations with obesity and communicating them to the general public (ibid.). Although there were still population groups who perceived fat women for example as beautiful and rather associated thinness with physical and moral weakness, even in these groups many wanted to cure their obesity (ibid). As Sawbridge and Fitzgerald conclude, "other than […] Neolithic statues[8] […] there is very little evidence to suggest that obesity, as opposed to 'plumpness', was part of this positive perception" (ibid. 67-68).

Thus, negative perceptions of obesity have existed since antiquity, although there are differences concerning their extent. While some forms of obesity have been regarded as natural and sometimes even desirable, others were seen as a sign of immoral behaviour such as overindulgence or lack of control. It can be said that these negative perceptions became stronger under the influence of certain philosophical or religious schools of thought and were extended to more forms of obesity until obesity in general became the dreaded condition it is today. As mentioned above, Sawbridge and Fitzgerald suggest the Enlightenment as the starting point for the current perception of obesity, which can be explained by the threat to rationality – especially that of men – that obesity was perceived to pose as Stolberg describes:

> By stuffing themselves with food, the obese behaved like animals, until their bodies finally resembled those of a 'fully masted pig or ox'. The contemporary ideal of rational man, whose reason lifted him above beasts (and women), was also at stake. Contemporary medical theory lent scientific authority to the notion of the intellectual inferiority of fat people. Admittedly, some very obese men had been known to possess a bright intellect, but in general obese people were said to suffer from inferior intelligence, poor memory and weak senses, and according to physicians, this was the consequence of their bodily condition. The vital and animal spirits on which the senses and the workings of the soul depended were impure, and could not move freely through the body and its vessels, compressed by masses of fat. As a result, the obese were also 'slow, lazy [and] idle', they tired quickly or even developed an irresistibly strong propensity to fall asleep. The obese became the antithesis of the

[8] Sawbridge and Fitzgerald name the 'Venus of Willendorf' as one example "of several anatomically accurate figurines of obese women from Stone Age Europe, dated at over 22,000 years old" (2009: 60), which presumably "represent fertility symbols and therefore a positive perception of obesity" (ibid.).

> industrious, productive citizen, the virile, courageous soldier or the bright, devoted scholar. (Stolberg 2012: 374-375)

However, it is important to note, that the causal link between obesity and laziness or compromised intelligence was still the opposite of what is commonly believed today: The obese were not obese because they were lazy, but they were lazy because of their obesity. Therefore, although obesity sometimes seemed to correlate with certain behaviours or characteristics it was not yet perceived as a visible sign for them.

Again, this has changed gradually, for today obesity is described as a stigma, which shows the personal or moral failings of an individual. Based on this stigma, obese people experience discrimination in various settings, such as job search and workplace, interpersonal relationships, education and health care, as Puhl and Heuer show in a review of studies published between 2000 and 2008. They found that employment discrimination was common among obese people, which included "not being hired for a job, not receiving a promotion[9], […] wrongful termination" (2009: 2) and lower wages[10] (ibid.). Furthermore, the situation was worse for non-professionals (ibid.). While these findings are based on self-reported discrimination, there are also experimental studies, which confirm the experiences of obese people. They showed that women as well as men were susceptible to weight discrimination and that they were more disadvantaged "when they were being evaluated for jobs that required extensive public contact, and when they were rated for their desirability as a coworker" (ibid. 3). According to Puhl and Heuer:

> These experimental findings clearly demonstrate that overweight and obese individuals are disadvantaged in workplace interactions, evaluations, and employment outcomes as a result of negative weight-based stereotypes.

[9] In a short column of *Hospitals & Health Networks* titled "Does Weight Matter?", Alcorn and Langhans (2005) offer their reasons for promoting or not promoting a fictive employee named "John" weighing 300 pounds to the director of communications of a hospital. While both argue in favor of promotion, Langhans says that she "would change the job description so that the director of communications is now responsible for coordinating interviews for media inquiries and preparing the appropriate person to comment" (2005: 24), because "John can't be on camera" (ibid.). This shows that weight does matter at least in certain positions. Interestingly, for Langhans this seems to be a form of professionalism: "As a marketing professional, John should be the first to eliminate himself from the role of spokesperson. After all, for a story on cancer prevention, John wouldn't put a smoking oncologist on camera" (ibid.).

[10] Sometimes it is argued that lower wages are justified to compensate for productivity loss and higher health care costs (cf. Yang & Nichols 2011). Schulte et al. remark, however, that there are also work-related factors, which contribute to the development of obesity, and therefore argue for the compensation of workers instead (2007: 433).

> Research to date suggests that the most common stereotypes about obese employees include views that they are less conscientious, less agreeable, less emotionally stable, and less extraverted that [sic] their normal-weight counterparts […]. (Puhl & Heuer 2009: 3)

However, these stereotypes proved to be invalid through research about the relationship between character traits and BMI (ibid.).

Concerning interpersonal settings, Puhl and Heuer found that women were especially affected in a negative way. They were less likely to be dating and less satisfied if they were in a relationship (ibid. 10). While obese men appear to be less disadvantaged in dating:

> [b]oth men and women ranked the obese person as the least desirable sexual partner compared to the others. However, men ranked the obese partner as significantly less preferable than women did, suggesting that weight stigma may be heightened for women in sexual relationships. These findings parallel other work demonstrating that obese women (but not men) are rated as being less sexually attractive, skilled, warm, and responsive, and less likely to experience sexual desire […]. (Puhl & Heuer 2009: 10)

In general, obese people received weight stigmatization most frequently from family members, most of all from mothers, but also from friends and spouses (ibid.). This included "weight-based teasing, name calling, and inappropriate, pejorative comments" (ibid.) and seemed to affect individuals in the upper BMI range more than those in the lower range. However, if they had been in the 'normal' BMI range as children and adolescents, they did not experience significantly worse relationships with family members (ibid.).

In education, too, obesity seems to be a disadvantage, as several studies show that obese men and women are less likely to attain higher education (ibid. 9). This may be due to poor relationships with peers, which may hinder their success at school, but also due to negative attitudes of teachers, especially in physical education (PE) (ibid.). PE students "explicitly endorsed the belief that obese individuals lack willpower" (ibid.), while PE teachers "perceived overweight students to have poorer social, reasoning, physical, and cooperation skills" (ibid.).

But what Puhl and Heuer found to be the most researched area is weight bias among health care professionals. Physicians, nurses, medical students and dieticians were all likely to hold negative images of obese people. They are regularly described as "awkward, unattractive, ugly, and noncompliant" (ibid. 4) as well as "weak-willed, sloppy, and lazy" (ibid.) by 30 to 60% of study participants in several countries. In the case of GPs those who were not up-to-date with research concerning the complex causes of obesity were more likely to maintain these negative images. Furthermore, experimental studies showed that:

> [a]s the patient became heavier, physicians judged them to be less healthy, worse at taking care of themselves, and less self-disciplined. In addition, as patient BMI increased, physicians reported liking their jobs less, having less patience, and less desire to help the patient. Physicians also reported that seeing obese patients was a greater waste of their time and that heavier patients were more annoying than patients with lower body weights. Furthermore, physicians predicted that heavier patients would be less likely to comply with medical advice and would be less likely to benefit from counseling. (Puhl & Heuer 2009: 4)

This finding indicates that physicians are less motivated to treat obese patients, which is interesting since physicians, on the other hand, commonly perceived obese patients as unmotivated, although their motivation proved to be higher than that perception if studies asked patients directly (ibid.). In addition, some health care professionals felt uncomfortable treating obese patients and found it difficult to feel empathy for them (ibid. 5).

Despite this negative attitude, the majority of physicians agreed that they were not sufficiently equipped for treating obesity and thought that treatment would be futile (ibid. 6). Studies show the contradicting positions of physicians in this respect. Although "60% reported insufficient knowledge regarding nutritional issues" (ibid.) in a French study, another one conducted in the same country found that "60% of the GPs set stricter weight loss standards for their patients than recommended guidelines" (ibid.). Apparently, many physicians believe that there is little they can do to help obese patients if they do not succeed to lose weight. From the physicians' perspective, obesity is primarily caused by behaviour, so that in the case of unsuccessful attempts

to lose weight the physicians' advice seems to be nothing more than to say 'Try harder'.

Thus, it is not surprising, that patients feel misunderstood by their physicians. The majority thinks that physicians "do not understand how difficult it is to be overweight" (ibid.) and many report that they received inappropriate comments from their physicians or were told that weight is responsible for most of their medical problems (ibid.). These negative experiences and the fact that some medical equipment is not fit for very large bodies hinder many patients to seek healthcare. Women, for example, express their reluctance to undergo gynaecological cancer screenings for these reasons (ibid. 7). On the other hand, some obstetricians categorically refuse to accept pregnant women above a certain weight saying that their equipment was not fit for them (McGee 2011: 1). However, this has been refuted and a more probable reason is that obstetricians fear litigation as obese patients carry a higher risk for complications during pregnancy (ibid.). As a matter of fact, obstetricians and gynaecologists face more claims than physicians from other fields so their fear of complications may be justified, but McGee argues that it is still unethical to categorically decline patients because of their weight (ibid. 1-2). Rather obstetricians should refer patients to specialists after examination showed that this is necessary (ibid. 2).

Besides facing discrimination, patients in obstetrics-gynaecology and surgery are also most commonly the targets of derogatory humour (Puhl & Heuer 2009: 5), which physicians rarely perceive as inappropriate. This lack of sensibility becomes clear in an example given by Aphramor:

> […] at the National Obesity Forum conference 2004, in a debate considering rationing treatment for 'obese' people, it was proposed 'The problem is simply the working class who are fat, lazy and stupid' in which case 'rather than giving them (fat people) expensive drugs we should simply sew up their stomachs.' When the ensuing laughter died down the opposer did manage to avoid another whitewash: asking delegates to substitute 'Black people' (as there are high rates of obesity and corelated [sic] morbidity in Black Afro–Caribbean people) for 'fat people' highlighted a considerable collective lack of intellectual rigour, and showed who was really being stitched up. (Aphramor 2005: 328-329)

It shows that the discrimination of obese people remains one of the last socially accepted forms of discrimination, which often gets noticed only if 'obese people' is replaced with other groups for which discrimination has ceased to be sanctioned (cf. Puhl & Heuer 2010).

Since so much weight bias is found within the health care professions, it is only consequent that obese practitioners meet the same kind of negative attitudes from their colleagues. In his analysis of an online discussion about the question 'Are overweight doctors a problem for the profession?' on *Medscape*, a website aiming at health care professionals, Monaghan (2010a, b) found four types of argumentation among participants of that discussion – acquiescent, critical compliant, excusable and justifiable resistant. The discussion was started in reaction to a video titled 'Physician Heal Thyself', a short video, in which obesity researcher Dansinger argues in line with the dominant obesity discourse that obesity is caused by individual choice and behaviour and accuses overweight physicians of being poor role models for their patients (Monaghan 2010a: 7):

> Sadly, those of us who fail to embrace lifestyle recommendations in our personal and professional lives promote a public perception that lifestyle change is ineffective or unrealistic. Despite dramatically increasing obesity rates, we have failed to improve our dismal obesity counseling rates. The physicians who fail to recognize and treat obesity are often the ones who personally fail to heed lifestyle recommendations, and these doctors may sometimes lose credibility with their own patients. (Dansinger, cited after Monaghan 2010a: 7)

As Monaghan notes, neither Dansinger nor the replying physicians mention critical weight studies or reflect on the effects their pathologizing messages may have on obese people (ibid. 8). Instead, they more or less agree with each other.

A physician, who Monaghan identifies as acquiescent, "envisions a future where physicians continue to 'police each other', resulting in a situation where it is unacceptable not to exercise and control one's weight" (ibid.).

Another physician reminds the discussion group of the problematic effects of discrimination, which would keep obese patients from seeking health care. She thinks that:

> clinicians and patients alike are caught in a cultural web of meanings and interpretations that may result in negative, prejudicial reactions that could undermine the clinician's perceived credibility. However, she adds that in the absence of disdain (which circulates around fat people in and outside of medicine), 'heavier healthcare professionals' may actually be less prejudiced and be 'able to build better relationships with obese patients'. (Marchetti, cited after Monaghan 2010a: 9)

Still, she does not challenge the 'weight loss-imperative', i.e. the need to loose weight, which makes her critical compliant.

A third physician admits to be struggling with overweight himself. He reports of the disapproval he received when patients pointed to his own waistline after he lectured them about their eating habits (Monaghan 2010: 10). Although trying to lose weight:

> he maintains that exercise for busy clinicians may mean less sleep yet recent research suggests sleep debt may contribute to obesity. Of course, if Donnell subsequently embarked upon an unsuccessful weight-loss programme, such accounts could enable him to negotiate a less culpable identity and remain excusable. (Donnell, cited after Monaghan 2010a: 10)

The fourth position is taken by a physician who challenges the common view that weight loss would be easy and criticises Dansinger's suggestion to exercise for one hour everyday as unfeasible (ibid.): "Dr. Dansinger did not suggest where we physicians should get that extra hour in the day to exercise. Should we cut some of those preventive services offered to patients, spend less time with our families, or just sleep less?" (Poses, cited after Monaghan 2010a: 10). However, with respect to patients' weight, he takes a critical compliance stance implying that weight loss is "ultimately deemed possible and desirable" (ibid.). Therefore, even if physicians experience how difficult it is to change one's lifestyle or to lose weight, they continue to recommend weight loss and lifestyle change to their patients who are expected to do somehow better.

In addition to the areas mentioned so far, Puhl and Heuer show that weight stigma is also present in the media. They found that obese people were held "partially responsible for rising fuel prices […], global warming […], and causing weight gain

in their friends" (Puhl & Heuer 2009: 11) in news reports. Concerning obesity, causes and especially solutions focus on individual behaviour, reiterating the 'moral panic' discourse (ibid. 12). The same holds true for advertisement, which portrays the illusion that weight loss would be easily achievable (ibid.).

In the entertainment media overweight characters were often the targets of humour. If overweight characters appear on television or in movies at all, they were usually seen in minor, stereotypical roles but hardly ever in romantic relationships (ibid. 11). Although "[m]ales and females were almost equally as likely to be targets of weight stigma […] male characters were three times more likely to engage in fat stigmatization and humour than female characters" (ibid.). Furthermore, "the immense popularity of the movies and shows containing portrayals of weight stigmatization indicates its social acceptability" (ibid.).

An analysis of children's media shows a similar trend. It was found that the prevalence of overweight characters in cartoons declined over the last few decades while underweight characters appeared more often (ibid.). The same applies to other media aimed at children, so that overweight characters are underrepresented and underweight ones, especially female, overrepresented (ibid.). Additionally, the weight of the characters was also linked to their ascribed character traits so that thin characters in general possessed socially desirable characteristics. Overweight characters, on the other hand, "were far more likely to be depicted as unattractive, unintelligent, and unhappy" (ibid.) or even "evil, […] unfriendly, and cruel" (ibid).

Thus, the areas in which fat people are confronted with stigma and discrimination concern virtually every aspect of social life and there are still understudied areas such as "public accommodation, jury selection, housing, and adoption" (ibid. 12). There is, however, increasing research on the consequences of weight stigma. This research suggests that weight stigma contributes to psychological distress, like depression, low self-esteem or body image issues, and unhealthy behaviours, such as binge-eating and other eating disorders or avoiding exercise (ibid. 13-16). Therefore, weight stigma should be a pressing topic for public health but is actually rarely discussed. On the contrary, weight stigma is commonly regarded as a helpful tool to induce lifestyle change, although there is significant consensus that stigma undermines public health when it comes to other issues like for example AIDS (Puhl & Heuer 2010: 1020; Pomeranz 2008).

But unlike AIDS, obesity is not regarded as being caused by an external factor such as a virus.[11] This is crucial for the attribution of responsibility and therefore the development of stigma as experimental studies show. If study participants were presented with information on biological or genetic causes of obesity, which were not in control of obese people, negative attitudes towards obese people lessened (Puhl & Heuer 2009: 17). Therefore, attempts to reduce stigma aim to educate about the complexity of causes for obesity, but such attempts are rare and public health campaigns against obesity using weight stigma still exist, although some authors have recently cautioned against the usage of weight stigma pointing to the ethical no-harm principle (cf. Vartanian & Smyth (2013); Abu-Odeh 2014). Even Courtwright who argues against "the blanket condemnation of stigmatization efforts in public health" (Courtwright 2013: 74) concludes that "[o]besity stigma would be impermissible" (ibid. 80).

To combat weight stigma, McLean et al. propose that public health programme planners "evaluate [their interventions] for stigma" (McLean 2009: 91), "[b]e aware of the potential impact of separating out the overweight/obese for targeted interventions at any intervention level" (ibid.), "[p]rovide training across sectors for professionals such as nurses, doctors, nutritionists, educators and social workers about stereotyping, as well as accurate information about obesity and obese people" (ibid.), "[s]creen public health mass communication messages for stereotyping, blaming and misinformation" (ibid.), "[i]nclude programming efforts to prevent stigma in all interventions" (ibid.), "[b]ring stakeholders to the table" (ibid.) and suggest that "[i]n programs crossing system levels and sectors, each segment of programming needs to be examined for coherence and consistency with non-stigmatizing messages and approaches" (ibid). Furthermore, they note that the possible "[l]ayering of stigma must be considered" (ibid. 92), since obese people often bear several stigmata at once, e.g. being poor and/or belonging to a minority.

Measures like these are urgently needed, because discrimination due to weight stigma has become more common. In the US, for example, the prevalence of weight discrimination has increased by 66% since the year 2000 (Puhl & Heuer 2009: 1). This correlates with the fact that obesity became 'epidemic' and therefore a topic for various public health campaigns since then, which leads to the conclusion that public

[11] Although virus-induced obesity does exist (cf. Monaghan 2006: 138).

health at least to some extent bears responsibility for the growing stigmatization of obese people. Currently, however, public health as well as other interventions usually focuses on combating obesity using several strategies, which also raise ethical concern as the following section will show.

2.2 Interventions Against Obesity

The previous sections have shown that obesity has a long history of medicalization as well as moralization. As a result, it now seems self-evident that interventions – usually diet and exercise or in severe cases weight loss surgery – against obesity are necessary, especially since obesity has been declared an epidemic. Critics of this dominant obesity discourse, however, have stressed the fact that there is considerable bias against obesity among health care professionals so that medical research may not always be as neutral as science requires. Therefore, treatment and prevention of obesity are commonplace today, although doubts remain about whether obesity is a disease per se and even about whether current treatment is effective. As Campos et al. note:

> [i]t is […] remarkable […] that the central premise of the current war on fat—that turning obese and overweight people into so-called 'normal weight' individuals will improve their health—remains an untested hypothesis. One main reason the hypothesis remains untested is because there is no method available to produce the result that would have to be produced—significant long-term weight loss, in statistically significant cohorts—in order to test the claim. (Campos et al. 2006: 57)

Indeed, studies show that even the more successful interventions to treat obesity do not exceed a success rate of 5% (Aphramor 2005: 318) while most participants regain the weight they lost within five years after the intervention. So, even if treating obesity actually was beneficial for patients, it would only benefit very few of them.

But for most the treatment is futile and may rather have negative effects on their health and wellbeing. As Aphramor describes, there are several:

> unwanted health effects associated with promoting dieting behaviour for thinness, such as – on a personal level – weight gain […], compromised immunity […], adverse skeletal integrity […], decreased dietary quality […], chronic dieting[12] […], poor body image […], reinforcing a sense of failure […], detrimental influence on children's eating […], low mood […], increased risk of laxative abuse/binge eating/purging/smoking […], decreased exercise […], increased cardiovascular risk […]. (Aphramor 319-320)

She consequently asks, whether patients are aware of these effects "[a]nd if not, what is going wrong in obtaining informed consent" (ibid. 319)? She suggests, that "[p]erhaps it will take litigation from previously ill-informed patients seeking compensation for [these unwanted effects] before these concerns carry any real weight among the (?hapless) diet prescribers" (ibid. 319-320).

Herself a dietician, Aphramor expresses her amazement with the current practice in a powerful argument saying that:

> [t]here is a recurring pattern in the medical/ dietetic literature around evidence searches for weight loss, a description of morbidity and mortality deemed to arise from obesity, the intake/output equation energetically defended, an impressive list of search engines and strategies, and a conclusion along the lines of 'controlled trails of interventions for weight loss with adequate duration and power to detect differences in mortality are lacking' combined with observations that there is 'substantial evidence documenting the difficulty of sustaining weight loss over time' […] or 'the high attrition rate (69%) suggests that these dietary programmes were of little value to many patients who were referred to the dietetic department' […] and 'We found that the evidence from long-term [randomized controlled trials] on which to base dietary recommendations – aimed at weight loss – for obese adults was limited' […] That the conclusions should then unanimously call for better trials, better behaviour change skills, better-not-rewrite the question is flabbergasting. Untold numbers of people have participated in weight-loss trials and acted on dietary advice given in clinics to no good avail. What is it that happens to smother their stories or render them abserd [sic]? (Aphramor 2005: 318)

[12] Rich and Evans remind us "that achieving ideal weight, for some, may actually mean living in a condition of semi-starvation" (2005: 348).

Aphramor refers to stereotype to explain this situation, but she also questions whether weight loss treatment is even ethical given the fact that it is neither effective nor without harm (ibid. 319).

This question is even more important if we consider obesity surgery or 'bariatric surgery', which is with 14 articles also the intervention most discussed ethically. Bariatric surgery refers to procedures that bypass the stomach ('gastric bypass') or reduce its volume by cutting or banding ('gastric banding' is the only type of bariatric surgery that is reversible)[13] so that patients cannot eat more than very small amounts of food at a time. It is difficult to assess these technologies[14], due to a lack of randomized controlled trials to compare the risks and benefits of different methods of bariatric surgery as well as their effectiveness opposed to less invasive obesity treatments. According to Bjørn Hofmann:

> [b]ariatric surgery has been shown to result in weight reduction the first several years of 33%, and 14–25% after 10 years […]. Furthermore, there is evidence that bariatric surgery results in remission of diabetes type 2 (77%), hypertension (66%), and sleep apnea (88%), and that 15-years mortality is reduced by 27% […]. (Hofmann 2010: 4)

However – contrary to what one might believe – bariatric surgery does not guarantee weight loss: "a majority of weight-loss surgery patients regain weight after two years, and that, for some procedures, nearly 30% of patients achieve no sustained weight loss at all" (Oliver 2006: 624).

Also, it is difficult to assess the cost effectiveness of bariatric surgery. Compared to other methods of obesity treatment, "[b]ariatric surgery is costly (about USD7000) and has caused a significant rise in health care expenditure" (Hofmann 2010: 4), but because of the high health care costs ascribed to obesity it is argued that surgical intervention is still cost-effective (ibid.).[15] For some, the high costs of obesity

[13] There is also a method using a balloon, which is inserted into the stomach and then filled ('intragastric balloon'). It is removed after a maximum of six months. This method can be used to help patients reduce their weight prior to another bariatric surgery.

[14] Although bariatric surgery is often referred to as a novel technology, a procedure called 'jejunoileal bypass' was used already from the 1950s through the 1970s to treat 'morbid' obesity, but was abandoned due to serious complications. The jejunoileal bypass circumvents most of the small intestine leaving only 30 to 45 cm out of its total 7 m, which led to more severe malabsorption compared to newer methods that only bypass the stomach and additional risks such as liver or renal disease.

[15] Of course, as Hofmann remarks, the time span chosen for evaluation will influence the result of cost-effectiveness calculations (2010: 7).

also seem to be reason enough to endorse bariatric surgery, even if they agree that more research is needed. For example, Anna R. Brandon et al. claim that "we simply cannot afford, in terms of costs to society and obese individuals, to wait for results of randomized controlled trials […] to justify bariatric surgery" (Brandon et al. 2010: 19).

Those who demand more caution, point to the fact, that the long-term effects of bariatric surgery are not well known, whereas there are certainly risks involved. Most importantly, there is the high mortality rate, as pointed out by Oliver:

> Based on current estimates, this year, more than 1,000 Americans will die from complications directly resulting from weight-loss surgery, and possibly thousands more will die from post-surgical complications such as malnutrition and leaks in the digestive tract […]. That is roughly a tenth of the number of deaths estimated from people who "weigh too much." (Oliver 2006: 623)

And de Ville notes that the mortality rate of bariatric surgery has been underestimated at first, which led to a surge in the number of bariatric surgery procedures (de Ville 2010: 23). This rapid rise in spite of the many uncertainties about bariatric surgery has been criticized (cf. Shikora 2012), although it is also acknowledged that surgical innovations in general do not undergo the same process of testing as drugs for example (cf. de Ville 2010, Dixon et al. 2013).

But those who survive the initial surgery face serious risks as well: "nearly 30% of patients who have weight-loss surgery develop nutritional deficiencies such as anemia, osteoporosis, and metabolic bone disease" (Oliver 2006: 624), "[a]t least 20% of patients need further surgery and almost all patients encounter chronic side effects ranging from body odor and bad breath to chronic vomiting, diarrhea, infections, and such digestive ailments as "dumping syndrome"" (ibid.), which occurs when the contents of the stomach are emptied too rapidly into the small intestine and leads to nausea and cramping among other symptoms. Hofmann names similar risks, but remarks that "more recent findings indicate that the risks are moderate" (Hofmann 2010: 3). He also cites a study showing that only 2.2% of patients would need to be operated again (ibid. 4), which is roughly a tenth of the number Oliver mentioned. It is therefore likely that bariatric surgery became much safer in recent years.

Still, for the critics bariatric surgery seems like a paradoxical procedure as expressed by Oliver:

> Whereas all other general surgical procedures go after things such as an inflamed appendix or a sick gallbladder, bariatric surgeons target a *healthy* stomach and small intestine. Paradoxically, weight-loss doctors evaluate the various bariatric surgical procedures based on their capacity for creating "mal-absorption," the ability to make the stomach and small intestine dysfunctional. The Orwellian logic behind this process is telling: in order to "cure" the imaginary "disease" of obesity, doctors will surgically alter a healthy organ and make it permanently sick to the point where it actually meets the technical definition of a disease. They are ostensibly treating an imaginary disease by creating a real one. (Oliver 2006: 624-225)

While Brandon et al. admit that "consensus over whether or not obesity is a disease [is lacking]" (Brandon et al. 2010: 19), they refer to the real diseases linked to obesity in order to oppose this kind of critique:

> […] obesity's comorbid illnesses are established diseases. For example, type 2 diabetes (perhaps the most serious disease with a well-established link to obesity) is difficult and expensive to treat. As diabetes progresses, even with standard medical treatment, the disease sequelae include cardiac death, blindness, limb amputation, and end-stage kidney disease requiring dialysis or kidney transplant. The health care costs to society of diabetes alone (without consideration of additional obesity comorbidities) are enormous and growing at a rapid rate, and the loss of health to individuals can be devastating. Bariatric surgery offers not only improvement but also the chance for remission of diabetes. (Brandon et al. 2010: 19)

As this quotation shows, bariatric surgery is not only used to address obesity but also the risk of diseases associated with it. Therefore, it has been suggested as a treatment option for type 2 diabetes already at BMIs not considered 'morbid' obesity for which bariatric surgery is usually performed. The ethical concerns involved in this are similar to the ones raised concerning bariatric surgery for 'morbid' obesity (cf. Hofmann et al. 2013).

However, even as a treatment for 'morbid' obesity bariatric surgery is not immediately lifesaving, so that some critics stress the importance of informed consent given the many risks involved in bariatric surgery and its uncertain outcomes (cf. Saarni et al. 2011). While informed consent is necessary prior to any surgical intervention, in the case of bariatric surgery it is especially important to make sure the patient also understands the long-term effects of the procedure. Besides the risks mentioned above, bariatric surgery requires that the patient changes his or her lifestyle significantly and permanently because, except for gastric banding, the surgery is irreversible (ibid. 1473). This also has social consequences, such as not being able to participate in events, which involve eating, as the surgery limits patients' eating capacity (Hofmann 2010: 5). It may be criticized that this hampers autonomous choices, but Hofmann cites a study which has shown that "[p]aradoxically, some persons feel that they gain control because surgery limits their choice and imposes control over their eating habits" (ibid.). How patients perceive the effects of bariatric surgery on their autonomy may therefore differ from that criticism. April Michelle Herndon (2008) cites US American singer Carnie Wilson to illustrate this impressively. Wilson describes dumping syndrome as follows:

> [L]et me just tell you that dumping is the most horrible feeling in the world. Your heart beats really fast, you're sweating, your nose gets totally stuffy, and you feel really dizzy. It's like a panic attack combined with a terrible stomachache and a horrible cold. Basically there isn't a part of your body that doesn't feel like total shit. (Wilson, cited after Herndon 2008: 213)

During such episodes, Wilson says that she has to leave her guests and sometimes even has to be cared for by them until the symptoms pass (Herndon 2008: 213). But despite the unpleasant experience dumping syndrome is for Wilson, she seems to embrace it:

> Dumping isn't fun—however, it's my lifesaver now because I feel a certain reaction after I eat specific foods. If those foods are high in sugar or fat and I eat too much of them (which might only be two or three bites), I'll have a nasty reaction. […] This could go on from 15–45 minutes, as the degree of dumping varies. Sometimes I don't even know what caused it. You've got to be ready for the possibility of this happening. […] That's why I'm happy that I

> dump. Why would I want to be able to eat a lot of the foods that made me fat in the first place? I love being able to write that! (Wilson, cited after Herndon 2008: 213)

Wilson describes dumping syndrome as a "punishment for eating forbidden foods" (Herndon 2008: 214) and at the same time a 'lifesaver', which resonates with Brandon et al.'s argument that bariatric surgery offers treatment for a life-threatening condition.

Because of this perceived threat, even such severe side effects as dumping syndrome are acceptable for proponents of bariatric surgery as well as patients and may even be endorsed as 'treatment effects'.[16] This shows how patients decisions to undergo treatment "may be influenced by the marketing and attitudes of health professionals" (Saarni 2011: 1473; Hofmann 2010: 7) or "[p]rejudice in health professionals and society at large" (Brandon et al. 2010: 19). It may also be influenced by psychological disorders, which often accompany obesity and may compromise patients' decision-making (ibid.; Hofmann 2010: 5; Brandon et al. 2010: 19). Indeed, an important question concerns the purpose and goals of bariatric surgery. For the operating surgeon the goal may be to reduce risks to the health of the patient, while for the patient it may be to conform to societal norms and achieve a "'new' normal-sized life" (Knutsen et al. 2011: 355). Thus, expectations about the outcomes of bariatric surgery may vary considerably, which makes it difficult to evaluate its effectiveness as well.

It is also negatively remarked upon that patients are often required to change their behaviour already before bariatric surgery is performed. Critics claim that this is in order to prove that they are eligible for the procedure (cf. Knutsen et al. 2011) and therefore "reduces the patients' choice and, hence, their voluntariness with regard to bariatric surgery" (Hofmann 2010: 5), but proponents of bariatric surgery hold against this accusation that preoperative dietary counselling (PDC):

[16] Here, Herndon gives the example of a weight loss drug called 'alli', which causes "anal leakage or diarrhea when patients eat too much fat" (2008: 214). But instead of a warning, GlaxoSmithKline gave a statement on its marketing website for alli in 2007 about how this may help the patient: "While no one likes experiencing treatment effects, they might help you think twice about eating questionable fat content. If you think of it like that, alli can act like a security guard for your late-night cravings" (GlaxoSmithKline, cited after Herndon 2008: 214). This statement seems to have been removed from the website since then but remains for the record in blog posts, articles and books.

> is a mechanism for ensuring informed consent and autonomous decision making. Rather than hampering access to treatment and reducing patient's choice, PDC addresses many of the concerns of full disclosure regarding alternatives to surgery for weight loss and post-surgical outcomes. (Brandon et al. 2010 19)

However, for Knutsen et al. the power relations emerging in PDC also serve to create "'morally' acceptable individuals" (2011: 348) and they use Michel Foucault's theories of 'biopower' and 'governmentality' to describe how this happens. Governmentality refers to the institutions and techniques invented to manage and optimize populations through complex power relations, which Foucault named biopower (Knutsen et al. 2011: 350). This "[b]iopower is manifested as productive power where the free individual's actions are influenced by encouraging his / her actions to comply with existing discourses, or in Foucault's terminology, technologies of the self" (ibid.).[17]

Knutsen et al. conducted interviews with twelve candidates for bariatric surgery undergoing PDC to find out about their technologies and found that they constructed themselves:

> as included group members, as acceptable individuals and as aiming at new positions [to position themselves as ethical selves]. However, these constructions displayed contradictions and inconsistencies, thus making no clear conclusions of either the route or the ending position of the participants. (Knutsen et al. 2011: 352)

One such contradiction is their attitude towards weight loss during PDC. Although their ultimate goal and motivation to undergo bariatric surgery was weight loss, they were concerned about losing too much weight during PDC and thus crossing the lower BMI limit to be eligible for the procedure (ibid. 355). It seems like they were torn between the need to show their ability to change their behaviour and stressing their need for the surgery. Knutsen et al. interpret this "as an indication that the respondents are concerned about saying and doing the 'right things' as a strategy to ensure they will receive surgery" (ibid. 356) and they conclude:

[17] Wray (2007) draws on Foucault in a similar way in her qualitative study on the effects of exercise on the well-being of midlife women.

> The respondents' desire for surgical treatment seems to make them do what they must, like a strategic act. As the respondents position themselves to achieve what they want, they act as powerful agents. This is an example of how power is productive and not just repressive, in line with Foucault's notion of power not as an evil, but as strategic acts that encompass all directions. (Knutsen et al. 2011: 356)[18]

After all, given the many risks and uncertainties of both lifestyle and surgical interventions to treat obesity, Aphramor seems right in questioning how ethical recommending weight loss is, but it is important to note that not recommending weight loss to fat people does not mean not to care about their health (Aphramor 2005: 321). On the contrary, Aphramor cites the Scottish Intercollegiate Guidelines on obesity (SIGN) from 1996, which state that "exercise protects against non-insulin dependent diabetes and cardiovascular disease irrespective of BMI" (SIGN, cited after Aphramor 2005: 321). The American Diabetes Association (ADA) puts it similarly saying "[t]here is strong evidence that physical activity increases cardiorespiratory fitness with or without weight loss; activity may positively influence the distribution of body fat independent of its effect on body weight; exercise alone can reduce visceral abdominal fat, reducing risk for disease" (ADA, cited after Aphramor 2005: 321). Therefore, recommending exercise without focussing on weight loss would be enough to promote health.

But there are inconsistencies even within the guidelines themselves. For example, despite the claim cited above that weight loss is not necessary to protect against diseases, the SIGN guidelines still promote weight loss as beneficial (Aphramor 2005: 321). According to Aphramor:

> there can be few UK health practitioners who are not familiar with the SIGN claim that intentional weight loss of 10 kg results in many benefits, such as a >20% fall in total mortality. There are probably fewer practitioners who know that this refers only to one study […] and holds for 'overweight' white women with existing conditions (diabetes, shortness of breath, cardiovascular disease, hypertension) and that the original authors clearly state that 'among women with no pre-existing illness, the association is equivocal' and 'similar data are

[18] Note also that some individuals will develop strategies of resistance to power (cf. Warin 2011).

> not available for men, except overweight men with non-insulin dependent diabetes.' (Aphramor 2005: 321-322)

Thus, it is only a very specific group of patients who would benefit from weight loss, but this finding is generalized to any fat person without reason. After citing other studies the SIGN guidelines draws upon while leaving out crucial details, Aphramor consequently asks "[h]ow is it that national guidelines are drawn up relying on such insubstantial data? What are the ethical and theoretical frameworks employed?" (ibid. 323) and criticises that "[c]linical guidelines for obesity do not stand up to scrutiny beneath their own gaze" (ibid.).

Besides the questionable scientific standards behind obesity treatment, Monaghan points out, that the weight loss imperative does not only harm obese people, but also those who might not need to lose weight and are still inclined to diet. As he reminds us of the health problems associated with underweight, he also refers to the interdependency of eating disorders and obesity (Monaghan 2005: 308). The fear of obesity as a medical as well as a moral or cultural problem drives some people into a problematic relationship with food. Therefore, the discourse on the 'obesity epidemic' and the "Western culture of slenderness" (ibid.) cannot be separated and "obesity researchers should consider how their recommendations contribute to anorexia and bulimia", according to Monaghan (ibid.). In this respect, Rich and Evans point to the increase in anorexia and bulimia, yet remark that "'fat' continues to be a stigmatized condition within Western culture, and this has seen a resurgence in the popular media in recent years" (2005: 354). Thinness, on the other hand, "becomes more about social fitness than it does about health" (ibid. 355), so that Rich and Evans finally claim: "What might be of concern here is not just the science but the type of society we want, and the body types that we value" (ibid.). From this perspective, obesity intervention can be seen as a transformation from 'contested health identities' to 'accepted health identities', which Craig L. Fry describes as follows:

> In many areas of population health, our policy and intervention decisions (and indeed the community attitudes and responses to these decisions) are also informed by a range of value positions about the 'types' of healthy citizens we wish to see in our societies. […]

> [W]e can think of these health types or identities in two ways. Firstly, there are permissible or *accepted health identities* such as being rational and responsible, disciplined and in control, and aspiring to be healthy or healthier e.g. health seeking behaviour in pursuit of being fitter, thinner, smarter, stronger or faster. In the health sphere it is also acceptable to be vulnerable and in need of professional help. Secondly, there are the disapproved or *contested health identities* or states including being unhealthy, over-consumptive (of alcohol, drugs, food), non-adherent or out of control in the treatment context and engaging in health risks. (Fry 2010: 116)

As we have seen before, obesity is a stigmatized condition, which makes it a 'contested health identity'. This may be the reason why obesity intervention is so widely accepted despite its ineffectiveness and the many adverse effects involved. Therefore, although treatment and prevention of obesity are endorsed in order to promote health, they may have more to do with creating better (i.e. morally accepted) than healthier citizens. This is also criticized by opponents of the dominant obesity discourse, but for its supporters interventions against obesity are necessary and lead to questions about responsibility and justice, which will be the topic of the next section.

2.3 Responsibility and Justice

According to the dominant discourse, obesity is caused by individual behaviour, i.e. too much eating and too little exercise, and since individuals are usually believed to be free to determine their behaviour they are held responsible for the choices they make. These are in sum described as 'lifestyle' so that we also use the term 'lifestyle-related' for diseases believed to originate in individual choices, a concept, which according to Devisch and Deveugele (2010) was formed in the 1970s[19] and still influences the medical discourse on responsibility. Based on this

[19] While concentrating on the current discussion of lifestyle and obesity, Devisch and Deveugele use Foucault's method of genealogy to trace the history of the idea of 'lifestyle'. According to them, it has its origin in Max Weber's *Wirtschaft und Gesellschaft* [*Economy and Society*], in which "Weber developed three concepts [to theorize the question of lifestyle]: stylization of life [*Stilisierung des Lebens*] or lifestyle [*Lebensstil*]—both concepts actually mean the same (Weber varies only in the formulation of it), life conduct [*Lebensführung*], and life chances [*Lebenschancen*]" (Devisch & Deveugele 2010: 553). But there were also other meanings, such as "the personality style or attitude

concept, obesity as well as the diseases it might cause is seen as the result of individual choices so that the burden of responsibility for treatment and prevention is put on individuals.[20] As long as obesity was regarded as an individual problem, this responsibility only affected individual outcomes regarding health and so the individual was free to try to reduce its weight and change its behaviour or bear the consequences of obesity. However, since obesity has been claimed an 'epidemic', obese people are accused of being a financial burden to the health care system, the economy and therefore the whole of society (cf. Yang & Nichols 2011). Therefore, the burden of responsibility the individual bears has increased, because now it is not only responsible for its own health but also for that of society. At the same time, declaring obesity 'epidemic' has made it a public health problem, which is used to justify – sometimes drastic and controversial – interventions.

For Giordano (2008), for example, even forced dieting seems to be appropriate as she discusses the possibility of forcing obese people to diet. She compares this with the current practice of forcing anorexics to eat:

> There seems to be no difference between the anorexic, who is often intelligent, bright, successful, and who endangers herself through scarce food intake because she feels she cannot do otherwise, and the obese, who might be equally intelligent bright and successful, and endangers herself through excessive food intake because she feels she cannot do otherwise. If the latter is competent, why should we assume the former is not? If the reverse is true and it is right to force-feed an anorexic, why shouldn't it be right to force-diet the obese? And perhaps more importantly and most alarming, why are so many people content not to challenge a "diagnosis" of incompetence when applied to anorexics but so reluctant to challenge the assumption of competence when applied to the obese? (Giordano 2008: 319)

The reasons for Giordano's last question may be given by those who think that dieting makes obese people worse off. They stress the fact that losing weight and especially

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individuals have chosen and resort to for the rest of their lives, be it primarily unconsciously" (ibid.) as the Austrian psychologist Alfred Adler described in the 1930s or "a retreat into fantasy whenever the real world is too confrontational" (ibid.) as formulated by the British physician Walter Langdon-Brown in 1938. Used in these senses, lifestyle was a reaction to the individual's living conditions including disease rather than the cause of disease it is regarded as today (ibid. 554).

[20] It is often remarked that this attitude is typical for neoliberalism (cf. Mackenzie 2010; Frandsen & Triantafillou 2011).

keeping a reduced weight is impossible for many obese even if they changed their behaviour, while constant dieting may also be harmful so that remaining obese may actually be the best choice for them (cf. Banja 2004; Jeppson 2015).

Others think that causing costs to society alone is not sufficient to legitimate the dictation of behaviour by one group to another (cf. Brown & Allison 2013). In the words of de Beaufort, "we do not want a health inquisition prying into our private habits and private lives, creating an atmosphere of distrust, suspicion, and control that would be unacceptable (and expensive)" (2014: 239). She argues that although we have a responsibility for living a healthy lifestyle "there are also morally good reasons for taking risks with our health as we cherish other goals and values" (ibid. 235). It is also important to note that eating is a kind of pleasure and eating habits are part of our identity (ibid. 236; Jonas 2010: 345). Eating is not only a way to combat hunger, but:

> has to do with culture, hospitality, friendship, care, intimacy, solidarity. We eat for social reasons, ask any serial dieter what the most difficult moments are and they will tell you that celebrations and parties are difficult; because carrots and mineral water are not a gourmet's delight and because it feels rude as someone has gone through the troublesome effort of preparing festive food. We also eat for emotional reasons, to console or to comfort ourselves. (De Beaufort 2014: 239)

In addition, de Beaufort points out that living a healthy lifestyle does not guarantee "disease-free longevity" (ibid. 239) and therefore, we should balance our choices between living a healthy lifestyle and risking our health in order to reach other goals.

Another important argument against individual responsibility for obesity intervention is that it presupposes capability (cf. Jeppson 2015; Ried 2008; Ried et al. 2010). Ried points to the moral philosophy of Kant, according to whom accountability for behaviour is the necessary condition for responsibility and accountability is determined by the level of freedom the individual enjoys and eventual obstacles, which stand against its behaviour (2008: 93). Such obstacles can be biomedical conditions, such as hypothyroidism, or genetics (e.g. Prader-Willi-Syndrome), [21] which the individual cannot control and therefore limit its

[21] More recently it has also been argued that even the foetal environment influences weight and the risk for obesity in later life (cf. Scott Yoshizawa 2012).

responsibility.[22] But since obesity is usually caused by multiple factors and even unchangeable factors like certain genes are in fact expressed by behaviour, the burden of responsibility is only gradually decreased for individuals (Ried 2008: 93). Ried et al. (2010) also argue that even if individuals cannot be held responsible for becoming obese or diseased they can still be held responsible for changing their unhealthy behaviour.

However, they have to be enabled to change and in this context, it is often remarked that individuals are neither free from any constraints, which may obstruct healthy choices, nor free-floating entities without any social, cultural, religious or economical environment that influences their behaviour (cf. Devisch & Deveugele 2010: 551-552; Gostin 2005; Ried 2010: e102). This becomes clear if we look at the high prevalence of obesity in certain population groups, for example those with low socio-economic status (cf. Jiménez-Cruz et al. 2013). To stress this is not without problems either, because it conflates weight stigma with stigmatizations of the poor and other minorities, but it shows that obesity is linked to other factors besides individual behaviour. Therefore, the discourse of the so-called 'obesogenic environment' tries to shift the responsibility of addressing obesity from the individual to other parts of society such as schools, companies, city planners, physicians, families (Eichhorn & Nagel 2010: 15) and last but not least to politicians, although they should do so without 'blaming and shaming' as stressed by Jeppson (2015: 89).[23]

The 'obesogenic environment' approach links obesity to processes brought by modernization and globalization. As Danny Meetoo describes, "[w]hile globalization has improved health and lowered mortality by improving economic prosperity and income in many countries, it has also encouraged the transition from 'traditional' diets to 'obesogenic' food through a number of mechanisms" (2010: 564). Firstly, Meetoo names urbanization as contributing to rising obesity rates. In contrast to rural lifestyles, urbanization means that people engage less in manual labour and fulfill sedentary jobs instead (ibid.). Further, many physical activities become unnecessary

[22] As Monaghan (2006) notes, obese people sometimes embrace such factors to justify their weight and are then likely to be accused of making excuses.

[23] Criticism of the 'obesogenic environment' discourse seems to be sparse, but according to Kirkland (2011) the same criticism this discourse tries to avert can be applied to itself. These criticisms are "first, that some of the baseline empirical assumptions of the environmental account are wrong or at least not sufficiently well established; second, that the popularity of this account depends on unacknowledged moralism; and, third, that policies based on the environmental account will end up being punitive, ineffective, and patronizing and will come with burdensome unintended consequences that will hurt the groups feminists claim to most want to help" (Kirkland 2011: 464-465).

because they are replaced by transportation systems and automation (ibid.). However, according to Levitsky and Pacanowski the differences in physical activity between rural and urban areas have found to be not that different (2011: 126-127). Secondly, Meetoo names food consumption changes due to global marketing and price incentives, which influence purchasing patterns (Meetoo 2010: 564) and thirdly, he mentions the 'toxic' environment globalization has created:

> The term 'toxic' refers to the unprecedented exposure to energy-dense, heavily advertised, inexpensive and highly accessible food, and this, when combined with a sedentary lifestyle, results in obesity […]. Examples of the toxic environment include fast-food restaurants […], large portion sizes […], fast-food franchises, buffet restaurants, minimarkets in petrol filling stations […] and the use of microwave ovens to cook relatively cheap prepared meals with high fat and caloric content […]. (Meetoo 2010: 565)

Brownell et al. (2010) argue in a similar fashion. They claim that "[s]ome conditions common to the modern food environment undermine or damage the body's delicate balance of hunger, satiety, and body weight. Rising portion sizes and increasing amounts of sugar in food are examples of such conditions" (Brownell et al. 2010: 380). Additionally, they explicitly mention sugar-sweetened beverages and addictive food (ibid.) to be responsible for obesity. According to them, "[a] great many studies have identified factors in the modern food environment that compromise or even hijack biological and psychological regulatory systems that govern eating and weight. These forces make it difficult to be "responsible" (Brownell et al. 2010: 381).[24]

Meetoo and Brownell et al. agree that in general the individual is responsible for its choices, but they admit that the 'obesogenic environment' poses an obstacle that calls for intervention. For Meetoo such interventions would "save lives" (2010: 565) and in Brownell et al.'s view, obesity resembles a public health problem like air or water pollution or "the control of infectious diseases […], the classic example"

[24] Levitsky and Pacanowski agree with this view, calling it a 'myth' that we are free to chose what we eat (2011: 126). They acknowledge that all attempts to reduce weight by will-power – i.e. diet – are futile and propose bariatric surgery instead, which would free the patient from deciding how much to eat (ibid. 128-131).

(ibid. 382), which cannot be dealt with by individuals alone,[25] a view that is also supported by Kaminsky (2009) and Resnik (2007). Unfortunately, "[p]ublic health approaches, particularly those involving government action, are sometimes caricatured as forcing people to behave in certain ways" (Brownell et al. 2010: 382), but "[a]n overemphasis on personal responsibility and mislabeling actions that enhance personal choice as "government intrusion" prevents or stalls needed policy changes that can help people be responsible" (ibid. 383-384). Brownell et al. argue that individual and collective responsibility should be combined, which "begins with viewing these approaches as complementary, if not synergistic, and recognizing that conditions can be changed to create more optimal defaults[26] that support informed and responsible decisions and hence enhance personal freedoms" (ibid. 2010: 384).

Several interventions have been proposed to enable such defaults. According to Eichhorn and Nagel (2010), there are three kinds of governmental intervention for preventing obesity, which are direct regulation, economical incentives or subsidies and information. The first kind is the most invasive and includes the regulation of food marketing and certain food ingredients as well as certain food environments such as school cafeterias (cf. Brownell et al. 2010; Eichhorn & Nagel 2010; Ried 2008). Economical incentives can be created by food taxes, which are discussed controversially and are sometimes even called 'sin taxes' (cf. Green 2010). Such incentives aim to reduce the consumption of sugar-sweetened beverages for example (Brownell et al. 2010: 385-386). Although they are less invasive than direct regulations, economical incentives are often criticized as limiting choice. Proponents argue however that they "do not remove choice; they simple add consequence to a choice" (Green 2010: 75). Information is the least invasive intervention, which include food education or the disclosure of nutritional information on food packaging and in restaurants to protect the right of consumers to rightful information and enable them to make better choices (cf. Brownell et al. 2010; Eichhorn & Nagel 2010).

Although Meetoo endorses interventions to change 'obesogenic environments' he also discusses some arguments against intervention. The first argument is that of libertarianism, which, in Meetoo's words, "refers to the individual's political and civil

[25] This is exactly what Dietz intended when he first framed obesity as an 'epidemic'.

[26] Holm calls policies to create such defaults 'libertarian paternalist' and claims that they "are unobjectionable as long as they are based on solid evidence that the healthy choice is really the healthiest option" (2007: 210).

rights and the rights to self-respect, dignity and freedom of thought, and to actions and safeguards against the invasion of privacy without his/her knowledge for the sake of knowledge" (ibid.). In this respect, Meetoo reminds us that it is important to distinguish negative and positive liberty:

> Negative liberty is the freedom from external constraints that would prevent one from acting in accord with one's desires, while positive liberty is the freedom to act in a fully authentic way. For this, one must be free from all forces that affect one's desires, apart from reason itself. One's true self is one's fully rational self. While freedom is very important to individuals, there are instances when it may be necessary to legislate against negative liberty in order to maintain positive liberty.[27] Mere negative liberty from external constraints may not be of any value, for example, to people in the developing world who lack the education, resources or infrastructure to make free choices […]. (Meetoo 2010: 566)

Secondly, Meetoo imagines the consequences of intervention and argues that despite rising obesity rates, globalization and urbanization have brought many positive changes that may outweigh the benefits of intervention like for example giving up a free market (ibid.). Such a restriction of choice would be indoctrination instead of education, which could enable populations make healthier choices (ibid.).[28] His third argument is that globalization does not intend to harm people so that there may be no need to feel responsible to change anything (ibid.). But Meetoo holds against this that "to allow people to suffer from diseases that could have been prevented in the first instance is ethically equivalent to, if not a form of, harming them" (ibid.). Finally, he argues that in certain countries large bodies are admired, so that it would mean to impose the value of thinness on them, but also expresses some doubt concerning the

[27] According to Herington et al. (2014), such instances can be found in public health emergencies, which pose a grave and imminent risk to population health. They argue that this risk includes "nontrivial costs on all members of society, regardless of whether their health is affected" (Herington 2014: 30) because "[f]irst, the cumulative impact of otherwise self-regarding reckless behavior may begin to impose significant costs on others, particularly where a health care system involves the pooling of health costs. [And s]econd, risks to the health of individuals (whether voluntarily assumed or otherwise) may begin to degrade important public goods once enough individuals are afflicted" (ibid. 30-31). They claim that these arguments can be made for obesity and therefore accept state intervention to control it (ibid. 34).

[28] Ried argues in a similar way, saying that the goal of public health "is not the skillful imitation, but the insight in and the internalization of constitutional behaviour, which in this way should be sustained on a continuing basis" (2008: 94, translation by the author).

validity of this argument in light of the negative effects of obesity (ibid). In short, Meetoo supports interventions to equip populations with the necessary knowledge and resources to make free choices without restrictions.

Restrictions like regulation and taxes also conflict the interests of the food and drink industry (FDI). FDIs make most of their profits from processed foods. In fact, the more processed the more profit the FDI can make, but for the consumer the healthiest foods are the least processed, which "protect against obesity and related diseases by virtue of their rich nutrient content and satiating properties" (Ludwig & Nestle 2008: 1809). In order "to increase revenues [food industry strategies] typically depend on "eat more" campaigns designed to promote larger portions, frequent snacking, and the normalization of sweets, soft drinks, snacks, and fast food as daily fare" (ibid.). Therefore, "[a]dvice to eat less often, eat foods in smaller portions, and avoid high-calorie foods of low-nutritional quality undermines the fundamental business model of many companies" (ibid.) and it is no surprise that the FDI has been accused of being responsible for obesity.

To counter these accusations, the FDI has developed its own strategies. These so-called Corporate Social Responsibility (CSR) strategies use 'health' as a mean to "to secure brand value and consumer goodwill" (Herrick 2009: 51), but on the other hand "promote a narrow epidemiological understanding of obesity, shifting blame from 'foods' to 'diet' and from 'diet' to 'sedentarism'" (ibid.). Herrick argues that "CSR reporting and its associated practices have enabled the food industry to assume some responsibility for obesity prevention, thereby problematizing the state's role in addressing its own 'public health' crisis" (ibid.).

To appeal to consumers, the FDI assures them of their choice provided by a wide range of products and dedicate to consumer education, which mirrors the rhetoric of public health policy:

> [T]his rhetoric of health constructs choice and information as a form of consumer empowerment. In practice, healthy choices come in two forms: brand extensions making existing products healthier through lowering fat, sugar, salt or carbohydrate content, or through novel product platforms with new nutritional properties, health claims and often functional ingredients. (Herrick 2009: 55).

Herrick remarks that the meaning of 'healthy choices' must be questioned here, because "'healthy choices' are now so defined as much by the companies themselves as government agencies" (ibid.) and can result in so-called 'health halos'. These "may lead consumers to more substantially underestimate the caloric content of main dishes; and when main dishes are positioned as "healthy," consumers tend to choose more energy-dense beverages, side dishes, and desserts" (Marks 2014: 274).

Furthermore, the FDI tries to promote brand value by claiming that their 'mission' is to support consumers' health and wellbeing. In doing so, the FDI perpetuates the idea of personal responsibility through individual behaviour change:

> The drive to maintain and enhance brand value through specific linguistic tropes not only underpins the association of health and CSR across the FDI, but it also demonstrates the faith placed in the possibility of individual behaviour change. The belief in behaviour change is further reinforced through media-driven attempts to reassure consumers that their health and nutritional needs are central to the FDI's product development, that information provision through labelling and the extensive choices offered within brand portfolios can satisfy a wide variety of consumption occasions and lifestyles. (Herrick 2009: 56)

This also reinforces the idea that consumers should make 'healthy choices' and have physically active lifestyles as well as the assumption that 'unhealthy choices' show as 'too much weight' (ibid. 56-57).[29] Since there is still much controversy about what kind of foods are responsible for obesity, the FDI can shift the focus from food to inactivity, which "means that the rhetoric of choice can be employed to flip the argument, so that consumption, if no longer the problem, can be a part of the solution – a discourse again mirroring recent policy documents" (ibid. 58).

Therefore, CSR strategies are a powerful tool for the FDI to avert accusations of being responsible for the rising obesity rates:

> [T]o assume the responsibility needed to cultivate essential brand value without, importantly, attracting blame, the global FDI has turned to three strategies: first, heavy investment in and advertisement of its health and

[29] Also note this definition by Levitsky and Pacanowski: "After reaching maximum height for age, adult weight per age reflects accumulated error in energy balance" (2011: 128).

> wellness research and development efforts; secondly, continued support for its physical activity programmes, either emanating directly from companies themselves or by sponsoring state-led strategies; and thirdly, its entrance into the field of health promotion and education in both the virtual realm and the classroom. All three have been taken up in different ways and to varying degrees of financial investment by industry. (Herrick 2009: 58)

The United Nations Standing Committee on Nutrition (UNSCN) describes four degrees of investment, which are "(1) direct funding, (2) contributions in kind (which may be goods and/or services), (3) dialogue (including information exchange), and (4) joint delivery" (Marks 2014: 269). Although the FDI is often "actively encouraged to participate in government-sponsored workshops, contribute to the formulation of national nutritional policy, affiliate with government-sponsored initiatives, and partner with scientists and professional associations" (Ludwig & Nestle 2008: 1809) such activities are not without their own pitfalls. According to Marks:

> [t]hese include the subordination of institutional values, mission reorientation, weakened capacity to promote regulations and monitor compliance, displaced organizational priorities, and self-censorship […] In the case of research partnerships, significant concerns include impact on research priorities; on the quality, outcome and dissemination of research; and on public trust in science and in research institutions […]. The approach also captures concerns about corporate influence over policymaking at the expense of the public good, and the loss of the public partner's legitimacy with key constituencies due to perceived co-option by commercial interests […]. (Marks 2014: 273)

As a result, "there now needs to be an acknowledgement of how [the] corporate uptake [of health promotion] may be diminishing the degree of trust in the state as an authoritative source of health-related information" (Herrick 2009: 60). According to Herrick, the efforts by the FDI have led to a kind of industrial 'public health' that influences and stands next to state-led public health efforts, which is problematic given that the FDI is financially better equipped than many tax-paid public health resorts (ibid.). This is dangerous because the FDI only promotes an idea of obesity and its causes that fits into corporations' goals and more complex problems that are involved might therefore be overlooked (ibid. 61). Thus, regulation is not only

necessary for the products of the FDI and their marketing, but also for public-private partnerships (cf. Marks 2014).

Finally, the question of responsibility also stretches to that of a just allocation of healthcare. Although the debate about whether or not patients with 'self-inflicted illnesses' should receive lower priority in access to healthcare resources has been going on for almost 25 years, the question remains unsolved (cf. Sharkey & Gillam 2010). Most of this debate is concerned with smoking and alcoholism, while obesity has entered it quite recently. My literature search resulted in only seven articles dealing with access to healthcare and obesity, which may be surprising given the ever-present discussion of obesity as a burden to healthcare systems in the popular media.[30] It seems like the question of responsibility does not extend much beyond attempts to make people responsible for losing weight or preventing weight gain.

However, some scholars do discuss the problem of obesity and access to healthcare, like Feiring who supports the idea that society is responsible "to distribute goods and burdens in a way that is luck-neutralising and choice-sensitive" (Feiring 2008: 33). Based on this 'Luck Egalitarianism', Feiring argues that "inequalities in health expectancies that derive from unchosen features of people's circumstances are unjust and should be compensated, while inequalities that reflect personal choices of lifestyle may not" (ibid.). But since it is not easy to decide what is caused by circumstances and what is caused by choice, Feiring disagrees with a backwards-looking approach of Luck Egalitarianism. In her opinion, people should not be denied healthcare because it "is a special good and should not be allocated to eliminate the impact of bad brute luck or to ensure that everyone gets what they morally deserve" (ibid. 34). Instead, she votes for a forward-looking approach and suggests

> that the obese patient suffering from [a disease] should be asked to sign a contract of frequent medical follow-ups to help her lose weight (in the same token as smokers with chronic obstructive lung disease should be asked to get medical advice on how to quit smoking and alcohol abusers with liver disease on how to stop drinking). If the patient refuses, then she cannot reasonably complain to be given lower priority on the waiting list. (Feiring 2008: 35)

[30] Mackenzie also claims that "public opinion […] showed an almost uniform moral outrage that the fat were selfishly using health care resources that could have gone to the genuinely ill for self-inflicted conditions caused by greed and sloth" (2010: 16-17).

Feiring claims that healthcare should be allocated according to the severity of a condition and the expected benefit of treatment (ibid.). Therefore, she thinks it is justified "to ask the individual to do what she can to change an unhealthy lifestyle to make treatment efficacious" (Feiring 2008: 36).[31]

This kind of argumentation is typically used in bariatric surgery. As described in the previous section, candidates for bariatric surgery often have to make lifestyle changes in order to become eligible for surgery, which has been criticized as being driven by prejudice, creating unequal access to these procedures and therefore unjust (cf. Hofmann 2010). However, given the still experimental nature of bariatric surgery, Golomb and Koperski remark that "it is unjust to impose the term "unjust" when persons have disparate access to an unproven treatment for which harm may exceed benefit" (2010: 26) and question the necessity of making unproven treatment available for everybody (ibid.).

Nevertheless, since access to bariatric surgery is limited, more and more patients choose to travel abroad to undergo the procedure, which raises questions about responsibility, too. As is generally the problem with medical tourism, having bariatric surgery done in another country may enable more people to access this kind of treatment, but leaves open the question of who is responsible for follow-up care once the patient returned to his or her home country (cf. Snyder & Crooks 2010). This question is not only concerned with who should offer care, but also who should pay for it (ibid.), which poses new problems surrounding justice.

Besides bariatric surgery, kidney transplants are a concrete example, which is discussed in this context of access to healthcare. In many transplant clinics it is current practice to not place patients on wait-lists based on BMI, which means that they are denied access to life-saving kidney transplants.[32] One problem here is that the criteria for becoming wait-listed are not regulated so that upper BMI limits range

[31] Lévesque et al. (2009) also found this kind of reciprocity argument in their qualitative study on equity and access to nutrigenomic interventions for obesity prevention. They note that „[r]eciprocity is a form of justice that involves the exchange of collective services and individual actions for mutual benefit. Reciprocity is not limited to redistribution of, or access to, resources. Additionally, it requires a stable commitment due to limited available resources" (Lévesques et al. 2009: 276). But they also argue that „[w]ithout a counterbalance, reciprocity as a value related to access to personalized nutrition services in the public healthcare system has the potential to become a kind of tyranny where individuals carry the burden for their own health and that of the community. Individuals have a responsibility, but this should also be balanced with solidarity through the provision of societal support" (ibid.). However, ensuring social support might become more difficult in the future, since in some countries solidarity with obese people is decreasing (cf. Bonnie et al. 2010).

[32] Similarly, it is currently discussed whether access to fertility treatment should be restricted based on BMI (cf. Vahratian & Smith 2009).

from 35 to 45 (Lentine et al. 2012: 576), which causes injustice. On the other hand, the practice of setting BMI limits in wait-listing is itself criticised as being unjust (cf. Kovesdy & Molnar 2014). The reasons for denying patients with higher BMIs access to wait-lists are said to be worse outcomes and higher risks after the kidney transplant compared to patients with lower BMI, but opinions differ on how grave these differences actually are.

While Lentine et al. admit that "clear evidence to support a specific BMI threshold for exclusion from transplant candidacy [is lacking]" (Lentine et al. 2012: 576) they still argue that "achieving and maintaining healthy body composition on the basis of guidelines for nutrition in renal failure are important priorities for kidney transplant candidates and recipients" (ibid. 584). Because of the lacking evidence, they claim that "[a] dilemma arises for transplant practitioners who desire normal weight levels in their transplant candidates" (ibid. 576). Note that the dilemma seems to stem from the 'desire' of transplant practitioners, which is not in accordance with the evidence. This supports Kovesdy and Molnar's hypothesis that "preconceived notions about [obesity's] overwhelming harm may lead to prejudiced attitudes and an unwillingness to accept or even consider findings suggesting limited or no adverse effects of high BMI in transplant patients" (2014: 2). They maintain that "the association of obesity with unhealthy behavior may generate feelings that the patients' inability to take action to prevent their obesity makes them directly responsible for it; withholding transplantation then becomes a form of punishment for undisciplined behavior" (ibid.)

However, Lentine et al. as well as Kovesdy and Molnar agree that BMI is a bad criterion to limit access to wait-lists because it ignores differences in body composition. Both name waist-circumference as a better criterion to evaluate outcomes instead (Lentine et al. 2014: 580; Kovesdy & Molnar 2014: 2).

Besides the lacking regulation of wait-listing criteria the intransparency of criteria was criticized as well (Kovesdy & Molnar 2014: 1), but intransparency is not only a problem concerning access to kidney transplants but to healthcare in general. As Owen-Smith et al.'s (2010) study shows, most patients want to know about how healthcare is rationed: "Nearly all patients said they wanted to know how financial factors affected their access to healthcare, and this was normally because they wanted to be granted the autonomy to decide whether to contest decision-making or to access care in the private sector" (Owen-Smith et al. 2010: 89), although they "also

acknowledged that it would be very distressing to know about rationing if you were unable to access care through another route" (ibid.). Despite the clear need for information among patients, Owen-Smith et al. found that healthcare professionals were not always aware of this need (Owen-Smith et al. 2010: 91). Therefore, they suggest:

> that clinicians need to be sensitive to patients who want to take on a consumer role within the doctor-patient relationship and not resort to a paternalistic model when they feel vulnerable due to factors outside their individual control. Additionally, professionals need to be aware that patients use a number of different information sources to research the availability of particular treatments, notably including the popular media and a variety of internet sites. This is of concern, since the use of the internet to research health conditions is increasing steeply, yet information may be incomplete, inaccurate or subject to the influence of vested interests. Furthermore, reliance on electronic media to distribute information may result in social inequalities in access to information, and therefore potentially exacerbate inequalities in access to health and healthcare. (Owen-Smith et al. 2010: 91)

To sum up this section, it has become clear that the question of responsibility for becoming obese and diseased is not only relevant to decide who is responsible for treating and preventing obesity and its related diseases, but also in consideration of a just allocation of healthcare resources. As long as obesity is thought to be the result of individual lifestyle choices, restricting access to healthcare remains an option for those who argue in favour of allocating healthcare resources according to responsibility. To date, this is only a hypothetical reason for restricting access to healthcare, but there are a few examples showing that access to certain treatments is already restricted for obese people. Later, we shall see how the question of responsibility for obesity and its related diseases is answered by the new paradigm in obesity research, but first I shall describe the paradigm shift in obesity research in the following chapter.

3 The Paradigm Shift in Obesity Research

The previous chapter shed light on how obesity is currently discussed ethically. It has become clear that this discussion can be divided roughly into two parts. On the one hand, there is the critique of the dominant obesity discourse, which deals with how obesity was medicalized and moralized over time to become the problem it is today. While the dominant obesity discourse regards the globally rising obesity rates as proof that obesity has become 'epidemic' and urge for intervention, its critics speak of a 'moral panic' instead. They claim that the growing stigmatization of fat is what makes obesity a problem and therefore, rather than fighting obesity, discrimination against it should be tackled. On the other hand, there is also an ethical discussion among those who view obesity as an 'epidemic', which points out problems occurring in interventions against obesity. It also deals with questions concerning the responsibility for treatment and prevention as well as justice in access to healthcare.

Although there has been much discussion about obesity within the field of ethics, the discussion relies for the most part on the current medical model of obesity, which says that obesity is caused by too much food and too little exercise and is also the basis for the dominant obesity discourse. The number of articles pointing to other factors such as genes or hormones is very limited and even the 'obesogenic environment' discourse, which is looking for causes of obesity individuals cannot control, relies in the end on the theory that obesity is caused by eating too much and exercising too little. In short, whether the individual is made responsible for becoming obese or its environment, the reason for weight gain is commonly believed to be a positive energy balance, i.e. consuming more energy than is spent.

This theory is so ubiquitous in obesity research, that it is hardly a topic for debate anymore and can safely be said to be the current paradigm of obesity research. However, this theory is currently under attack. In fact, there are reasons to believe that there is a paradigm shift occurring in obesity research, which offers different explanations for weight gain. These enable new possibilities for the treatment and prevention of obesity and therefore also require a reconsideration of obesity and ethics. Before turning to this in the fourth chapter, I shall describe the current paradigm shift in obesity research in this chapter, which shall clarify the following

questions: Firstly, what is a paradigm and what is the current paradigm in obesity research? Secondly, how is this paradigm put into practice in what Kuhn calls 'normal science'? And thirdly, what is a paradigm shift? Is there a paradigm shift in obesity research and if so then what is the new paradigm?

3.1 Kuhn's Theory of Paradigms and the Current Paradigm in Obesity Research

Thomas S. Kuhn introduced the term 'paradigm' in 1962 through his book *The Structure of Scientific Revolutions* (hereafter cited as *SSR*[33]), in which he analyses how revolutions in science evolve.[34] He already defines what he means by 'paradigms' in the preface to this book: "These I take to be universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners" (*SSR*: viii). However, in the postscript added to the second edition of *SSR* he acknowledges that his use of the term is not consistent. In fact, one of his readers "concluded that the term is used in at least twenty-two different ways" (*SSR*: 181). Kuhn claims that this is mostly due to stylistic inconsistencies, but admits that even after reediting those inconsistencies two separate ways of using the term paradigm would remain (ibid.): he calls the first 'disciplinary matrix' and the second 'shared example'. I shall explain about them more in detail later.

Further, it has been criticized that it was not necessary to introduce the paradigm concept, because it merely replaced the term 'hypothesis', which is commonly used in science (Hoyningen-Huen 1989: 131). 'Paradigm' may also seem to be identical in meaning with the term 'theory'. But according to Kuhn, speaking of a 'theory' is not sufficient to express what is meant by 'paradigm':

> Scientists themselves would say they share a theory or set of theories, and I shall be glad if the term can ultimately be recaptured for this use. As currently

[33] I cite from the second edition of *SSR* published in 1970.

[34] Although Kuhn did not coin the term, it became widely used since *SSR* was published (Sharrock & Read 2002: 31).

> used in philosophy of science, however, 'theory' connotes a structure far more limited in nature and scope than the one required here. (*SSR*: 182)

Although theories are a part of paradigms, as we shall see below, paradigms are more than just theories. Like Kuhn said later, they can be described as a kind of 'consensus'[35] in a certain scientific community (Hoyningen-Huene 1989: 142). In the post-script to *SSR*, Kuhn expresses this in the following way: "A paradigm is what the members of a scientific community share, *and*, conversely, a scientific community consists of men who share a paradigm" (*SSR*: 176), but interestingly, a scientific community often shares a paradigm without being able to tell what it is:

> Though many scientists talk easily and well about the particular individual hypotheses that underlie a concrete piece of current research, they are little better than laymen at characterizing the established bases of their field, its legitimate problems and methods. If they have learned such abstractions at all, they show it mainly through their ability to do successful research. That ability can, however, be understood without recourse to hypothetical rules of the game. (*SSR*: 47)

This is because paradigms are "prior to, more binding, and more complete than any set of rules for research that could be unequivocally abstracted from them" (*SSR*: 46). What Kuhn means by 'rules' are 'guides to action' (Hoyningen-Huene 1989: 136), such as:

> —[…] explicit definitions of concepts, […]
> —[…] laws or theories, […]
> —[…] any kind of explicit, unequivocal, methodological percepts, such as recipes for problem choice, the evaluation of problem solutions, crisis identification, theory improvement, theory evaluation, theory comparison, theory rejection, and so forth. (ibid.)

Through these kinds of rules, a paradigm may "give scientists (real) work to do" (Sharrock & Read 2002: 34), although they may not be aware of the paradigm behind

[35] As Hoyningen-Huene notes, this consensus is neither necessarily monolithic nor always present in a given scientific field, especially in the social sciences where there is hardly any consensus at all (1989: 132-133).

these rules.[36] Paradigms are therefore mostly invisible, which makes it difficult to discover them (*SSR*: 46). But if scientists are not even aware of their shared paradigm, then how do they acquire it in the first place?

To understand how the paradigm or consensus of a scientific community is formed, it is necessary to have a closer look at what constitutes a scientific community first. Kuhn describes this as follows:

> A scientific community consists […] of the practitioners of a scientific specialty. To an extent unparalleled in most other fields, they have undergone similar educations and professional initiations; in the process they have absorbed the same technical literature and drawn many of the same lessons from it. Usually the boundaries of that standard literature mark the limits of a scientific subject matter, and each community ordinarily has a subject matter of its own. There are schools in the sciences, communities, that is, which approach the same subject from incompatible viewpoints. But they are far rarer there than in other fields; they are always in competition; and their competition is usually quickly ended. As a result, the members of a scientific community see themselves and are seen by others as the men uniquely responsible for the pursuit of a set of shared goals, including the training of their successors. Within such groups communication is relatively full and professional judgement relatively unanimous. Because the attention of different scientific communities is, on the other hand, focused on different matters, professional communication across group lines is sometimes arduous, often results in misunderstanding, and may, if pursued, evoke significant and previously unsuspected disagreement. (*SSR*: 177)

As this description shows, education plays a crucial role in the formation of a scientific community. What young scientists learn during their education enables them to pursue their research and communicate it to their colleagues, who are able to understand it because they were educated in the same way.

During the education of scientists textbooks play a crucial role especially in the natural sciences, which differs from that in other fields:

[36] We shall learn more about rules in the next section.

> In music, the graphic arts, and literature, the practitioner gains his education by exposure to the works of other artists. Textbooks, except compendia of or handbooks to original creations, have only a secondary role. In history, philosophy, and the social sciences, textbook literature has a greater significance. But even in these fields the elementary college course employs parallel readings in original sources, some of them the "classics" of the field, others the contemporary research reports that practitioners write for each other. As a result, the student in any one of these disciplines is constantly made aware of the immense variety of problems that the members of his future group have, in the course of time, attempted to solve. Even more important, he has constantly before him a number of competing and incommensurable solutions to these problems, solutions that he must ultimately evaluate for himself.
>
> Contrast this situation with that in at least the contemporary natural sciences. In these fields the student relies mainly on textbooks until, in his third or fourth year of graduate work, he begins his own research. (*SSR*: 165)

Thus, contrary to other fields the natural scientist is rarely aware of the history of his field including all the drawbacks, which did not find their way into the current textbooks, so that natural science appears like the linear accumulation of knowledge. If science is regarded in this way, that way of learning is highly effective, as Kuhn notes:

> Why, after all, should the student of physics, for example, read the works of Newton, Faraday, Einstein, or Schrödinger, when everything he needs to know about these works is recapitulated in a far briefer, more precise, and more systematic form in a number of up-to-date textbooks? (*SSR*: 165)

Textbooks present the scientific achievements with all their theories and laws that are accepted by the scientific community. Later, Kuhn called these theories 'metaphysical paradigms' or models, which scientists believe to explain certain phenomena. They can be heuristic or ontological and have various functions such as offering metaphors and analogies for explanations (*SSR*: 184). The laws are later named 'symbolic generalizations', which points especially to those laws that can be expressed in a logical form (*SSR*: 182).

Besides theories and laws, the textbooks deliver to the student of natural science the 'shared examples' mentioned above. These describe the paradigm in its narrowest sense, which according to Kuhn is "the central element of what I now take to be the most novel and least understood aspect of [*SSR*]" (*SSR*: 187). Without shared examples "the laws and theories [the student of science] has previously learned would have little empirical content" (*SSR*: 188). They offer exemplary problems to apply the laws and theories to, and in doing so the student learns how to approach and solve them in a way accepted by his scientific community:

> After he has completed a certain number, which may vary widely from one individual to the next, he views the situations that confront him as a scientist in the same gestalt[37] as other members of his specialists' group. For him they are no longer the same situations he had encountered when his training began. He has meanwhile assimilated a time-tested and group-licensed way of seeing. (SSR: 189)

Equipped with this way of seeing as well as with theories and laws, all that is missing to the student in order to conduct his own research are 'values', which "are more widely shared among different communities than either symbolic generalizations or models, and […] provide a sense of community to natural scientists as a whole" (*SSR*: 184). Kuhn names many such values in *SSR* as well as in his later work. Some he describes more in detail are the following:

> —*Accuracy*: Applications of theory, assertions about factual situations derived from theory, should be both qualitatively and quantitatively accurate. […]
> —*Consistency*: A theory should be free of internal contradiction and compatible with other accepted theories.
> —*Scope*: A theory should have a broad domain of possible applications.
> —*Simplicity*: A theory should provide unifying perspectives for the ordering of apparently unrelated groups of phenomena and have the simplest possible conceptual and technical apparatus and procedures for application.
> —*Fruitfulness*: A theory should encompass new phenomena or new relations between previously known phenomena. (Hoyningen-Huene 1989: 149)

[37] Kuhn uses the 'gestalt switch' theory from psychology in order to describe the way paradigm shifts occur.

Taken together, the 'metaphysical paradigms', 'symbolic generalizations', 'shared examples' and 'values' are the main elements of what Kuhn refers to as the 'disciplinary matrix', although he abandoned the term after 1969 (ibid. 143). This 'disciplinary matrix' defines a scientific community and describes the term 'paradigm' in its broadest meaning. Kuhn adds, that it is "'disciplinary' because it refers to the common possession of the practitioners of a particular discipline; [and it is a] 'matrix' because it is composed of ordered elements of various sorts […]" (*SSR*: 182). With the 'disciplinary matrix' or paradigm in its broadest sense as their background, scientists exercise what Kuhn calls 'normal science'. But before looking at Kuhn's idea of 'normal science' more closely, I shall describe the current paradigm in obesity research first.

When I speak of obesity research I mean all medical research concerned with the causes, treatment and prevention of obesity. Although the term 'bariatrics' – which is a compound word of the Greek 'bár(os)' meaning 'weight' and '-iatrics' meaning 'healing' or 'medical practice' that was coined around 1965 – [38] is used to describe the branch of medicine, which deals with the causes, treatment and prevention of obesity, searching for 'bariatrics' on PubMed results mainly in articles dealing with bariatric *surgery*. This indicates that 'bariatrics' would be a too narrow term to describe obesity research. Other relevant branches are internal medicine, especially its subspecialities gastroenterology (dealing with digestive diseases) and endocrinology (dealing with diseases of the endocrine system, which is responsible for secreting hormones), clinical nutrition (the study of the relationship between food and health) and public health, which is based on epidemiology (the study of the distribution, frequency and determinants of diseases in certain populations).[39]

Despite the different foci and approaches of these medical branches, the current consensus in obesity research is that obesity is caused by 'overeating', i.e. consuming more food than necessary, which has been described as the 'dominant discourse' in the previous chapter. As we have already seen to some extent, there is a long history before this consensus was reached and various medical schools as well as non-medical discourses influenced it over time. Later we shall learn that the most

[38] bariatrics. Dictionary.com. *The American Heritage® Stedman's Medical Dictionary*. Houghton Mifflin Company. http://dictionary.reference.com/browse/bariatrics (accessed on October 27, 2015).

[39] Considering the fact that certain socio-economic factors also influence obesity, it could be argued that obesity research should include social sciences and economics. However, since those factors are also relevant for epidemiological research, I do not think that this is necessary.

controversial discussion about a consensus in obesity research took place in the latter half of the 20th century. However, most medical students will not learn about the controversies, because their textbooks typically provide the most up-to-date summary of obesity research only. Even if other factors, which contribute to obesity, are acknowledged the consensus is still that obesity can most effectively be treated and prevented by moving more and eating less as reflected in the countless campaigns against obesity.

Although they may differ in how they intend to make people move more and eat less, they all rely on the same paradigm according to which weight is determined by the amount of energy we consume and spend every day. In this paradigm, consumed energy and spent energy work like the two sides of a balance scale. If the amount of the consumed energy is greater than that of the spent energy, the difference or 'excess energy' will lead to weight gain, because it is converted into fat and stored in fat cells. Conversely, if the amount of consumed energy is smaller than that of the spent energy, the difference will show as weight loss, because the body will use fat from the fat cells in order to meet its energy requirements. The greater the difference the more weight is gained or lost and to keep a stable weight it is necessary to keep both sides in balance; hence this paradigm is referred to as 'energy balance' or 'energy homeostasis'.

Since body fat can be expressed as energy as well, it is possible to express weight gain and loss as mathematical equations. One pound of fat is said to equal 3500 calories[40] worth of energy; so in order to lose one pound of fat, a negative energy difference of 3500 calories has to be created by eating less, moving more or ideally both. But it is hardly possible or healthy to achieve an energy difference this big because the body requires a certain amount of calories every day just to maintain its functions. This amount of calories is called Basal Metabolic Rate (BMR) and can be calculated using height, weight, age and gender as variables. The BMR only describes the amount of energy, which the body needs at rest without any energy needs to adjust body temperature or digest food. If the energy required for these functions as well as other activities is considered, too, the daily calorie needs of a person can be calculated. To lose weight, it is then usually recommended to cut a

[40] Although it is commonly referred to 'calories' in the context of food energy and weight, the correct unit is 'kilocalorie' (kcal). In order to avoid confusion, the terms 'food calorie' or 'large calorie' (Cal) are also used sometimes. In addition, there are 'joule' (J) or 'kilojoule' (kJ) of the International System of Units (SI). One kilocalorie equals approximately 4.2 kilojoules.

certain amount of calories, e.g. 500 calories, from the daily diet. This diet, if continued for a week would lead to an energy difference of 7 x 500 calories = 3500 calories and thus one pound of fat lost in one week. It is sometimes acknowledged that weight loss is not that straightforward in reality, because the body may not only lose fat but also lean tissue and water, and it may down regulate the BMR in order to cope with the reduced calorie intake, so that even more calories have to be cut to lose more weight. But in general, weight gain and loss according to the energy balance paradigm can be expressed in the following logical form: *energy intake (food) – energy expenditure (BMR + activity) = energy storage (weight gain, if the energy balance is positive and weight loss if it is negative)*. This is the 'symbolic generalization' of the energy balance paradigm.

Physicians and other health care professionals use this symbolic generalization based on the energy balance paradigm to work with or conduct research on their patients, each of which is an exemplar. The exemplars described in textbooks serve as prototypes to teach students the energy balance paradigm and how to work with it and are therefore 'shared exemplars'. What this means here is that students learn to view an obese person as someone who consumes more energy than he or she needs, because this is how weight is gained according to the energy balance paradigm. If this view meets with cultural or religious values like self-restraint or modesty, health care professionals may become biased against obese people, and that they may become so is not surprising, since this bias only expresses what they have been taught and trained to see during their education reinforced by their values. Every obese person who eats high-calorie foods and does not exercise regularly seems to confirm their knowledge and becomes another problem for them to solve with calorie equations.

The 'metaphysical paradigm' or model of the energy balance paradigm compares the human body to a steam engine: just like a steam engine burns energy in the form of fuel to produce heat and perform work, the body burns energy in the form of food. This is also reflected in common phrases like 'burning calories' or 'burning fat'. But unlike a steam engine, which can only hold a certain amount of fuel, the human body can grow to accommodate more fuel, stored as fat, in order to save it for periods of limited access to food. Proponents of the 'obesogenic environment' discourse often argue that this used to be an advantage as long as human beings suffered hunger periods, but now that we live in environments of abundant food it has turned into a disadvantage making us obese and sick. So, while the body as a

'biological steam engine' must be fuelled like a mechanical one, the amount of fuel has to be carefully calibrated in order to prevent too much storage. In a mechanical steam engine, over-fuelling would merely lead to a spill over, but in the human body it results in obesity and eventually disease.

Obesity research is thus concerned with the consequences of 'over-fuelling' the body as well as questions like how to reduce its unnecessary fuel-storage or how to prevent over-fuelling in the first place and bases its solutions on the energy balance paradigm. The following section will describe how this research is conducted as 'normal science'.

3.2 Obesity Research as 'Normal Science'

Now we know what a paradigm as well as what the current paradigm in obesity research is, we shall look at how it is put into practice in 'normal science', which Kuhn defines as follows: "[N]ormal science means research firmly based upon one or more past scientific achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice" (*SSR*: 10). The goal of normal science is to further articulate and specify a paradigm under more stringent conditions (*SSR*: 23). In other words, scientists do not seek to find new paradigms but rather more precise explanations for how it matches natural phenomena. Kuhn calls this 'mop-up work' and points to possible criticism:

> Closely examined, whether historically or in the contemporary laboratory, that enterprise seems an attempt to force nature into the preformed and relatively inflexible box that the paradigm supplies. No part of the aim of normal science is to call forth new sorts of phenomena; indeed those that will not fit the box are often not seen at all. Nor do scientists normally aim to invent new theories, and they are often intolerant of those invented by others. Instead, normal-scientific research is directed to the articulation of those phenomena and theories that the paradigm already supplies. (*SSR*: 24)

Given this description of normal science, obesity research seems to behave just like it should. Although, as we have seen in the second chapter, it has often been

criticized that researchers ignored evidence contrary to the dominant obesity discourse, this kind of behaviour is just what normal science demands from scientists working under a certain paradigm, according to Kuhn. He admits that normal science may appear to be redundant and scientists narrow-minded, but in fact, "[the] restrictions, born from confidence in a paradigm, turn out to be essential to the development of science" (ibid.):

> By focusing attention upon a small range of relatively esoteric problems, the paradigm forces scientists to investigate some part of nature in a detail and depth that would otherwise be unimaginable. And normal science possesses a built-in mechanism that ensures the relaxation of the restrictions that bound research whenever the paradigm from which they derive ceases to function effectively. At that point scientists begin to behave differently, and the nature of their research problems changes. In the interim, however, during the period when the paradigm is successful, the profession will have solved problems that its members could scarcely have imagined and would never have undertaken without commitment to the paradigm. And at least part of that achievement always proves to be permanent. (*SSR*: 24-25)

The problems normal science is concerned with under a given paradigm can be grouped into three classes: "determination of significant fact, matching of facts with theory, and articulation of theory" (*SSR*: 34). In addition, there are 'extraordinary problems', which cannot be solved under the current paradigm and thus induce change (ibid.). The extraordinariness of such problems should be emphasized, because not any unexpected problem will be regarded as a failure of the paradigm: "the project whose outcome does not fall in that narrower range is usually just a research failure, one which reflects not on nature but on the scientist" (*SSR*: 35). This explains the reaction of obesity researchers who call for better studies if the results do not match their expectations. Again, this has been criticized but it is in fact nothing else than the natural reaction of scientists doing normal science. They work based "on the assumption that [they] know[…] what the world is like" (*SSR*: 5) and are willing "to defend that assumption, if necessary at considerable cost" (ibid.). Their research is therefore not designed to refute their paradigm, but rather to confirm it. The question it seeks to answer is not what the result will be, but rather how to reach it:

> Though its outcome can be anticipated, often in detail so great that what remains to be known is itself uninteresting, the way to achieve that outcome remains very much in doubt. Bringing a normal research problem to a conclusion is achieving the anticipated in a new way, and it requires the solution of all sorts of complex instrumental, conceptual, and mathematical puzzles. The man who succeeds proves himself an expert puzzle-solver, and the challenge of the puzzle is an important part of what usually drives him on. (*SSR*: 36)

In the case of obesity research, a typical 'puzzle' to solve would be, for example, how to achieve weight loss under the paradigm that weight loss requires an energy deficit. An experimental study to solve this puzzle would therefore look for ways to create energy deficits or compare different ways to do so. The study's outcome – namely that the energy deficit will lead to weight loss – is already known, but the question remains which method will achieve it or is the best.

This reveals another "parallelism between puzzles and the problems of normal science. If it is to classify as a puzzle, a problem must be characterized by more than an assured solution. There must also be rules that limit both the nature of acceptable solutions and the steps by which they are to be obtained" (*SSR*: 38). To illustrate this, Kuhn uses the example of a jigsaw puzzle:

> To solve a jigsaw puzzle is not, for example, merely "to make a picture." Either a child or a contemporary artist could do that by scattering selected pieces, as abstract shapes, upon some neutral ground. The picture thus produced might be far better, and would certainly be more original, than the one from which the puzzle had been made. Nevertheless, such a picture would not be a solution. To achieve that all the pieces must be used, their plain sides must be turned down, and they must be interlocked without forcing until no holes remain. (*SSR*: 38)

Similarly, the energy balance paradigm sets the rules for solving puzzles concerning obesity. To stick to the example above, whether it is assumed that an energy deficit can be achieved by dieting, by exercise or by making changes to the environment, these hypotheses and the data they produce work like the pieces of a puzzle. If they

have the right form, i.e. they fit together without holes to create a perfect picture of the paradigm, they solve the puzzle of how to achieve weight loss.

There are various types of rules or commitments, as Kuhn describes. Of course the laws or 'symbolic generalizations' mentioned in the previous section serve as rules for puzzle-solving. In addition, instrumentation and metaphysical rules decide what kind of solutions will be acceptable (*SSR*: 38, 40-41). Instrumentation in obesity research refers to – needless to say – scales to measure body weight or body fat, but also to methods of determining levels of obesity such as the BMI. Its metaphysical rules rely on the body-as-steam-engine model. According to Kuhn, these rules are metaphysical as well as methodological (*SSR*: 38-41). As metaphysical, they tell obesity researchers what the human body is like. And as methodological, they tell researchers "what ultimate laws and fundamental explanations must be like" (ibid.), i.e. in obesity research: how the body uses and stores energy. There are still more rules, but the final ones Kuhn explicitly mentions are crucial:

> Finally, at a still higher level, there is another set of commitments without which no man is a scientist. The scientist must, for example, be concerned to understand the world and to extend the precision and scope with which it has been ordered. That commitment must, in turn, lead him to scrutinize, either for himself or through colleagues, some aspect of nature in great detail. And, if that scrutiny displays pockets of apparent disorder, then these must challenge him to a new refinement of his observational techniques or to a further articulation of his theories. Undoubtedly there are still other rules like these, ones which have held for scientists at all times. (*SSR*: 42)

With respect to these last rules Kuhn mentions, obesity research rightly faces criticism when we recall how ineffective current 'solutions' to obesity are, as described in the second chapter. This ineffectiveness hints to the possibility that obesity research under the energy balance paradigm might not explain weight loss and gain precisely enough and needs to be scrutinized. However, as has been criticized, it is often not the paradigm but the patient who is questioned if weight loss interventions fail.

Here, we also see how obesity research as a part of medicine is different from other natural sciences. As indicated by its name, natural science is concerned with understanding natural phenomena. Depending on the specific scientific field,

scientists seek to understand the nature of electricity, molecules, organisms, stars etc. The goal of medicine is to understand disease in order to achieve health in human beings. Therefore, it researches how biological (bacteria and viruses), physical (manual labour, exercise or radiation) and chemical (food or toxins) phenomena influence health. But while other natural sciences will research those phenomena in nature, medicine is concerned with how they manifest in human beings. Human beings, however, although being part of nature, are also cultural and social beings and thus medicine should examine these aspects, too, as was proposed by the German physician Rudolf Virchow (1821-1902) in 1849 (Rather 1958: 24), but modern medicine hardly looks at them. As is reflected by the many subspecialties of medicine, physicians are often more concerned with certain parts of the body than the whole human being. This is not that problematic as long as the treatment of disease depends on the physician, e.g. by administering medications or performing surgery, but if treatment relies on the patient, like it is mostly the case in obesity treatment, the physician becomes merely an intermediate between the patient and his body. In other natural sciences, the relationship between researcher and nature is more direct and interference only caused by instruments or the researcher himself. In medicine, however, the patient is another possible source of interference. Especially in obesity treatment that is dependent on the behaviour of the patient, direct research is difficult. Whereas in other natural sciences, as cited earlier, unexpected research outcomes reflect not on nature but on the scientist, in medicine they can also reflect on the patient. It would not make sense to blame quarks, for example, if they did not behave as expected, but it is possible to blame patients if they did not adhere to a regimen. However, if patients are blamed for unexpected research results every time and researchers never reflect on their own theories, it is questionable whether this kind of behaviour can still be called scientific.

Returning to rules, we have already noted that paradigms are prior to rules in the previous section. According to Kuhn, "[r]ules, […] derive from paradigms, but paradigms can guide research even in the absence of rules" (*SSR*: 42). And they do so, as we have also learned already, even if scientists are not aware of them:

> Scientists work from models acquired through education and through subsequent exposure to the literature often without quite knowing or needing to know what characteristics have given these models the status of community

> paradigms. And because they do so, they need no full set of rules. The coherence displayed by the research tradition in which they participate may not imply even the existence of an underlying body of rules and assumptions that additional historical or philosophical investigation might uncover. That scientists do not usually ask or debate what makes a particular problem or solution legitimate tempts us to suppose that, at least intuitively, they know the answer. But it may only indicate that neither the question nor the answer is felt to be relevant to their research. (*SSR*: 46)

In obesity research the education of scientists does not include learning the science's history. Although some obesity researchers may learn that ancient physicians like Hippocrates already wrote about obesity, most of them will not know much beyond this fact. If they know it at all, it will only serve to confirm that what they learned about obesity is coherent since antiquity. That obesity was at times explained and interpreted quite differently from today will remain unknown to most obesity researchers, as this problem is irrelevant to them.

Kuhn gives four reasons for why he believes that "paradigms could determine normal science without the intervention of discoverable rules" (*SSR*: 46):

> The first, […] is the severe difficulty of discovering the rules that have guided particular normal-scientific traditions. That difficulty is very nearly the same as the one the philosopher encounters when he tries to say what all games have in common. The second, to which the first is really a corollary, is rooted in the nature of scientific education. Scientists, it should already be clear, never learn concepts, laws, and theories in the abstract and by themselves. Instead, these intellectual tools are from the start encountered in a historically and pedagogically prior unit that displays them with and through their applications. […]
>
> These consequences of scientific education have a converse that provides a third reason to suppose that paradigms guide research by modeling as well as through abstracted rules. Normal science can proceed without rules only so long as the relevant scientific community accepts without question the particular problem-solutions already achieved. Rules should therefore become

> important and the characteristic unconcern about them should vanish whenever paradigms or models are felt to be insecure. (*SSR*: 46-47)

These first three reasons can be drawn from normal science working under an established paradigm. However, as long as there is no paradigm, there will be "deep debates over legitimate methods, problems, and standards of solution, though these serve rather to define schools than to produce agreement" (*SSR*: 48). Kuhn calls these phases 'pre-paradigm periods', but even if a paradigm has been established this does not mean that debates like these do not occur anymore: "[t]hough almost non-existent during periods of normal science, they recur regularly during scientific revolutions, the periods when paradigms are first under attack and then subject to change" (ibid.). It is during these periods that the forth reason to believe that paradigms are prior to rules becomes visible: "[e]xplicit rules, when they exist, are usually common to a very broad scientific group, but paradigms need not be" (*SSR*: 49). Therefore, a paradigm shift in one scientific group does not necessarily lead to change in others. Kuhn illustrates this as follows:

> Consider, for a single example, the quite large and diverse community constituted by all physical scientists. Each member of that group today is taught the laws of, say, quantum mechanics, and most of them employ these laws at some point in their research or teaching. But they do not all learn the same applications of these laws, and they are not therefore all affected in the same ways by changes in quantum-mechanical practice. On the road to professional specialization, a few physical scientists encounter only the basic principles of quantum mechanics. Others study in detail the paradigm applications of these principles to chemistry, while others to the physics of the solid state, and so on. What quantum mechanics means to each of them depends upon what courses he has had, what texts he has read, and which journals he studies. It follows that, though a change in quantum-mechanical law will be revolutionary for all of these groups, a change that reflects only on one or another of the paradigm applications of quantum mechanics need be revolutionary only for the members of a particular professional subspecialty. For the rest of the profession and for those who practice other physical sciences, that change need not be revolutionary at all. In short, though

> quantum mechanics […] is a paradigm for many scientific groups, it is not the same paradigm for them all. Therefore, it can simultaneously determine several traditions of normal science that overlap without being coextensive. A revolution produced within one of these traditions will not necessarily extend to the others as well. (*SSR*: 49-50)

We shall see how this applies to the paradigm shift in obesity research later, but first, I describe what leads to a paradigm shift according to Kuhn. Further, I shall argue that the 'obesity epidemic' is what will lead to a paradigm shift in obesity research.

3.3 Paradigm Shift, Crisis and the Energy Balance Paradigm

So far, we have learned that normal science is more or less guided by rules under a certain paradigm. As long as there is no paradigm, during the pre-paradigm period, rules are more important and will eventually lead scientists to a consensus, which then becomes their paradigm. The paradigm will not be questioned and the goals of their research are application, confirmation and further articulation of the paradigm rather than refuting it – unless scientists encounter an extraordinary problem in their research. Then, they behave differently and adhere more to rules again in order to either explain the extraordinary problem with the current paradigm or change the paradigm. Although, as Kuhn writes, "[n]ormal science does not aim at novelties of fact or theory and, when successful, finds none," (*SSR*: 52) the history of science shows that normal science has been very effective in finding new paradigms as well (ibid.). Kuhn describes how the process of finding a new paradigm unfolds in three phases:

> Discovery commences with the awareness of anomaly, i.e. the recognition that nature has somehow violated the paradigm-induced expectations that govern normal science. It then continues with a more or less extended exploration of the area of anomaly. And it closes only when the paradigm theory has been adjusted so that the anomalous has become the expected. Assimilating a new sort of fact demands a more than additive adjustment of theory, and until that

> adjustment is completed—until the scientist has learned to see nature in a different way—the new fact is not quite a scientific fact at all. (*SSR*: 52-53)

However, not all discoveries lead to paradigm shifts. There are also discoveries that can be predicted based on established paradigms. Kuhn names the discovery of new chemical elements in the nineteenth century as an example for this (*SSR*: 61). In order to change a paradigm, there must be a 'crisis' in normal science, i.e. the emergence of an extraordinary anomaly.

For such an anomaly to occur, the paradigm is essential. It leads to the development and refinement of theories and tools, which are necessary to discover anomalies in the first place:

> Without the special apparatus that is constructed mainly for anticipated functions, the results that ad ultimately to novelty could not occur. And even when the apparatus exists, novelty ordinarily emerges only for the man who, knowing *with precision* what he should expect, is able to recognize that something has gone wrong. Anomaly appears only against the background provided by the paradigm. The more precise and far-reaching that paradigm is, the more sensitive an indicator it provides of anomaly and hence of an occasion for paradigm change. (*SSR*: 65)

This is why normal science is so effective in finding new paradigms, despite the fact that scientists usually resist change. Their resistance is even necessary, as Kuhn explains: "By ensuring that the paradigm will not be too easily surrendered, resistance guarantees that scientists will not be lightly distracted and that the anomalies that lead to paradigm change will penetrate existing knowledge to the core (ibid.)." Only when this kind of anomaly is encountered, will scientists start looking for alternative explanations to match their data although it would always be possible to find alternatives:

> Philosophers of science have repeatedly demonstrated that more than one theoretical construction can always be placed upon a given collection of data. History of science indicates that, particularly in the early developmental stages of a new paradigm, it is not even very difficult to invent such alternates. But that invention of alternates is just what scientists seldom undertake except

> during the pre-paradigm stage of their science's development and at very special occasions during its subsequent evolution. So long as the tools a paradigm supplies continue to prove capable of solving the problems it defines, science moves fastest and penetrates most deeply through confident employment of those tools. The reason is clear. As in manufacture so in science—retooling is an extravagance to be reserved for the occasion that demands it. The significance of crises is the indication they provide that an occasion for retooling has arrived. (*SSR*: 76)

In obesity research, we could, or perhaps should observe how confident scientists applied the energy balance paradigm during the past decades. Since the 1970s, eat less – especially less fat – and move more have become the unquestioned mantra of virtually all interventions against obesity and its associated diseases. However, today, the 'obesity epidemic' discourse shows that obesity research is in crisis. If the current paradigm of obesity research was true, solving this crisis should be very easy and those who eat less and move more should sooner or later lose any excess weight. The only question left would be how to motivate more people to eat less and move more.

Yet, despite more and more campaigns against obesity worldwide, obesity is still on the rise and the question is this: why it that the case? The intuitive answer is that the campaigns do not work. Either they do not reach enough or the right people or their approaches fail. Some might say that this is the people's fault, because they are lazy and cannot control their appetite. This kind of argumentation is not rare, as the growing stigmatization of obese people indicates, but is it true? As a matter of fact, many people follow the advice they are being given. Especially, the long-standing advice to reduce fat intake – which contains the most energy per gram compared to carbohydrates and protein – has been successfully put into practice in most countries:

> Countries like the USA and Norway have reported particular success in reduction of dietary fat intake […]. In the USA, for instance, a reduction in energy from fat from about 40% to 33% was achieved between 1960 and 1995 […]. In Norway, fat intake was reduced from 40% to 34% in only 15 years […], making Norwegians a role model for the other Nordic countries, where a high fat consumption is the tradition. Finland […] has followed this trend, and

> now reports patterns of decreasing fat intake similar to those in the USA and Norway. However, some countries, like Denmark and Sweden, still displayed intake figures for fat consumption as high as 39-43% until the late 1980s, and only recently have decreases been reported […]. (Heitmann & Lissner 2001: 137)

Admittedly, these numbers are all still higher than the recommended 30% fat intake, but paradoxically, the countries with the most successful reduction are also the ones in which obesity rates have risen the most:

> In Finland, for instance, prevalence of obesity rose from 10% to 14% in men and from 10% to 11% in women between the late 1970s and early 1990s […] while at the same time fat intake decreased from approximately 38% to 34% […]. In the USA, data from the National Health and Nutrition Examination Survey (NHANES) show that while fat intake was decreasing, prevalences of severe obesity increased from 10% to 20% in men and from 15% to 25% in women […]. (Heitmann & Lissner 2001: 137)

These trends indicate a mismatch between the current paradigm of obesity research and reality, but as usual in normal science, instead of looking for a new paradigm, scientists try to explain anomaly with the help of current theories. In this case, it is argued that, "it cannot be excluded that the secular trends in obesity may have been even more dramatic if not for the decrease in fat intake" (ibid.). Thus, although the reduced fat intake could not prevent obesity from rising, the situation would be even worse if it had not been reduced at all and therefore the apparent anomaly is not an anomaly after all.

What we see here is the way normal science usually reacts in the presence of a crisis. Although crises lead to paradigm change, they do not do so immediately, as Kuhn describes:

> Let us […] assume that crises are a necessary precondition for the emergence of novel theories and ask next how scientists respond to their existence. Part of the answer, as obvious as it is important, can be discovered by noting first what scientists never do when confronted by even severe and prolonged anomalies. Though they may begin to lose faith and then to consider

> alternatives, they do not renounce the paradigm that has led them into crisis. They do not, that is, treat anomalies as counterinstances, though in the vocabulary of philosophy of science that is what they are. (*SSR*: 77)

This is also the kind of behaviour we can observe if we look at how Heitmann and Lissner argue further in their contribution to the *International Textbook of Obesity*. They offer three possible explanations for why reduced fat intake did not lead to an energy deficit as expected: „[o]ne is that people are decreasing their energy intake but also becoming less active. Another is that people are maintaining their energy intake despite the reduction in fat intake. A third explanation, is that fat intakes are not as low as reported" (Heitmann & Lissner 2001: 137). These explanations roughly translate into the argumentation introduced above: people gain weight because they are lazy and eat too much. On top of that they may even be dishonest in reporting or acknowledging their real food intake. In short, the anomaly is their fault, not that of the paradigm.

For Heitmann and Lissner, the first two explanations are most plausible and they go on to present evidence for and against the relationship between fat intake and obesity. However, underreporting of fat intake cannot account for the apparent anomaly, because actually it does not rely on reported data Heitmann & Lissner 2001: 141). Thus, there remains some insecurity about fat intake and obesity, but Heitmann and Lissner solve this problem by shifting the focus back to overall energy balance of which fat intake is merely a small part (Heitmann & Lissner 2001: 141-142).

This is only one example for how anomalies in obesity research are usually explained, but coming from a textbook, it can be regarded as typical. Further, it illustrates that, contrary to common belief, scientists do not falsify their theories alone by comparison with nature:

> No process yet disclosed by the historical study of scientific development at all resembles the methodological stereotype of falsification by direct comparison with nature. That remark does not mean that scientists do not reject scientific theories, or that experience and experiment are not essential to the process in which they do so. But it does mean—what will ultimately be a central point—that the act of judgment that leads scientists to reject a previously accepted theory is always based upon more than a comparison of

> that theory with the world. The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgment leading to that decision involves the comparison of both paradigms with nature *and* with each other. (*SSR*: 77)

This is because:

> Once a first paradigm through which to view nature has been found, there is no such thing as research in the absence of any paradigm. To reject one paradigm without simultaneously substituting another is to reject science itself. That act reflects not on the paradigm but on the man. Inevitably he will be seen by his colleagues as "the carpenter who blames his tools." (*SSR*: 79)

Instead of rejecting a paradigm once an anomaly is encountered, scientists "will devise numerous articulations and *ad hoc* modifications of their theory in order to eliminate any apparent conflict. Many of the relevant modifications and qualifications are, in fact, already in the literature" (*SSR*: 78), as can be seen in the example from obesity research above.

In addition, Kuhn stresses that:

> […] there is no such thing as research without counterinstances. For what is it that differentiates normal science from science in a crisis state? Not, surely, that the former confronts no counterinstances. On the contrary, what we previously called the puzzles that constitute normal science exist only because no paradigm that provides a basis for scientific research ever completely resolves all its problems. The very few that have ever seemed to do so (e.g., geometric optics) have shortly ceased to yield research problems at all and have instead become tools for engineering. (*SSR*: 79)

A counterinstance is therefore not enough to cause a paradigm shift, as it could be nothing more than another puzzle for normal science to solve. In fact, the dividing line between a puzzle and a counterinstance is always blurred (*SSR*: 80) and the main difference between them lies in the way they are solved: puzzles may be solved by strict adherence to the rules, but in order to explain a counterinstance, "crisis loosens the rules of normal puzzle-solving in ways that ultimately permit a new paradigm to emerge" (ibid.). According to Kuhn:

> All crises begin with the blurring of a paradigm and the consequent loosening of the rules for normal research. In this respect research during crisis very much resembles research during the pre-paradigm period, except that in the former the locus of difference is both smaller and more clearly defined. And all crises close in one of three ways. Sometimes normal science ultimately proves able to handle the crisis-provoking problem despite the despair of those who have seen it as the end of an existing paradigm. On other occasions the problem resists even apparently radical new approaches. Then scientists may conclude that no solution will be forthcoming in the present state of their field. The problem is labelled and set aside for a future generation with more developed tools. Or, finally, the case that will most concern us here, a crisis may end with the emergence of a new candidate for paradigm and with the ensuing battle over its acceptance. (*SSR*: 84)

I argue, that the 'obesity epidemic' is more than just another puzzle in obesity research and will lead to a new paradigm, because we can already see the phenomena Kuhn describes will happen during a paradigm shift:

> When […] an anomaly comes to seem more than just another puzzle of normal science the transition to crisis and to extraordinary science has begun. The anomaly itself now comes to be more generally recognized as such by the profession. More and more attention is devoted to it by more and more of the field's most eminent men. If it still continues to resist, as it usually does not, many of them may come to view its resolution as *the* subject matter of their discipline. For them the field will no longer look quite the same as it had earlier. Part of its different appearance results simply from the new fixation point of scientific scrutiny. An even more important source of change is the divergent nature of the numerous partial solutions that concerted attention to the problem has made available. The early attacks upon the resistant problem will have followed the paradigm rules quite closely. But with continuing resistance, more and more of the attacks upon it will have involved some minor or not so minor articulation of the paradigm, no two of them quite alike, each partially successful, but none sufficiently so to be accepted as paradigm by the group. Through this proliferation of divergent articulations (more and

> more frequently they will come to be described as *ad hoc* adjustments), the rules of normal science become increasingly blurred. Though there still is a paradigm, few practitioners prove to be entirely agreed about what it is. Even formerly standard solutions of solved problems are called in question. (*SSR*: 82-83)

By adopting the term 'obesity epidemic', obesity researchers acknowledged that there is a crisis although they did not intend to change the energy balance paradigm with it. Rather, their aim was to intensify research in order to solve the puzzle of why obesity rates were rising on a global scale and this aim was reached successfully. The number of published articles containing the keyword 'obesity' on PubMed increased tenfold during the past twenty years, from less than 2000 articles in 1994 to almost 20,000 articles in 2014, which clearly shows that more and more scientists have come to recognize the need to research obesity more thoroughly.

At first, researchers tried to find explanations for the 'obesity epidemic', which are consistent with the energy balance paradigm. On the one hand, this led to the 'obesogenic environment' discourse. Although considering environmental factors could be called radical and new compared to approaches, which only look at the amount of food and exercise, the 'obesogenic environment' approach still relies on the energy balance paradigm and does not change any of its elements. Further, while this approach has become widely accepted and is put into practice in various attempts to 'nudge' people into healthier eating and exercising habits, it does not change the fact that individuals are still responsible for their choices, so that obesity remains a visible sign of 'wrong' choices and therefore stigmatized. However, the 'obesogenic environment' approach is now confronted with the fact that obesity, which has long been regarded as a symptom of affluence that only occurs in the developed (i.e. 'obesogenic') world, is rapidly becoming a problem in developing countries as well (cf. Garret & Ruel 2005; Doak et al. 2005).

On the other hand, research has been intensified on bariatric surgery, which is not a new, but nevertheless radical approach to treat obesity. This treatment is usually chosen after other approaches to create energy deficits have failed, which shows how much obesity researchers cling to the energy balance paradigm. Even when energy deficits induced by diet and exercise do not result in weight loss as expected, this anomaly is not countered with scepticism towards the paradigm, but by creating even

more energy deficit with the help of bariatric surgery. However, bariatric surgery does not always result in weight loss, which presents a serious problem for the energy balance paradigm, since a more radical way to create an energy deficit is hardly imaginable unless one was to endorse not eating at all.

Thus, both of these approaches have not solved the problem of globally rising obesity rates yet, but the intensification of obesity research has also led to explanations for obesity, which do not rely on energy balance. For example, it has been discovered that the gut microbes found in lean and obese mice are different and that bariatric surgery also alters the gut microbes. Therefore, it is now suggested that these gut microbes play an important role in bariatric surgery and obesity in general (cf. Aron-Wisnewsky et al. 2012).

Besides the role of gut microbes, that of hormones has moved into the focus of obesity researchers, too. In fact, we should say that hormones moved back into the focus of obesity research. As the following section will show, the current paradigm shift in obesity research relies on the rediscovery of past theories to explain obesity, which were mostly forgotten once the energy balance paradigm was established. It is beyond the scope of this chapter to describe all of these, let alone to summarize every aspect of obesity research including all its controversies during the past decades. Rather, I want to focus on the role insulin plays in the formation of obesity, because this is what the paradigm shift in obesity research is based upon.

3.4 The Rise and Fall of the Energy Balance Paradigm

Obesity research under the energy balance paradigm focuses on quantities: how much someone weighs depends on how much he or she eats and exercises. As we already know, this simple theory has a long history; so long, that we might think there have never been other explanations for weight gain and loss, but in this section we shall see that there is an alternative explanation for obesity, which was developed from the 19th century onward and was ultimately abandoned in the 1980s. We can call this period the pre-paradigm period of obesity research. Since then, the energy balance paradigm has been established and remained until today. It presumably relies on the first law of thermodynamics, according to which energy can only be

transformed from one state into another, but it can never be lost. Therefore, the source of energy is irrelevant to the energy balance paradigm, whether derived from fat, protein or carbohydrates, 'a calorie is a calorie', as was stated at an obesity symposium in the early 1950s (Taubes 2008: 292-293). Since then, it was almost impossible to question this paradigm, because to question it was equal to questioning the laws of physics.

However, Taubes demonstrates in *Good Calories, Bad Calories. Fat, Carbs, and the Controversial Science of Diet and Health* that the energy balance paradigm relies on two misconceptions of thermodynamic law, the first misconception "is the assumption that an association implies cause and effect" (Taubes 2008: 293):

> The first law of thermodynamics dictates that weight gain—the increase in energy stored as fat and lean-tissue mass—will be *accompanied by* or *associated with* positive energy balance, but it does not say that it is *caused* by a positive energy balance—by "a plethora of calories," as Russell Cecil and Robert Loeb's 1951 *Textbook of Medicine* put it. There is no arrow of causality in the [energy-in-energy-out-]equation. It is equally possible, without violating this fundamental truth, for a change in energy *stores*, the left side of the […] equation, to be the driving force in cause and effect; some regulatory phenomenon could drive us to gain weight, which would in turn cause a positive energy balance—and thus overeating and/or sedentary behavior. Either way, the calories in will equal the calories out, as they must, but what is cause in one case is effect in the other. (Taubes 2008: 293)

Usually, obesity researchers interpret energy balance one-directional and ignore the possibility that eating too much and exercising too little do not cause weight gain, but are rather the consequence of weight gain. As Taubes explained above, the causal relationship between energy balance and weight gain cannot be drawn from the energy-in-energy-out-equation alone,[41] but the misconception that it can "has led to a

[41] In *Why We Get Fat* Taubes stresses this fact: "A logician would say that it contains no causal information" (Taubes 2011: 92). He uses the following example to illustrate this: "Imagine that, instead of talking about why we get fat, we're talking about why a room gets crowded. Now the energy we're discussing is contained in entire people rather than just their fat tissue. Ten people contain so much energy, eleven people contain more, and so on. So what we want to know is why this room is crowded and so overstuffed with energy – that is, people. If you asked me this question, and I said, *Well, because more people entered the room than left it*, you'd probably think I was being a wise guy or an idiot. *Of course more people entered than left*, you'd say. *That's obvious. But why?*" (ibid.)

century of misguided obesity research" (ibid.). Only occasionally did obesity researchers describe overeating and physical inactivity as caused by weight gain. Those who did, looked at obesity more critical than their colleagues, like Hugo Rony for example (Taubes 2008: 294).

Rony discussed energy balance in his 1940 work *Obesity and Leanness* and compared it to that of growing children:

> "The caloric balance is known to be positive in growing children," he observed. But children do not grow because they eat voraciously; rather, they eat voraciously because they are growing. They require the excess calories to satisfy the requirements of growth; the result is positive energy balance. The growth is induced by hormones and, in particular, by growth hormone. This is the same path of cause and effect that would be taken by anyone who is driven to put on fat by a metabolic or hormonal disorder. The disorder will cause the excess growth—horizontal, in effect, rather than vertical. For every calorie stored as fat or lean tissue, the body will require that an extra calorie either be consumed or conserved. As a result, anyone driven to put on fat by such a metabolic or hormonal defect would be driven to excessive eating, physical inactivity, or some combination. Hunger and indolence would be side effects of such a hormonal defect, merely facilitating the drive to fatten. (Taubes 2008: 294)

Similarly, Hilde Bruch claimed that weight gain is driven by "primary metabolic or enzymatic defects" (Bruch, cited after Taubes 2008: 294). She had observed a remarkable number of obese children in New York City in 1934, i.e. the "depth of the Great Depression, an era of soup kitchens, bread lines, and unprecedented unemployment. […] In New York City, where Bruch and her fellow immigrants were astonished by the adiposity of the local children, one in four children were said to be malnourished" (Taubes 2011: 4). Bruch established a clinic to treat obese children, but found that it was almost impossible for them to lose weight: "maintaining a lower weight involved "living on a continuous semi-starvation diet," and they just couldn't do it, even though obesity made them miserable and social outcasts" (ibid. 4-5).

Unfortunately, such critical accounts of obesity are limited. Taubes claims that there are merely "half a dozen [serious books on obesity published after 1900] (out of

the innumerable professional texts and proceedings now available)" (Taubes 2008: 294) and expresses his astonishment about this fact:

> What may be the single most incomprehensible aspect of the last half-century of obesity research is the failure of those involved to grasp the fact that both hunger and sedentary behaviour can be driven by a metabolic-hormonal disposition to grow fat, just as a lack of hunger and the impulse to engage in physical activity can be driven by a metabolic-hormonal disposition to burn calories rather than store them. (Taubes 2008: 295)

However, he gives the explanation for this failure himself:

> What they believe is what they were taught in medical school, which was and is the conventional wisdom: the growth of skeletal muscle and bones, and thus our height, is driven by the secretion of growth hormone from the pituitary gland; the growth of fat tissue, and thus our girth, is driven by eating too much or physical inactivity. (Taubes 2008: 295)

Because obesity researchers were educated under this paradigm they assumed that they already know what causes obesity and so their research interest focused on "establishing the characteristics that distinguish fat people from lean" (ibid. 296). As a result, obesity researchers have tried to show that obese people eat more or exercise less than non-obese. But although these assumptions could not be proven to be true,[42] most obesity researchers rather blamed their studies than let go of the energy balance paradigm. Also, in contrast to Hilde Bruch, the majority of more contemporary obesity researchers lacked the opportunity to observe blatant discrepancies like obese children during the Great Depression. In times of abundant food, it is hard to see that energy balance could work any other than the perceived way. Thus, the faith of

[42] In their 1989 report on diet and health, the American National Academy of Science analysed the scientific research on the role of nutrition in causing disease and death and found that food intake as well as energy expenditure were not related to obesity. In fact, „[i]n several cross-sectional studies, overweight subjects have often been found to eat the same or smaller amounts of food compared to normal-weight subjects" (National Academy of Science 1989: 144) and "[p]hysical exercise may reduce the total quantity of body fat and body weight. In a review of training programs lasting from 7 to 22 weeks, Wilmore (1983) found that changes in body composition were surprisingly small. On average, body fat decreased by only 1.6%, and in 5 of 55 studies there was actually an increase in body fat after training. Moreover, lean body mass dropped in 17 of these 55 studies" (ibid. 146).

obesity researchers in energy balance based on the first law of thermodynamics perpetuated popular beliefs about the character of obese people.

One of these, is the belief that people who grow fat cannot control their energy intake and expenditure in contrast to those people who stay lean. This belief is based on the second misconception of the first law of thermodynamics:

> The idea that obesity is caused by the slow accumulation of excess calories, day in and day out, over years or decades, and the associated idea that it can be prevented by reductions in caloric intake and/or increases in physical activity, are both based on an assumption about how the three variables in the energy-balance equation—energy storage, energy intake, and energy expenditure—relate to each other. They assume that energy intake and energy expenditure are what mathematicians call *independent variables*; we can change one without affecting the other. […] The question is whether one can actually change energy intake in a living organism without prompting compensatory changes in energy expenditure. (Taubes 2008: 296-297)

These ideas go back to the German internist and diabetologist Carl von Noorden who published his monograph on obesity *Die Fettsucht* ('Fettsucht' means 'obesity' in German) in 1900. He suggested "that obesity could be caused by eating one extra slice of bread every day or climbing fewer flights of stairs, so that a few extra dozen calories each day would accumulate over a decade into tens of pounds" (Taubes 2008: 297). This theory is still common sense in obesity research and used in disease prevention campaigns today, for example in the American *Dietary Guidelines*:

> [W]hen the USDA [U.S. Department of Agriculture] *Dietary Guidelines*, over a century later, evoked the same concept with the suggestion that "for most adults a reduction of 50 to 100 calories per day may prevent gradual weight gain," they were treating human beings as though they are simple machines. "There is only one trouble," as Hilde Bruch commented about von Noorden's logic—"human beings do not function this way." (Taubes 2008: 297)

As Bruch knew from her observations, fat does not simply accumulate and weight cannot be controlled by simply eating a few calories less every day. Rather, the body regulates fat accumulation and adapts energy intake and expenditure in order

to achieve energy balance and keep body weight stable.[43] This is why we get hungry when we need energy "and if we can't satisfy that hunger, we'll get lethargic and our metabolism will slow down to balance our intake" (ibid. 299). Similarly, when we have energy to spend we get restless and feel an "impulse to move" (ibid. 302). This shows:

> that energy intake and expenditure are very much *dependent* variables—that they are physiologically linked so that a change in one forces a corresponding change in the other—and it is energy storage that is determined biologically within a certain range set by the interaction between genetics and the environment (Taubes 2008: 298).

Interestingly, these regulatory effects are well known "[a]mong researchers who study malnutrition, as opposed to those whose specialty is obesity, […] as is the fact that hormones regulate this process" (ibid. 299): "Changes in …hormones such as insulin and glucagon play an important role in this metabolic response to energy restriction […]" (ibid.).

Therefore, for those researchers who know these facts it is no surprise that:

> "dieting is difficult," as Keith Frayn of Oxford University says in his 1996 textbook, *Metabolic Regulation*. "It is a fight against mechanisms which have evolved over many millions of years precisely to minimize its effects…. As food intake drops, the level of thyroid hormone falls and metabolic rate is lowered. Food intake has to be reduced yet further to drop below the level of energy expenditure. Hunger mechanisms, including the feeling of an empty stomach, lead us to search for food…." (Taubes 2008: 299)

For most obesity researchers, however, "the traditional response to the failure of semi-starvation diets to produce long-term weight loss has been to blame the fat person for a lack of willpower" (ibid.). By blaming their research subjects instead of their research methods and trials, obesity researchers missed the chance to recognize in the anomaly every failed diet represents "an important "clue to the puzzle," as

[43] Taubes notes, that "[t]his theory evolved in the 1970s into the popular set-point hypothesis, that our bodies will defend a certain preferred amount of body fat against either an excess or a deficit of calories. It fell out of favor because it implied that neither calorie-restricted diets nor exercise would lead to long-term weight loss" (ibid. 298).

Bruch suggested in 1955" (ibid. 300). Eventually, obesity researchers accepted the theory:

> that obesity is caused by a perverted appetite. "The idea that people burn off excess energy when overfed was regarded with great disfavor by respectable nutritionists," as the British clinician John Garrow later noted. "It was a story put about by charlatans to justify magic cures, or by self-indulgent obese people as a justification for their obesity." (Taubes 2008: 301)

As the use of words like 'perverted' or 'self-indulgent' indicates, the decision to dismiss homeostatical energy regulation in favour of a causal interpretation of energy balance was influenced by the moralization of obesity. Further, speaking of 'charlatans' and 'magic cures' makes clear how anyone who supports an explanation for obesity other than positive energy balance will be discredited. The only accepted weight loss methods under the energy balance paradigm are calorie-restricted semi-starvation diets that require nearly impossible willpower to ignore hunger, which shows the influence of the cultural and religious value put on asceticism. Up until today, losing weight is so tightly linked with ascetic behaviours such as discipline, self-control, patience and endurance, that any easy method to lose weight, which does not require any of these traits, is viewed with suspicion.

However, if we accept homeostatical energy regulation by hormones and model our weight loss strategies accordingly, losing weight can be remarkably easy. Following this theory of obesity, leads to three propositions:

> First, […] is the basic proposition that obesity is caused by a regulatory defect in fat metabolism, and so a defect in the distribution of energy rather than an imbalance of intake and expenditure. The second is that insulin plays the primary role in this fattening process, and the compensatory behaviors of hunger and lethargy. The third is that carbohydrates, and particularly refined carbohydrates—and perhaps the fructose content as well, and thus the amount of sugars consumed—are the prime suspects in the chronic elevation of insulin; hence, they are the ultimate cause of common obesity. These latter two propositions—that insulin regulates fat deposition and carbohydrates regulate insulin—have never been controversial, but they've been dismissed

> as irrelevant to obesity, given the ubiquitous belief that obesity is caused by overeating. (Taubes 2008: 359)

Like Taubes remarks, the role of insulin in the formation of obesity is not a new discovery, but existed as an alternative theory of what causes obesity already more than a century ago. Unfortunately, it:

> ultimately vanished in the 1980s, a casualty of the official consensus that fat was the dietary evil and carbohydrates were the cure. Ironically, it disappeared just as all the relevant physiological mechanisms had been worked out and a causal path established from the carbohydrates in the diet through insulin to the regulatory enzymes and molecular receptors in the adipose tissue itself. That, I will argue, was a mistake. (Taubes 2008: 359)

The consensus Taubes mentions here, goes back to the so-called 'diet-heart hypothesis' Ancel Keys first introduced in 1952, according to which dietary fat was responsible for causing heart disease. All advice to avoid fat consumption is based on this hypothesis, although it could never be proven that reducing fat intake does decrease mortality from heart disease and met with much criticism in the beginning. However, Keys was very successful in refuting his critics until it became impossible to criticize the diet-heart hypothesis without being discredited. In addition, politicians and other influential personalities embraced Keys' theory very early so that it became the basis for virtually all public health programmes concerning diet despite the lack of evidence. Teicholz meticulously describes how the diet-heart hypothesis gained the importance it enjoys today in *The Big Fat Surprise. Why Butter, Meat, and Cheese Belong in a Healthy Diet* (2014), but there is not enough space in this essay to look into this process in all detail. It certainly was a mistake, since the endorsement of 'healthy' carbohydrates eventually led to the 'obesity epidemic', but this mistake is also what now enables the paradigm shift in obesity research, because as Kuhn notes in citing Francis Bacon: "Truth emerges more readily from error than from confusion" (*SSR*: 18).

Obesity researchers now find themselves, thanks to the 'obesity epidemic', reconsidering alternative approaches to obesity and started to treat it by restricting carbohydrate intake. This leads to low insulin levels, which is the prerequisite for weight loss:

> The one fundamental requirement to increase the flow of fatty acids out of adipose tissue […] and so decrease the amount of fat in our fat tissue, is to lower the concentration of insulin in the bloodstream. […] By the same token, the one necessary requirement to shut down the release of fat from the fat cells and increase fat accumulation is the presence of insulin. When insulin is secreted, or the level of insulin in the circulation is abnormally elevated, fat accumulates in the fat tissue. When insulin levels are low, fat escapes from the fat tissue, and the fat deposits shrink. (Taubes 2008: 390)

This knowledge was really only rediscovered, because it was well-established fact based on over a hundred years of research before carbohydrates became the 'heart-healthy' alternative to fat as a source of energy thanks to Keys' diet-heart hypothesis, as the following quote shows:

> "It may be stated categorically," the University of Wisconsin endocrinologist Edgar Gordon wrote in JAMA in 1963, "that the storage of fat, and therefore the production and maintenance of obesity, cannot take place unless glucose is being metabolized. Since glucose cannot be used by most tissues without the presence of insulin, it also may be stated categorically that obesity is impossible in the absence of adequate tissue concentrations of insulin…. Thus an abundant supply of carbohydrate food exerts a powerful influence in directing the stream of glucose metabolism into lipogenesis, whereas a relatively low carbohydrate intake tends to minimize the storage of fat." Taubes 2008: 392)

In fact, fat storage is minimized even if large amounts of calories are consumed, as long as carbohydrate consumption is avoided.

Based on this principle, Robert Atkins published his famous diet book *Dr. Atkins' Diet Revolution. The High Calorie Way to Stay Thin Forever* in 1972. It was an immediate success, selling almost one million copies in only six months, but in 1973 Atkins was accused of malpractice in a hearing on obesity and fad diets held by George McGovern's Senate Select Committee on Nutrition and Human Needs (Taubes 2008: 404).

> A few weeks later, McGovern's committee hosted hearings on "Sugar in the Diet, Diabetes, and Heart Disease." Testimony came from an international panel of authorities […]. These investigators discussed the potential dangers of refined carbohydrates in the diet […]. McGovern and his fellow congressmen found the testimony compelling, although difficult to reconcile with the growing acceptance, their own included, of the notion that it was fatty foods that caused heart disease, and carbohydrates that would prevent it. (Taubes 2008: 404-405)

Due to this inconsistency, then Assistant Secretary of Health Theodore Cooper emphasized the need for further research at first, but when he was asked by McGovern about the kinds of foods that should generally be eaten more or less, he answered that it was necessary to reduce total fat intake, because "[f]at adds a caloric substance—almost twice as much—nine calories per gram—as compared to sugar" (ibid. 406). Thus, Cooper endorsed the energy balance paradigm, which eventually put an end to all controversies by the mid-1980s (ibid.).

However, just like Atkins, who took a chance with carbohydrate restriction after he had gained fifty pounds in four years and found it so successful he wrote *Diet Revolution* (ibid. 412), more and more physicians try the diet in recent years, too – either to treat their own obesity or that of their patients. Carbohydrate restriction is as successful in treating obesity now as it was then, but just like Atkins contemporary physicians have to defend their practice against the resistance of other physicians and obesity researchers, although it is very easy to verify its success thanks to to visibility of body fat. Unless other hormonal-metabolic defects are present in someone beginning carbohydrate restriction, body weight can be reduced significantly within a few weeks to months depending on the amount of body fat – and without becoming lethargic or feeling hungry like it is the case with semi-starvation (or calorie-restricted) diets: "Atkins said he lost twenty-eight pounds in a month and felt energized in the process" (ibid. 413). Asked about his weight loss method, he told his colleagues about it. "Sixty-five of them eventually tried it, as Atkins told it, and all but one reduced to their desired weight. The sole exception wanted to lose eighty pounds but lost only fifty" (ibid.).

Atkins was not the inventor of carbohydrate-restricted diets, but he was perhaps the most successful in making it popular – if only for some time – and he did

so at a time, when support for carbohydrate restriction faded knowing that it would result in his discrediting (ibid. 414). "Atkins wanted "a revolution, not just a diet." […] "Martin Luther King had a dream," Akins wrote. "I, too, have one. I dream of a world where no one has to diet. A world where the fattening refined carbohydrates have been excluded from the diet" (ibid.). His dream would come true if people followed his diet, which boils down to three assertions:

> The first is that weight could be lost on his diet without hunger, and perhaps without even restricting calories. Atkins said that his patients regularly lost weight eating three thousand calories a day, and that he had one three-hundred-pounder who reduced significantly while eating five thousand. His only explanation was that obesity is caused by the kind of calories we consume and not the quantity, and so if we avoid carbohydrate our bodies function correctly and shed any excess weight. […]
>
> Atkins second claim was that his diet was inherently healthy, much more so than a low-fat diet, because refined carbohydrates and starches, not saturated fat, caused heart disease and diabetes. […]
>
> His third claim was what he called the "cruel hoax" of calorie-restricted diets: "The balanced low-calorie diet has been the medical fashion for so long that to suggest any alternative invites professional excommunication," Atkins wrote. […] Atkins supported his accusation by […] offering three reasons why calorie-restricted diets inevitably fail. First, they "don't touch the primary cause of most overweight," which is a "disturbed carbohydrate metabolism." They also fail because they reduce energy expenditure. […] And finally, Atkins wrote, "The main reason low-calorie diets fail in the long run is because you go hungry on them…. And while may tolerate hunger for a short time, you can't tolerate hunger all your life." (Taubes 2008: 413-414)

Yet, today, living in a state of semi-starvation and constant dieting have become normal in the lives of many, as some critics of the dominant obesity discourse have noted (see chapter 2).

However, although resistance is still strong, we could in recent years observe a revival of carbohydrate-restricted diets, which today go under the name *Low*

Carb(ohydrate), High Fat (LCHF). While their popularity is growing worldwide, they have become especially popular in Sweden, where physician Andreas Eenfeldt is spreading knowledge about LCHF on his blog kostdoktorn.se ('kost doktorn' translates into 'diet doctor', which is also the name of the English version of his blog dietdoctor.com) since 2007. It "quickly became Sweden's largest health blog, with over 10,000 visitors per day" (Eenfeldt 2014: 12). In addition, Eenfeldt wrote a book on LCHF. It is perhaps no coincidence that its title contains the words 'food revolution'.[44] Just like Atkins, Eenfeldt, too, is aiming to revolutionize the treatment of obesity and "change the status quo", as he writes on his blog. I shall describe the paradigm LCHF relies on more in detail in the following chapter, before looking at its ethical and cultural implications.

It is perhaps no coincidence that the revival of carbohydrate-restricted diets is happening now, after Ancel Keys died in 2004, since, as Max Planck remarked: "a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it" (Planck, cited after Kuhn in *SSR*: 151). According to Kuhn, this is just how paradigm shifts work:

> The transfer of allegiance from paradigm to paradigm is a conversion experience that cannot be forced. Lifelong resistance, particularly from those whose productive careers have committed them to an older tradition of normal science, is not a violation of scientific standards but an index to the nature of scientific research itself. The source of resistance is the assurance that the older paradigm will ultimately solve all its problems, that nature can be shoved into the box the paradigm provides. Inevitably, at times of revolution, that assurance seems stubborn and pigheaded as indeed it sometimes becomes. But it is also something more. That same assurance is what makes normal or puzzle-solving science possible. (*SSR*: 151-152)

Thus, it is no surprise that obesity researchers who support LCHF today find it difficult to convince their colleagues who still cling to the energy balance paradigm. Most of the time, they have to defend themselves like Atkins, because, as Kuhn

[44] The full title is *Low Carb, High Fat. Food Revolution. Advice and Recipes to Improve Your Health and Reduce Your Weight* (2014). The original Swedish title is *Matrevolutionen. Ät dig frisk med riktig mat* (2011), which translates into *Food Revolution. Eat Yourself Healthy With Proper Food*.

writes, a paradigm shift cannot be forced (*SSR*: 151): "Like the gestalt switch, it must occur all at once (though not necessarily in an instant) or not at all" (ibid.) and for this "crisis alone is not enough" (*SSR*: 158):

> There must also be a basis, though it need be neither rational nor ultimately correct, for faith in the particular candidate chosen. Something must make at least a few scientists feel that the new proposal is on the right track, and sometimes it is only personal and inarticulate aesthetic considerations that can do that. (*SSR*: 158)

Many of the physicians and researchers who turn away from the energy balance paradigm now do so because of their own experience with weight gain or disease. Examples for this are Timothy David Noakes, an exercise and sports science professor at the University of Cape Town, and physician Peter Attia. Both used to believe in the energy balance paradigm until they started to gain weight, despite the fact that they paid attention to their diet and exercised regularly. Noakes used to be a marathon runner and Attia still is an endurance athlete, but even such intensive exercising could not prevent them from gaining weight. This anomaly according to the energy balance paradigm led Noakes as well as Attia to question what they had learned about obesity and eventually they accepted the fact, that carbohydrate consumption drives weight gain. As a result, Noakes renounced everything he had written on 'carb-loading' as a strategy for athletes to store energy in advance to competitions and even ripped the relevant pages from his book during an interview for the 2012 documentary *Cereal Killers*. Attia expressed his change of mind publicly in a TED talk[45] held in 2013. He describes how he could not treat an obese and diabetic patient with empathy, because he thought, that she was responsible for her own disease:

> "Looking back on that night, I'd love so desperately to believe that I treated that woman with the same empathy and compassion that I'd shown the 27-year-old newlywed who'd come to the ER three nights earlier with lower back pain that turned out to be advanced pancreatic cancer. I passed no judgment on

[45] TED stands for Technology, Entertainment and Design and is a non-profit organization, which features talk events all over the world to spread ideas, hence the organization's slogan *Ideas worth spreading*.

> her — obviously she had done nothing to bring this on herself," says Attia. "So why was it just a few nights later that as I stood in this same ER and determined that my diabetic patient did indeed need an amputation, why did I hold her in such bitter contempt?" The answer: this woman had Type 2 diabetes and was obese. Running through Attia's mind was the idea that, if she had just watched what she ate and exercised a little, she wouldn't be in this position. (Torgovnick: May 2013)

Later, when he started to gain weight himself and learned that what he had been taught about obesity was wrong, he regretted his behaviour deeply, shown by the tears he shed during his TED talk.

These are but two examples that illustrate how the current paradigm shift in obesity research is taking place. Kuhn describes this as follows:

> At the start a new candidate for paradigm may have few supporters, and on occasions the supporters' motives may be suspect. Nevertheless, if they are competent, they will improve it, explore its possibilities, and show what it would be like to belong to the community guided by it. And as that goes on, if the paradigm is one destined to win its fight, the number and strength of the persuasive arguments in its favour will increase. More scientists will then be converted, and the exploration of the new paradigm will go on. Gradually the number of experiments, instruments, articles, and books based upon the paradigm will multiply. Still more men, convinced of the new view's fruitfulness, will adopt the new mode of practicing normal science, until at last only a few elderly hold-outs remain. (*SSR*: 159)

We can see how more and more physicians and researchers are converted today by the foundation of new research institutions. Peter Attia and Gary Taubes, for example, joined forces to found the non-profit organization *Nutrition Science Initiative* (NuSI) in 2012. They describe their strategy and research interests on the website about NuSI:

> Our strategy is simple. NuSI builds teams of the best scientists in health and human nutrition and provides them with an unparalleled level of funding and the scientific freedom to study the most vexing health and metabolic questions

> plaguing us today. And all of this is done within an overarching strategy that systematically tackles the most critical questions asked by those struggling with the burden of metabolic illness —are all calories really equal with respect to weight gain? Does saturated fat cause heart disease? Why do some people get obese while seemingly eating so little? What role do the bacteria in our gut play in obesity and related disease? Only when these questions are answered, unambiguously, can we communicate broadly what we need to eat for maximum health.[46]

Further, there is the *Institute for Responsible Nutrition* (IRN), which was founded by pediatric endocrinologist Robert Lustig and has similar goals as NuSI. In addition, the IRN aims to change "the way food is produced, marketed and distributed", especially fructose, which Lustig argues is a toxin. He explained this in a lecture titled *Sugar: The Bitter Truth* held at the University of California San Francisco (USCF) in 2009. The lecture can be viewed on YouTube[47] and has reached more than six million views as of November 2015.

Through these efforts, scientists supporting LCHF are forming a new scientific community. Many of its members gathered at the first *Low Carb High Fat Convention* held in Cape Town in February 2015, which is another sign that a paradigm shift in obesity research is indeed taking place.[48] While it will still take time until LCHF is fully accepted as the new paradigm of obesity research, we shall now turn to the ethical and cultural implications this paradigm will have.

[46] http://nusi.org/About-NuSI/

[47] https://www.youtube.com/watch?v=dBnniua6-oM

[48] Another, more informal forum for discussing LCHF is the so-called *Low-Carb Cruise*, which is taking place every year since 2008.

4 A New Paradigm in Obesity Research and its Ethical and Cultural Implications

Although *Low Carb(ohydrate) High Fat* (LCHF) has yet to be accepted by the whole scientific community conducting obesity research, it has begun to prove its effectiveness in dealing with the 'obesity epidemic'. We can see this in the example of Sweden. Like other countries "Sweden was increasingly warned about the dangers of eating fatty food, and warned about the naturally saturated fat [since the 1980s]" (Eenfeldt 2011: 51). Due to this warning, butter sales in Sweden dropped steadily from more than 28,000 tons per year in 1980 until they reached a plateau at just over 12,000 tons per year in 2000 (ibid. 52). However, contrary to what was expected, we could observe the same trend in Sweden as in other countries (cf. chapter 3.3): "the more [Swedes] avoided fat, the fatter [they] became" (ibid. 51): while only 30% of the Swedish population were overweight or obese in 1980, their number rose to almost 45% in 2000 (ibid. 52). This discrepancy led the Swedish people to question the recommendation to eat a low-fat diet during the 2000s (ibid. 51), including Eenfeldt himself who graduated from medical school in 2000, "as scared of fat as any of my colleagues" (ibid. 10). It may be because of this scepticism that butter sales did not drop further in Sweden since then. Interestingly, they started to rise again since 2007 when Eenfeldt started his blog, which may be no coincidence. It is still too early to see the full effects of this change in butter consumption, but overweight and obesity rates also reached a plateau in Sweden during the 2000s (ibid. 52). As Eenfeldt writes, the trend even points into a reduction of overweight and obesity rates (ibid. 64).

The reason for this changing trend in Sweden is not only the growing consumption of butter; much more important is the trend to reduce carbohydrate consumption. Both trends go hand in hand, because more and more Swedes are following a LCHF diet, i.e. eating less carbohydrates and more fat such as butter. According to Eenfeldt, LCHF has become the most popular weight loss method in Sweden (Eenfeld 2015) and is getting more accepted by health care authorities, too, but the struggle of physicians supporting LCHF is as difficult as elsewhere.

The paradigm shift in Sweden was sparked by a physician called Annika Dahlqvist. Like so many other physicians who converted to the new paradigm in obesity research, Dahlqvist, too, did so based on personal experience. Despite

following a low-fat diet from the 1990s, she grew heavier and became sicker ever since (Eenfeldt 2011: 75). The turning point for Dahlqvist came in 2004, when:

> her daughter returned from medical school. Her daughter told her that she had done a group lab with different diets. Her group had tested a strict low-carb diet and she had lost 6.5 lbs (3 kilos) in a week.
>
> Annika Dahlqvist, who had tried everything to no avail, immediately wanted to try it for herself. She hadn't lost 6 lbs (3 kg) in years. That winter she lost 2.2 lbs (1 kg) per week. She almost reached her ideal weight. Her hunger was gone.
>
> After a couple of months she discovered that she had recovered from her ailments. Her shoulders and wrists did not longer pain her and her stomach had become flat and calm. She considered it a miracle. (Eenfeldt 2011: 75)

Dahlqvist then started to prescribe the diet to her patients and spread the knowledge about LCHF in interviews, blog post and books (Eenfeldt 2011: 75-76).

However, just like it had happened to Atkins, Dahlqvist was reported to the Social Board by two dieticians, who accused her of jeopardizing patient safety and wanted to stop her (ibid. 78). "Ironically, their claim had the opposite effect. It became crucial for the following turn of events" (ibid.). It followed a more than two years long investigation to review the science behind LCHF. The result was that:

> Annika Dahlqvist was cleared of all blame. The news struck like a bomb at every newspaper. In an infected media debate, the Social Board had all of a sudden validated the controversial fat diet. The "extreme fat diet" that many people stilled [sic!] viewed as life-threatening. (Eenfeldt 2011: 79)

As could be expected, the Dieticians' Association did not accept this and "urged the Social Board to retract its approval of the low-carbohydrate diet that they thought was a mistake" (ibid.), but "[t]he Social Board stood by its decision, which caused an inflamed debate in the *Journal of Doctors* between the different camps. Just as in the general media, the debate is still ongoing" (ibid.).

There are however first signs, that LCHF is becoming the standard treatment in Sweden. On September 23rd, 2013, the Swedish Council of Health Technology Assessment (SBU) published its summary and conclusions regarding the *Dietary*

Treatment for Obesity and made it official for the first time in Sweden, that a low-carbohydrate diet is the most effective for treating obesity. This finding is based on a systematic review of the scientific literature concerning obesity treatment. The SBU dismissed all warnings against LCHF and also concluded that physical activity has hardly any effect on weight loss (Eenfeldt 2013). While the SBU is carefully about giving recommendations, it could be the basis for change in the Swedish health care system. According to Eenfeldt: "The SBU-report Dietary Treatment for Obesity is a gigantic step towards more effective dietary guidelines within the health care system" (ibid.). Once Sweden will have adopted new dietary guidelines, it is probably only a matter of time until other countries will follow suit and LCHF become the standard treatment for obesity and its related diseases.

In addition to new guidelines, LCHF also introduces a new paradigm to obesity research and other medical fields. Under this paradigm, energy balance is still valid, but it does not give an answer to the question why weight gain happens. Instead, it explains *how* it happens. It happens, if something disrupts the metabolic mechanisms of the body to regulate energy intake and expenditure, which answers the question *why*. These mechanisms are operated by hormones and the most important hormone for weight regulation is insulin, which is secreted when carbohydrates are consumed. If insulin levels are high, fat is accumulated, which leads to a positive energy balance, because it induces hunger and lethargy, i.e. more energy intake and less energy expenditure. On the other hand, if insulin levels are low, fat is released from fat cells and can be used as energy, which reduces hunger and enables physical activity. The energy balance is then negative: less energy is consumed and more spent. Therefore, LCHF does not deny the first law of thermodynamics, but it introduces insulin as the main driving force to determine the direction of energy balance.

Due to the importance of hormones for weight gain and weight loss, the new paradigm of obesity research can be called 'hormonal obesity'. Its symbolic generalization is still based on energy balance albeit with a hormonal vector such as insulin determining whether energy balance is positive or negative:

High insulin levels → *energy intake* > *energy expenditure* = *weight gain*

Low insulin levels → *energy intake* < *energy expenditure* = *weight loss*

Other hormones may or may not work in the same direction as insulin. For example, thyroid hormones work in the opposite direction: if their levels are too low, they lead to weight gain and they lead to weight loss if they are too high. This is why it is so hard for people with hypothyroidism to lose weight, while people with overactive thyroids find it difficult to put on weight. The hormonal obesity paradigm also explains why sleep deprivation is connected to obesity: a lack of sleep leads to insulin resistance and hormonal changes that cause an increase in hunger and appetite, especially for foods with high carbohydrate content (cf. Spiegel et al. 2005).

Based on this new paradigm it will be necessary to write new textbooks on obesity, which will contain new shared exemplars. These will describe obese people in a new way. They will cease to be viewed as lazy and overindulging, but rather be seen as suffering from hormonal defects. According to the underlying problem, which caused the hormonal defect, the new textbooks will then describe ways to treat that problem and where there is no solution yet, obesity researchers will find new puzzles to solve.

The values that guide their research do not change due to the new paradigm, since they are still the same values shared by all scientists regardless of their discipline. As described in chapter 3.1, some of these values are accuracy, consistency, scope, simplicity and fruitfulness. However, when obesity researchers adopted the energy balance paradigm they did not stick to all of them.

For example, they did not stick to accuracy, because they adopted the energy balance paradigm just at the time when hormonal mechanisms that lead to obesity had been figured out. Unfortunately, political influences led to the decision to ignore all theories other than energy balance, which opens the question of how much influence politics should have on science. On the one hand, there are research areas, in which political influence is necessary, for example if it restricts harmful research such as the development of weapons of mass destruction. On the other hand, research aiming at the treatment and prevention of disease should be free of political and other influences in order to find unbiased solutions, but since obesity is a public health issue, it is impossible to avoid all political influence. In the case of obesity, political influence led not only to the adoption of the energy balance paradigm, but once adopted it also hindered alternative research, either because it was not funded anymore or because researchers did not dare to risk their careers by going against the establishment (Teicholz 2014: 133-134).

Further, obesity researchers did not stick to the value of simplicity when they adopted the energy balance paradigm. Although various studies had shown that obesity and the diseases that are ascribed to it rose significantly as soon as people ate more sugar and starchy foods:

> […] the dominant approach over the past fifty years toward understanding the chronic diseases of civilization has been to assume that they are only coincidentally related, that each disease has its unique causal factors associated with the Western diet and lifestyle, although dietary fat, saturated fat, serum cholesterol, and excess weight invariably remain prime suspects.
>
> The less common approach to this synchronicity of diseases has been to assume, as Peter cleave did, that related diseases have related or common causes; that they are manifestations of a single underlying disorder. Cleave called it the saccharine disease because he believed sugar and other refined carbohydrates were responsible. […] If nothing else, Cleave argued, this common-cause hypothesis was the simplest possible explanation for the evidence, and thus the one that should be presumed true until compelling evidence refuted it. This was Occam's razor,[49] and it should be the guiding principle of all scientific endeavors. (Taubes 2008: 138-139)

Cleave's hypothesis was later developed by Gerald Reaven who named obesity, diabetes, heart disease and their common metabolic defects *Syndrome X*. It was also referred to as *insulin resistance syndrome* and renamed *metabolic syndrome* in 2001 (ibid. 140). However, although "[t]he syndrome itself was accepted as real and important[,] the idea that it was caused or exacerbated by the excessive consumption of carbohydrates simply vanished" (ibid. 184), because it was not compatible with the diet-heart hypothesis and the energy balance paradigm. Here, we see one of the *ad hoc* modifications obesity research adopted to eliminate conflicts in their theories, but they had to sacrifice some of their scientific values in order to do so. By turning to the hormonal obesity paradigm, obesity researchers also return to those values.

Finally, the hormonal obesity paradigm introduces a new metaphysical paradigm for how the human body works. Instead of imagining the body as a steam

[49] Occam's razor is a heuristic tool used in science. It says: "do not invoke a complicated hypothesis to explain observations, if a simple hypothesis will suffice" (Taubes 2008: xxiii).

engine, thinking of it as a computer makes a better comparison.[50] I borrow this comparison from Tom Naughton,[51] who described it in his presentation titled *Konvincing Kids that Kounting Kalories is Kooky* [sic!] held at the 8th Low-Carb Cruise in 2015. According to this metaphysical paradigm, the body with its organs and tissues can be compared to the hardware of a computer. Its central processing unit (CPU) and memory is the brain, which saves and processes information. Another kind of memory is present in the DNA, which contains the information that developed through evolution and is passed on from generation to generation. This information can be compared to the software of a computer. Some of the software runs the programmes written in the DNA on its own, while other programmes need to be operated by certain inputs. These inputs can be sensual like touch or vision but also include bacteria, food or toxins. For example, seeing something threatening triggers the secretion of adrenalin, which operates fight or flight reactions. In someone who is allergic to a certain food, ingesting this food triggers programmes producing an allergic reaction. In the case of obesity, carbohydrate intake leads to elevated insulin levels, which can trigger a programme to eat more, move less and store fat in fat cells. These are but a few examples to illustrate how comparing the body to a computer could explain many – maybe all – of the body's functions and mechanisms.

Since everybody's DNA is different, everybody has a particular software so that the programmes do not operate in exactly the same way in everybody. Some programmes can override others and stop them. Others may interact and amplify their effects. Therefore, some programmes seem to show no effects, while the effects of others may only be seen after a while. For example, bacteria that enter a healthy body are immediately neutralized by the autoimmune system without showing any symptoms, while the same bacteria lead to disease in someone whose autoimmune system is compromised. Carcinogens trigger programmes that inhibit cell death and eventually lead to cancer if other programmes to stop the growth of cancer fail.

[50] Note that I compare the whole body to a computer and not only the mind as in the 'computational theory of mind'.

[51] Naughton is a computer programmer, comedian and director of the 2009 comedy-documentary *Fat head: you've been fed a load of bologna*, in which he interviews several physicians on health and nutrition. In addition, he conducts a self-experiment to refute the hypothesis that fast-food chains such as McDonald's were to blame for obesity as it had been claimed in the well-known documentary *Super Size Me* (2004) by Morgan Spurlock. Just like Spurlock did in his documentary, Naughton ate fast-food exclusively for 28 days, but while Spurlock ended up gaining weight and developing signs of disease, Naughton managed to loose twelve pounds. The difference between their equally high-fat, high-calorie fast-food diets was that Naughton limited his carbohydrate intake to 100 g daily, whereas Spurlock did not. Therefore, Naughton could show that fast-food per se is not to be blamed for obesity.

Similarly, carbohydrate intake may for a long time show no effects, but finally lead to insulin resistance and consequently diseases like diabetes or high blood pressure. In some people this is accompanied by weight gain, but in others it is not. While some people develop insulin resistance very quickly, others will never develop it at all and there are also differences regarding the amount of carbohydrates that have to be consumed to lead to insulin resistance. For some people even eating one fruit a day may be enough to cause it, while others can eat bread, rice and pasta for all their life without developing insulin resistance. The same is true for the diseases that are associated with obesity. As described by Cleave and Reaven above, these diseases are not caused by obesity but by insulin resistance – the same condition that causes obesity. It is precisely because they have the same cause as obesity that diseases like diabetes or heart disease are associated with obesity and just like obesity, it depends on the individual programming whether or not insulin resistance develops and leads to disease.

Imagining the body and the development of obesity and disease in this way, we now need to consider the implications of the new paradigm in obesity research. Obviously, it will change the way obesity and its related diseases are treated. As we have learned, restricting carbohydrate intake is an effective treatment for obesity, but does that mean that every obese person should adopt a LCHF lifestyle or are there ethical pitfalls involved with this treatment? This question is also linked with that of who is responsible for preventing and treating obesity as well as that of justice. Therefore, what we need to consider are the ethical implications the new paradigm of obesity research has regarding responsibility, justice and interventions. In the following section, I want to reconsider justice and responsibility for obesity and disease first, because this will allow us to understand fully the meaning of treatment and prevention under the new paradigm in obesity research. We shall see that culture plays an important role in considering the ethical issues involved.

4.1 Reconsidering Justice and Responsibility for Obesity and Disease

The question of justice and responsibility for obesity and disease has its origin in the assumption that obesity is the cause of certain diseases, which could be avoided

if obesity was prevented. According to the energy balance paradigm obesity and its related diseases are mainly discussed as a matter of lifestyle and therefore personal choice, which puts the whole burden of responsibility on the individual. It is responsible for what it eats and how much it exercises and consequently also for gaining and losing weight as well as for the diseases this might lead to, since the amount of food and exercise is all that matters to determine weight and disease according to the energy balance paradigm.

The 'obesogenic environment' discourse was introduced as a way to take some of that burden from the individual by discussing how its choices are influenced by the environment. Proponents of this discourse argue that the way our modern, globalized societies are built is responsible for the rising obesity rates. This may seem to excuse obese people, but it does not reduce stigma, because it still holds individual lifestyles responsible for obesity and disease. In fact, the 'obesogenic environment' discourse creates new forms of stigma, because it draws connections between certain environments and the people living in it, which reinforces obesity stigma with stigma about certain social or economic milieus. In addition, while the environment is made responsible for making people sick and obese, the individual is still held responsible for intervention. Even if the 'obesogenic environment' discourse shifts part of the responsibility to reduce obesity and disease to the society, which needs to create better environments, it is the individual who ultimately has to change its lifestyle.

However, we know now that obesity is not the result of eating too much and moving too little and can neither be prevented nor treated by simply eating less and moving more. In fact, it has become clear that interventions based on the energy balance paradigm are not only futile but harmful. Especially the idea that fat should be avoided turned out to be detrimental to health because it includes the promotion of carbohydrate consumption. As illustrated by various forms of the well-known 'food pyramid', we are told to base our diets on carbohydrates, which are thought to be healthy and a necessary source of energy for the body. Unfortunately, eating carbohydrates can lead to insulin resistance, which is the cause of obesity and many diseases. The rise of both, obesity and its related diseases, happened parallel to the promotion of restricting calories from fat consumption, which is no surprise and can be explained if we accept the hormonal obesity. We now have to recognize that the current interventions against obesity and its related diseases are actually responsible for promoting them. Consequently, we should abandon these programmes as soon as

possible and think about new interventions under the hormonal obesity, but before that we should consider what this new paradigm means regarding justice and responsibility for obesity and disease.

According to the hormonal obesity paradigm, obesity is the result of hormonal defects, which is why physical activity has hardly any effect on weight, but eating can – i.e. eating carbohydrates, if it leads to insulin resistance. The diseases, which were until now believed to be caused by obesity are in fact the result of insulin resistance, therefore, we could still argue that someone's lifestyle is responsible for obesity and disease if he or she chooses to eat carbohydrates. Since carbohydrate restriction leads to weight loss – unless other hormonal defects are present – and can prevent, reverse or at least stop the progress of diseases caused by insulin resistance, we can also conclude that individuals are capable of losing weight and preventing disease and can thus be held responsible. It is then the individual's responsibility to prevent insulin resistance by restricting carbohydrate intake or at least to restrict it once the individual has become insulin resistant. If its insulin resistance is caused by other hormonal defects, the individual might not be responsible for obesity and disease. For example, medical conditions, stress and sleep deprivation as well as environmental toxins influence hormonal balance and can cause insulin resistance as well. In these cases, it may not be possible for the individual to avoid insulin resistance as long as those factors are not addressed. But if carbohydrates are the cause of someone's insulin resistance should we require that person to restrict its carbohydrate intake? Would it be justified to deny access to healthcare for diseases caused by insulin resistance if that person refuses to do so?

Those who are in favor of such measures may argue based on Luck Egalitarianism, which was brought up by Feiring (2008) in chapter 2.2.1. Because healthcare resources are scarce, Luck Egalitarianism holds that they should be allocated choice-sensitively in order to neutralize bad brute luck. Therefore, if insulin resistance is the consequence of choices and leads to disease, we could argue that it is justified to restrict access to healthcare for insulin resistant patients with related diseases. Although Feiring does not support a backward-looking restriction, which would look at past choices that lead to disease, she argues that a forward-looking restriction would be acceptable, which means that if a patient with behaviour-related diseases refuses to change the behaviour that lead to those diseases in the future, restricting access to healthcare would be justified. Accordingly, if eating

carbohydrates is the reason why someone is insulin resistant and became sick, it would be justified to require obese patients to restrict carbohydrate consumption if they want access to treatment.

This approach seems reasonable at first, but there is some criticism against Feiring's forward looking approach to Luck Egalitarianism. For example, Albertsen (2015) argues that Feiring's distinction between backward-looking and forward-looking Luck Egalitarianism is inconsistent. This is because she demands different responses to people's choices at different times although their choices stay the same, but this is implausible according to Albertsen (2015: 162-163). To stay with our case of eating carbohydrates, why should a person be responsible for the diseases resulting from carbohydrate consumption after she pledged to stop eating carbohydrates, but not before? For Feiring, this is because we cannot say for sure, which past choices have led to disease, i.e. we cannot be sure that eating carbohydrates is what caused the diseases in question. We know, however, that eating carbohydrates can cause those diseases and therefore their consumption should be restricted in the future to make treatment effective. Again this is implausible to Albertsen who rightfully asks how we can request certain choices based on the assumption that they will lead to disease in the future although we could not be sure that they did so in the past (2015: 163). He also adds:

> Feiring's positions of forward-looking responsibility furthermore seem to overlook how people's circumstances affect their abilities to fulfil their commitments to lifestyle change. This is quite remarkable since her critique of luck egalitarianism and backward-looking responsibility was built around such a concern. (Albertsen 2015: 163)

Thus, it is implausible to admit people's inability to make healthy choices in the past but expect that they will be able to do so in the future.

There is also criticism against Luck Egalitarianism in general. Ekmekçi and Arda claim that "[t]he disputes against Luck Egalitarianism are various. The concepts they mainly argue are harshness towards the needy and abandonment of the wretched, discrimination of the disabled, anti-humanitarianism, incompatibility with human dignity, and dissonance with real life" (Ekmekçi & Arda 2015: 247). In addition, they criticize that "Luck Egalitarianism conceptualizes health from a narrow point of view.

The tendency is to consider health as something that can be lost or gained by one decision" (ibid. 248). They argue that this view is not supported by contemporary research, which shows that health is not determined by a limited number of choices but rather by "the living and working conditions which are not mostly determined by [the patient]" (ibid.). Although Ekmekçi and Arda agree with the idea of Luck Egalitarianism that health inequalities, which derive from unchosen features of peoples circumstances should be compensated, because they are unjust, they suggest that those unchosen features include more than just personal inferiorities (ibid. 248). Instead they support a broader view of health and therefore argue that the unchosen features of peoples circumstances are also influenced by socio-economic status (SES) as well as "the ethnic, cultural and/or religious identity of the individual" (ibid. 248-249):

> In brief, social factors in addition to SES have a significant impact on the health status of individuals through three primary options. 1. The norms and values of the social group are absorbed by the individual and become central to self-identity and are thus incorporated in the character of the person. As a result, it becomes natural for the individual to decide and act in compliance with them. 2. Even if an individual does not internalize all of the norms and values of her group, the risk of social exclusion may be so high that she avoids opposing them. 3. People also comply with norms and values for the sake of having respect, approval and acceptance by their community. (Ekmekçi & Arda 2015: 250)

I agree with this view and argue that it would be unjust to require obese patients to restrict carbohydrate intake or deny them access to healthcare for obesity-related diseases, because carbohydrates play an important role in most people's diets and are a part of their identity. To make my point clear, we should think about what restricting carbohydrate intake means more in detail.

In order to achieve long-lasting weight loss, it is necessary to restrict carbohydrates permanently, i.e. it requires the adoption of a LCHF lifestyle. Like all lifestyle changes it impacts an individual's life more than a diet, which lasts only a certain period. Lifestyle change is a life-long commitment that can only be upheld if the individual is convinced of its benefits. This is easier said than done, so that

strategies to make individuals successfully change their lifestyles are one of the main topics of health promotion. Until now, the goal of health promotion was to convince people that they should eat less calories and since fat contains so many calories promoting low-fat food and cooking methods was one way to achieve it. LCHF, on the other hand, means eating a lot of fat, but reducing carbohydrate intake as much as possible. What sounds similar at first, is in fact much more of a challenge if we consider that carbohydrates are staples in virtually all modern cultures:

> Most great (and many minor) sedentary civilizations have been built on the cultivation of a particular complex carbohydrate,[52] such as maize or potatoes or rice or millet or wheat. In these starch-based societies, usually but not always horticultural or agricultural, people are nourished by their bodily conversion of the complex carbohydrates, either grains or tubers, into body sugars. Other plant foods, oils, flesh, fish, fowl, fruits, nuts, and seasonings—many of the ingredients of which are nutritively essential—will also be consumed, but the users themselves usually view them as secondary, even if necessary, additions to starch. This fitting together of core complex carbohydrate and flavor-fringe supplement is a fundamental feature of the human diet—not of all human diets, but certainly of enough of them in our history to serve as the basis for important generalizations. (Mintz 1985: 9)

To illustrate this essential combination of complex carbohydrate and supplement, Mintz cites the British social anthropologist Audrey Richards, who "has described luminously how a preferred starch can be the nutritive anchor of an entire culture" (ibid.). Richards has studied a Southern Bantu people called the Bemba and writes: "To the Bemba each meal, to be satisfactory, must be composed of two constituents: a thick porridge (*ubwali*) made of millet and the relish (*umunani*) of vegetables, meat or fish, which is eaten with it…." (Richards, cited after Mintz 1985: 9). Mintz claims that:

> The picture Richards paints for us is in its more general features surprisingly common worldwide. People subsist on some principal complex carbohydrate,

[52] Note that Mintz talks of *complex* carbohydrates, i.e. starches, in contrast to *simple* carbohydrates, i.e. sugar. This difference is important because the introduction of sugar into the human diet had a profound impact not only on food preferences, but also on social relations and even the economy, as he describes in his 1985 book *Sweetness and Power. The Place of Sugar in Modern History*.

> usually a grain or root crop, around which their lives are built. Its calendar of growth fits with their calendar of the year; its needs are, in some curious ways, their needs. It provides the raw materials out of which much of the meaning in life is given voice. Its character, names, distinctive tastes and textures, the difficulties associated with its cultivation, its history, mythical or not, are projected on the human affairs of a people who consider what they eat to be the basic food, to be the definition of food. […] People brought up in starch-centered cultures may feel they have not really eaten unless they have had *ubwali* (tortillas, rice, potatoes, bread, taro, yams, manioc cakes—whatever), but they will also feel that *ubwali* is not enough unless it is accompanied by *umunani*. (Mintz 1985: 10-11)

Like Mintz describes, which ever carbohydrate a culture uses as its staple, it usually attaches a significant amount of value to it. Even more than other foods, carbohydrates are not only a means to feed the members of a culture, but also to define the culture and give identity to its members. Therefore, someone who chooses a LCHF lifestyle gives up a part of his or her culture and identity, which is especially difficult if such a step is taken alone.

The problems involved in eating LCHF are not different from those involved in following other diets. If we remember what de Beaufort (2014) said about the reasons we eat besides satisfying our need to eat, we understand that adopting a LCHF lifestyle can be isolating and prevents us from enjoying the pleasures involved in eating. Especially sweets are a source of pleasure for many people, this is reflected in the way we typically consume them: we eat sweets as a reward, when we are stressed physically or emotionally or when we celebrate. But while dietary guidelines agree on the necessity to reduce the consumption of sweets, LCHF goes further, restricting all carbohydrates and not only sugar.

Whether they actually follow it or not, many people accept the advice to reduce sugar consumption as necessary both for health and weight loss, but for the reasons given above to refrain from consuming staple foods seems too hard to do, especially if it should be done to prevent disease. Those who do are often already obese or sick – or both – and try LCHF out of despair after everything else has failed. Their frustration with their condition is so bad that even abstaining from carbohydrates seems worth a try – and usually it is, as the testimonies of over 140

people from all over the world on dietdoctor.com show: not only did they lose significant amounts of weight, many also reversed their diabetes,[53] a condition that is regarded as incurable. However, for the reasons mentioned above, not everyone will be willing to give up eating carbohydrates even if it could cure their obesity and disease and it would be too harsh to force them to restrict carbohydrate intake or deny them access to healthcare.

Furthermore, I argue that this would be unjust, because although becoming insulin resistant can be caused by eating carbohydrates, it is also the result of brute luck. We can see this in the fact that although virtually everybody eats carbohydrates – since they are staples – not everybody is obese or sick. As I have explained in the previous section, not everybody will develop insulin resistance despite eating carbohydrates, because not everybody is programmed in exactly the same way. This means that those who do not get insulin resistant even though they eat carbohydrates are just lucky they are not programmed to get insulin resistant. On the other hand, insulin resistant people did not choose to be programmed that way either.

The programmes written in their DNA can be programmed that way at any stage in life. Some of this programming already happens during foetal development, so that what expecting mothers eat during pregnancy influences not only the birth weight of their babies but also their weight as adults (Carey 2012: 3-4). Further, the gut bacteria can programme someone to become insulin resistant (cf. Caricilli & Saad 2013). This depends on the types of bacteria present in the gut, which are influenced by our food choices, but also by the way we come into this world: someone who is born by caesarean section is inoculated with different bacteria than someone who is born vaginally. This may explain why caesarean sections are associated with obesity (cf. Li et al. 2013). In addition, it has been shown in mice that exposure to antibiotics in early life changes their gut microbes in a way that leads to more and faster weight gain (cf. Phimister & Jess 2014). These findings suggest that the rise in caesarean sections as well as in the use of antibiotics is in part responsible for the growing obesity rates worldwide. However, nobody can choose how to be delivered or whether or not to take antibiotics in early life and sometimes caesarean sections and antibiotics are just necessary. Thus, being programmed to get insulin resistant is the

[53] http://www.dietdoctor.com/category/weight-loss/weight-loss-stories

result of brute luck and it would be unfair to require insulin resistant people to restrict carbohydrate intake or deny them access to healthcare if they refuse to do so.

To sum up this section, we have seen that under the new paradigm of obesity research, we need to re-think our ideas about obesity and disease. We know now that there is no causal relationship between obesity and disease, as proposed by the energy balance paradigm, but that obesity and its related diseases are caused by insulin resistance. Therefore, we have to look at what causes insulin resistance in order to determine responsibility. If we assume that its cause is carbohydrate intake we could claim that people who eat carbohydrates are responsible for becoming insulin resistant and consequently obese and/or sick. We could then argue, like the proponents of Luck Egalitarianism and demand that they restrict their carbohydrate intake or it would be justified to deny them access to treatment for the diseases, which result from their choice to eat carbohydrates.

However, I have argued that whether someone develops insulin resistance or not is determined by the way he or she is programmed. Since we cannot control everything that programmes us, it is the result of brute luck and thus it would be unjust to deny insulin resistant patients access to treatment if they refuse to restrict their carbohydrate intake. Even if we insisted that we should restrict carbohydrate intake because it is one programming factor we can control, I would still argue that it would be unjust to demand it due to the fact that carbohydrates play such an important role in today's culture. Following Ekmekçi and Arda's proposition that culture is one of the unchosen factors to determine health, eating carbohydrates can be part of someone's cultural identity that is impossible to give up without losing one's identity. In order to be effective as a treatment for insulin resistance, it would be necessary to restrict carbohydrate intake permanently and completely, which means giving up one's identity, but this would be too harsh to demand, even if it could prevent or cure disease.

While I argue that it would be unethical to force people to adopt a LCHF lifestyle, I still think that it could be a good idea to promote LCHF as a way to prevent disease. We should, however, promote LCHF in an ethical way and avoid the pitfalls present in many current programmes to prevent obesity and its related diseases. In the following section, I shall reconsider interventions against obesity and its related diseases and propose ethical interventions under the hormonal obesity paradigm.

4.2 Reconsidering Interventions Against Obesity and Its Related Diseases

Interventions against obesity and its related diseases include their treatment and prevention. Under the energy balance paradigm, this basically means eating less and moving more. In addition, the treatment of obesity includes bariatric surgery, while prevention aims at behaviour change either by educating individuals about healthy lifestyle choices or by changing the environment to enable healthy choices. In chapter 2.2, we have seen that interventions against obesity and its related diseases involve ethical issues, which often remain unaddressed. This is because obesity is a relatively new topic in ethics as well as in public health. In addition, public health ethics was introduced as a distinctive discipline around 1990, so that public health itself is still quite new as a field in medical ethics (Holland 2007: vii-viii).

With the new paradigm in obesity research, the treatment of obesity consists in the treatment of hormonal defects. There are many different defects, which can lead to obesity and need to be addressed individually, but the most important hormonal defect is insulin resistance. While it can be effectively treated by restricting carbohydrate intake, how much restriction is necessary differs for each person because it is dependent on individual programming. Some people will need to restrict their carbohydrate intake only a little, but others may need to avoid carbohydrates strictly. Interestingly, carbohydrate restriction is also recommended after bariatric surgery (cf. Moizé et al. 2010)[54] so that it is likely that rather than the surgical intervention it is in fact the restriction of carbohydrate intake, which is responsible for weight loss after bariatric surgery. This is also in line with studies showing that the more carbohydrates are restricted the greater weight loss after bariatric surgery is (cf. Faria et al. 2013). These findings suggest that bariatric surgery is not necessary under the hormonal obesity. Once carbohydrate restriction becomes the standard treatment for obesity, bariatric surgery would present a treatment option only to those, who embrace dumping syndrome as a tool to force carbohydrate restriction on them, like Wilson seemed to (cf. chapter 2.2).

Since carbohydrates are addictive and lead to hunger and cravings (cf. Heller & Heller 1994; Wurtman & Wurtman 1986), it may indeed be necessary to force some people to restrict carbohydrate intake. Carbohydrate addiction is the result of

[54] Moizé et al. (2010) suggest restricting carbohydrate intake to 2 servings per day compared to 5 to 11 servings that are usually recommended.

chronically elevated insulin levels or ‘chronic hyperinsulinemia’ and disappears once carbohydrate intake is reduced, but like other addictions, overcoming it makes it necessary to go through withdrawal, which is a challenge at first. However, compared to other addictions, the symptoms of carbohydrate withdrawal are mild, last approximately one week and can be alleviated by eating anything else than carbohydrates. Once insulin levels have come down, it is relatively easy to maintain a low carbohydrate diet especially if it is combined with a high fat approach, which is why LCHF is so successful: refraining from carbohydrate intake curbs hunger and cravings, while fat intake ensures energy supply. The biggest challenge for someone who adopts a LCHF lifestyle is how to deal with situations that do not offer a LCHF option, like for example eating out or attending social events around carbohydrate intake such as birthday parties with cake. However, occasional carbohydrate intake is possible as long as chronic hyperinsulinemia is avoided, which would trigger addiction again. Thus, it is questionable whether someone would choose the permanent and irreversible consequences of bariatric surgery over a week of carbohydrate withdrawal symptoms, especially since bariatric surgery is hardly effective without carbohydrate restriction either.

Rather than performing ineffective surgery, it would be more reasonable to support patients during carbohydrate withdrawal and equip them with the necessary skills to avoid carbohydrates in everyday life. These skills are on the one hand theoretical: people need to know about nutrition to be able to choose food with low carbohydrate content. On the other hand, they need practical skills, i.e. they need to know how to prepare food. This is especially important because processed or pre-cooked food typically contains many carbohydrates. Often, these foods are designed to be addictive and stimulate appetite, so that FDIs use a lot more sugar and other ingredients in their production than would be used when they are prepared at home. Therefore, even if someone does not want to give up eating staples such as rice or potatoes, preparing food at home instead of eating out or buying ready-made meals is one strategy to reduce carbohydrate intake significantly.

Information about nutrition and teaching cooking skills are also important tools for health promotion. However, knowing how to prepare food is of no use if there is no time for cooking. One reason why people choose processed food over fresh produce is because they do not have time to prepare their own meals. Time is a luxury in our contemporary economic system and many people will find it more appealing to

enjoy a little bit more of their free time than to stand in the kitchen and cook after a long working day. So, if we want to encourage people to prepare food by themselves, we need to think about working conditions as well. This is particularly important because stress and sleep deprivation influence hormone balance and are also the causes of obesity and disease.

Knowing about nutrition is not enough to ensure that people choose food with low carbohydrate content. High-carbohydrate food is one of the cheapest ways to feed oneself and one's family and may be the only affordable food for low income households. This explains why obesity can be – and is in fact frequently – found among people with low income. They do not get obese because they eat too much, but because the food they can afford has a high carbohydrate content, which causes insulin resistance, obesity and disease. Thus, the hormonal obesity paradigm offers explanations for phenomena that seemed paradoxical under the energy balance paradigm and requires us to think differently about the prevention of obesity and disease.

Until now it was thought that obesity and its related diseases mainly manifested due to individual behaviour. Socio-economic factors and living conditions may have been accepted as influencing that behaviour, but they were not regarded as direct causes. For example, the Ottawa Charter for Health Promotion calls these factors 'prerequisites for health' (WHO 1986). This changes with the hormonal obesity paradigm and its metaphysical paradigm in particular. Since we can now imagine the human body as a computer that interacts with its environment and everything that enters it by running the programmes these interactions trigger, we recognize that socio-economic factors and living conditions are more important than ever to address, because the programmes they trigger can cause disease directly. Equally important is the fact that the body is programmable – at least to a certain extent – and therefore we gain tools for health promotion if we learn how to trigger the programmes, which make us healthy and stop those, which make us sick.

One of these tools could be the promotion of a LCHF lifestyle, but if we choose this tool we should be careful to employ it ethically and avoid the pitfalls present in contemporary programmes to prevent obesity and its related diseases. Ten Have et al. (2011) have analysed these pitfalls and found that ethical problems can arise in the way a programme to prevent obesity affects physical health, psychosocial well-being, equality, informed choice, social and cultural values, privacy,

responsibility as well as liberty and autonomy. Their framework for thinking through a programme's ethical aspects (Ten Have et al. 2012) asks how a proposed programme affects each of the aspects that are potentially problematic:

> At the heart of the framework is a list of eight questions that helps in making a complete inventory of the morally relevant features of a programme [...]. Some questions concern ethical values that underlie the aim of programmes. Other questions concern ethical values that are not related to the aim of programmes, but that can be affected nevertheless. Each question is equally important, since each ethical pitfall requires equal attention. (Ten Have et al. 2012: 300)

Although Ten Have et al.'s framework is concerned with programmes to prevent obesity; I want to use it in the following to evaluate the potential ethical pitfalls of promoting a LCHF lifestyle in order to prevent obesity as well as its related diseases. I think that this is legitimate, since obesity is regarded as a risk factor for diseases and its prevention usually aims at reducing the diseases associated with obesity by preventing obesity in the first place.

4.2.1 How Does Promoting a LCHF Lifestyle Affect Physical Health?

Firstly, Ten Have et al.'s framework asks how a programme affects physical health. Ten Have et al. are concerned about the (cost-) effectiveness and unintended negative effects on health such as eating disorders, because "[t]he implementation of ineffective programmes or programmes with an unfavourable cost-effectiveness profile is at odds with the value of 'well-being'" (Ten Have et al. 2012: 300). To my knowledge, the cost-effectiveness of LCHF has not yet been evaluated. While it is certainly effective in treating and preventing obesity and its related diseases, the question remains whether prevention programmes promoting a LCHF lifestyle at the population level will actually reduce healthcare costs or merely shift costs from one group of diseases to another.

Regarding unintended effects on health, LCHF does not require calorie-counting or withstanding hunger so that the risk of eating disorders should be low. On

the contrary, since a LCHF diet replaces starches and sugars that offer little nutritional value besides energy with more nutrient-dense foods, promoting a LCHF lifestyle should in fact improve nutritional status and prevent malnutrition. However, with the growing popularity of LCHF more and more products labeled 'low-carb' enter the market, but many of them are not really low in carbohydrates and may contain unhealthy ingredients like vegetable oils for example. Therefore, programmes promoting a LCHF lifestyle should stress the importance of fresh produce and home-cooking. This is further important, because there are medical conditions that contraindicate the extreme lowering of carbohydrate intake, so that it is impossible to set universal nutritional goals.

4.2.2 How Does Promoting a LCHF Lifestyle Affect Psychosocial Well-being?

Secondly, the framework asks how a programme affects psychosocial well-being. Here, Ten Have et al. are concerned about programmes creating "uncertainty, fear and worries about the health risks of overweight and obesity" (Ten Have et al. 2012: 300) as well as contributing to the stigmatization of obesity by blaming and discriminating obese people (ibid.). As Flegal et al.'s (2005, 2013) studies have shown, overweight is associated with the lowest mortality rates so that programmes should not inflate the risks of 'excess weight'. Rather than lowering weight, programmes promoting a LCHF lifestyle should focus on treating insulin resistance and communicate that a high body weight is not necessarily a sign for disease. They should raise awareness about the potential risks of eating carbohydrates regardless of weight without spreading unnecessary fear by stressing the fact that personal risks are very diverse and should therefore be assessed individually.

Also, the use of stereotypes or blaming should be avoided because of this fact. Like Ten Have et al. remark, "[s]tigmatizing and blaming messages undermine 'well-being' and show a lack of 'respect'" (Ten Have et al. 2012: 300). Ideally, the promotion of LCHF should be implemented together with a fat acceptance approach like *Health at Every Size* (HAES),[55] for example, to stop the stigmatization of obese

[55] HAES "is a continuously evolving alternative to the weight-centered approach to treating clients and patients of all sizes. It is also a movement working to promote size acceptance, to end weight discrimination and stigma, and to lessen the cultural obsession with weight loss and thinness"

people. This is necessary firstly, because obesity is not as dangerous in itself as previously thought. Secondly, it is not simply the result of lifestyle choices and may not be treatable by adopting a LCHF lifestyle alone. And even if everybody ate LCHF it does not automatically mean that everybody will be thin or conform to contemporary beauty standards.

4.2.3 How Does Promoting a LCHF Lifestyle Affect Equality?

Ten Have et al.'s framework asks thirdly, how a programme affects equality. They point to the fact, that despite aiming at:

> [e]nabling people to live healthier lives […] some efforts to achieve this goal are at odds with the value of equality. Ironically and sadly enough, programmes are often least effective among the groups who need them most. […] Furthermore, programmes that affect financial distribution are likely to hit harder among people with low income. (Ten Have 2012: 301)

By adopting a LCHF lifestyle, relatively cheap foods like grains are replaced with more expensive ones like animal products, but such a change may be difficult to put into practice on a low income. If healthier alternatives to carbohydrates are not made affordable for people with low income, promoting a LCHF lifestyle would increase health inequalities, because obesity and its related diseases are already more prevalent among them.

In recent years, taxes on foods with high fat or calorie content have been implemented in several countries or cities in order to discourage their consumption and compensate for healthcare costs caused by 'unhealthy' choices. Similarly, it is imaginable to promote a LCHF lifestyle by taxing foods with high carbohydrate content. This could be defended if the taxation was restricted to foods that are not essential like for example sugar-sweetened beverages or candy. However, if we were to tax staples like bread or rice, this would not only conflict with cultural values but

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(https://www.sizediversityandhealth. org/about.asp). It was initiated by the *Association for Size Diversity and Health* (ASDAH), which is an international non-profit organization of healthcare professionals started in 2003.

also contribute to inequality, because such a tax would certainly be a greater burden for people with low income.

In addition, Ten Have et al. remark that:

> Equality may also be infringed upon by programmes that involve unjust discrimination. Programmes targeted at overweight persons use criteria such as BMI to 'discriminate' and treat them differently from non-overweight persons, for instance, at the workplace, in schools and regarding insurances. (Ten Have 2012: 301)

Since the goal of promotion of a LCHF lifestyle is to prevent insulin resistance, it is not necessary and would in fact be less effective if it was targeted at overweight people only. In this respect, it LCHF could be an equal approach to preventing obesity and its related diseases.

4.2.4 How Does Promoting a LCHF Lifestyle Affect Informed Choice?

Next, Ten Have et al. consider how a programme affects informed choice, because:

> programmes may not always succeed in promoting informed choice regarding diet and physical activity. Sometimes, they involve inadequate information and provide unclear, overstated, oversimplified, subjective, incomplete or even false messages. This may be due to the rush 'to do something' about the problem or to the translation of epidemiological information to individual cases without reserve. […] Inadequate information is ethically sensitive since it is at odds with the value of 'truthfulness' and 'transparency'. It hampers the exercise of freedom of choice and 'autonomy' and may have negative consequences on health" (Ten Have 2012: 301)

Although most healthcare professionals were not aware of the fact that promoting low-fat diets was based on inadequate information, we know now that it was indeed the result of a 'rush to do something'. Heart disease seemed too urgent a problem to

wait for research results showing without a doubt that reducing fat intake could prevent 'premature deaths'.

As long as similar data is not available for LCHF diets, we should be careful to not repeat the same mistake. Unless research has proven the effectiveness of adopting a LCHF lifestyle to prevent certain conditions, we should not claim that it does, let alone attempt to declare LCHF a panacea. Like Ten Have et al. remark, "[p]rogrammes that suggest that personal choices to eating healthily or engage in physical activity are the solution to all problems neglect other health determinants" (ibid. 301).

4.2.5 How Does Promoting a LCHF Lifestyle Affect Social and Cultural Values?

As we already know from previous sections, food and eating does not only concern health but also social and cultural values. Therefore, it is no surprise, that Ten Have et al. also consider how a programme affects these values. I have already described the importance of carbohydrates in chapter 4.1, so that it should be clear that promoting a LCHF lifestyle would greatly affect social and cultural values. Compromising these values may be acceptable for someone who seeks treatment for obesity or disease, but for someone who is healthy it might be too much of a sacrifice to make. Programmes to promote a LCHF lifestyle should keep this in mind and think about approaches, which enable low carbohydrate choices without denying culturally important foods. Here, too, promoting the use of fresh produce and home-cooking may be a better option for health promotion than insisting on strict carbohydrate restriction.

4.2.6 How Does Promoting a LCHF Lifestyle Affect Privacy?

How promoting a LCHF lifestyle affects privacy cannot be answered in general, but has to be evaluated for each programme specifically. What has to be considered according to Ten Have et al. is that:

> Programmes that ask for the provision of personal information or that insufficiently warrant that personal information does not become accessible to others, intervene in the personal life sphere and may thereby be sensitive to 'privacy' issues. Personal information for instance includes body weight, eating habits or styles of rearing children. Certain ways of gathering the information are sensitive to threats against privacy, such as physical contact, pressure or a lack of consent. It also makes a difference whether the party who collects the information (government, general practitioner, insurance company or employer) has a legitimate reason to do so. (Ten Have 2012: 301)

4.2.7 How Does Promoting a LCHF Lifestyle Affect Responsibility?

Ten Have et al.'s framework also asks how a programme affects responsibility:

> […] a programme is ethically problematic if it goes against a 'just division of responsibilities' or the 'balance between individual and collective responsibility'. Suggesting that the responsibility for the overweight epidemic should be attributed to one single party disregards the fact that overweight is the result of a complex web of causal factors. An emphasis on people's personal responsibility may disregard the influence of the social and physical environment, socio-economic status and genetic characteristics. (Ten Have 2012: 301)

This is in line with what I have already described in chapter 4.1: carbohydrate intake is only one factor that can lead to insulin resistance, obesity and disease. Therefore, we should not forget that implementing a programme to promote LCHF does not eliminate all factors contributing to obesity its related diseases. This also means that promoting a LCHF lifestyle should not be the only strategy for health promotion and does not preclude social responsibility to strive for better living and working conditions.

4.2.8 How Does Promoting a LCHF Lifestyle Affect Liberty and Autonomy?

Finally, Ten Have et al. ask how a programme affects liberty and autonomy. These values are at stake if a programme attempts to influence choices, which promoting a LCHF lifestyle would certainly do. However, "[a]ttempting to limit someone's actions or to require actions by someone for his or her own good is called 'paternalism'. Paternalistic programmes evoke moral objections because not all people consider health to be the only or the most important valuable thing in life" (ibid.). The promotion of a LCHF lifestyle should keep this in mind and refrain from forcing this lifestyle change on people. Its adoption should be voluntary and in accordance with individual values. Although health is not the only thing people strive for, it is also important to achieve other goals. Usually, people want to be healthy and are willing to make sacrifices for their health so that it can be expected that many people would choose a LCHF lifestyle if they knew about its benefits.

However, it should be accepted if someone does not want to give up eating carbohydrates. Since carbohydrates play such an important role in contemporary culture, it is understandable if for some people their cultural value is greater than the value of health and we should be solidary with them. In the end, it will depend on whether or not a society is willing to change a part of its culture for LCHF to be successful as a tool of prevention. If it is, promoting LCHF could lead to the creation of new cultural forms, i.e. new ways of preparing and eating food or new cultural events for example. This may be not that difficult after all, if we remember that the energy balance paradigm succeeded in creating a low-fat culture in many societies in a relatively short period of time and in some cultures, just going back to the eating habits that existed before the low-fat era might already be enough to promote health.

5 Conclusion

This thesis started with a review of articles published in scientific journals in order to understand how obesity is currently discussed in the field of ethics. Judging by the number of published articles per year, it became clear that obesity was hardly discussed before the notion of an 'obesity epidemic'. The question of whether there really is an epidemic of obesity or merely a 'moral panic' surrounding it became part of the first major topic cluster I identified: the discourse on obesity. Within this topic, the history of obesity was discussed and shows that obesity became more and more medicalized as well as moralized over time. Today, obesity is a stigmatized condition and obese people often have to deal with discrimination and bias based on their weight, not least shown by healthcare professionals. This indicates that obesity is not only a medical condition of growing importance but has also become a deeply moral issue concerned with overindulgence and a lack of self-control. Speaking of an 'epidemic' or a 'moral panic' may be exaggerated, but both of these aspects determine the dominant discourse on obesity.

With the spread of obesity and its related diseases, treating and preventing obesity became an important issue in medicine and resulted in various interventions against obesity, which raise ethical questions that form the second major topic cluster in the ethical discussion of obesity. The fact that current interventions against obesity are ineffective let some critics to question the legitimateness of advising these interventions to obese people. In addition to being ineffective, many interventions also have negative side-effects, but participants of weight loss programmes are usually not made aware of either of these facts, which raises concern over informed consent.

One intervention against obesity that is especially criticized is bariatric surgery. Bariatric surgery is different from other forms of surgery since it is performed on healthy organs with the goal of creating malabsorption in order to treat obesity. While its success is limited, bariatric surgery has serious side-effects for patients and requires lifelong treatment because most methods to perform bariatric surgery are irreversible. Despite these disadvantages and calls for more randomized controlled trials, bariatric surgery is performed in growing numbers.

The third major topic cluster in the ethical discussion of obesity, discussed in this thesis was concerned with responsibility for obesity and the just allocation of healthcare resources. According to the dominant obesity discourse, obesity is the result of lifestyle choices, i.e. eating too much and moving to little, so that individuals are responsible for becoming obese as well as for losing weight and if they get diseases, which are thought to be caused by obesity, they have themselves to blame. Although the 'obesogenic environment' discourse was introduced in order to shift that blame to the environment, which has changed due to industrialization, modernization and globalization in a way that promotes the development of obesity, it did not take the responsibility to treat and prevent obesity from individuals. Based on this understanding of responsibility for obesity and luck-egalitarianism, some scholars argue that it would be justified to restrict access to healthcare for obese people with obesity-related diseases, at least if they refuse to change their lifestyle in the future.

As this review of scientific journal articles has shown, there are a variety of topics discussed concerning obesity and ethics, but although the opinions on these topics may vary, they are all formed on the premise that obesity is caused by a positive energy balance. This theory is known as the energy balance paradigm of obesity research. However, drawing on Thomas S. Kuhn's theory of scientific revolutions, I have argued that there is currently a paradigm shift happening in obesity research, which makes it necessary to think about the ethical issues surrounding obesity anew.

By describing this paradigm shift, we have seen how obesity research works as normal science. Obesity researchers gain their knowledge of obesity from textbooks, which introduce shared exemplars and the rules for 'puzzle-solving' that are accepted by the community of obesity researchers. It is important to note that science textbooks typically only teach about the history of their field in abbreviated form – if at all. Controversies or theories that have been proven wrong are hardly mentioned in textbooks, which make it seem like research is advancing in a linear way. Therefore, researchers gain a lot of confidence in their paradigm even if they are not always aware of what it is.

In obesity research, the current paradigm is based on a metaphysical paradigm, which compares the human body to a steam engine that burns and is fuelled with energy in the form of food. Unlike a mechanical steam engine, it can be 'over-fuelled' and stores excess fuel as fat, so that eating more food than is needed for the body to

function and perform work results in weight gain. This can be expressed in an equation, which is the symbolic generalization of the energy balance paradigm. According to this symbolic generalization, weight gain and loss are the result of a positive or negative energy balance respectively. Many weight loss programmes work with the energy equation to calculate how many calories someone should eat in order to lose weight, although in reality most people do not lose as much weight as they should based on the calculations. Often they fail to achieve any weight loss at all, which is then either blamed on the obese person, who did not try hard enough or was dishonest about how much energy she ate, and spent, or explained away otherwise. Obesity researchers may seem ignorant and stubborn in defending the energy balance paradigm despite such conflicting evidence, but like Kuhn explains, this is just the typical behaviour of researchers doing normal science. Once accepted, a paradigm is not easily surrendered even when anomalies are encountered. Rather, *ad hoc* modifications will be thought of to defend the paradigm. In order for a paradigm shift to occur, there must be a crisis that leads research into different directions. I have argued that the 'obesity epidemic' is such a crisis for the energy balance paradigm.

Decades of nutritional advice to avoid overweight by watching one's food – and especially fat – intake and being physically active have not resulted in less overweight and disease as was expected. Quite the opposite happened, since we now face higher overweight and obesity as well as disease rates than ever before. This discrepancy led some obesity researchers to question the energy balance paradigm and look for other explanations for why we become obese. Eventually, they learned that there has never been clear evidence for the hypothesis that fat is causing heart disease and should be avoided. They also rediscovered that there is an alternative theory of obesity, which got forgotten because it was not taught anymore once the energy balance paradigm was accepted.

This alternative theory explains obesity as the result of hormonal defects. As long as the body's hormonal mechanisms work, they regulate its functions including its weight. They make us hungry when we need more energy and make us want to move when we got extra energy to spend, so that we can keep our weight stable even if we do not count calories and control how much we eat and move. If for some reason these mechanisms do not work, we may be hungry, although we do not need energy, or feel tired, although we have extra energy to spend. Insulin resistance is one important hormonal defect for obesity that works in this way. If someone is insulin

resistant, he or she is 'programmed' to gain weight and create a positive energy balance by eating more and moving less. Thus, in contrast to the energy balance paradigm, it is not the positive energy balance, which causes weight gain, but rather weight gain that causes a positive energy balance.

This shows a flaw in the energy balance paradigm. Under this paradigm, obesity researchers failed to recognize, that energy balance can be interpreted in two directions. They determined its direction so that the amount of energy consumed and energy spent results in weight gain or loss, while ignoring the fact that it could also be the other way round, i.e. weight gain or loss determines how much energy is consumed and spent. Based on their metaphysical paradigm comparing the body to a steam engine, this is plausible albeit it is not a true model of the human body. If we accept the alternative theory of hormonal obesity, we do not only gain a new paradigm for obesity research but also a new model of the body.

According to this model, the human body can be compared to a computer that consists of hardware (e.g. organs) and is run by its software (e.g. DNA). The software of the body contains programmes, some of which are operated automatically, while others need to be started by certain inputs, e.g. through the senses or through contact with substances like food or germs. Hormones play an important role in triggering those programmes. For example, if obesity is the result of insulin resistance, insulin is the hormone that triggers the weight gain programme. Insulin, on the other hand, is secreted when we eat carbohydrates, so that carbohydrate consumption is one of the main causes of obesity. Thus, if insulin resistance is the cause of someone's obesity, restricting carbohydrate intake will lead to weight loss unless other hormonal defects are present as well. This is also the hormonal mechanism *Low Carb(ohydrate) High Fat* (LCHF) diets work with.

Although they are still discussed controversially, LCHF diets are becoming more and more accepted as a treatment for obesity by healthcare professionals as well as patients, since they are more effective and easier to maintain than calorie-restricting diets. Therefore, it is necessary to reconsider the question of responsibility for obesity and its related diseases. Due to the fact that insulin resistance causes obesity and many diseases, it could be argued that people who eat carbohydrates and become obese or diseased are responsible for it. Based on Luck Egalitarianism, it could then be argued that they should receive lower priority for treatment or agree to

restrict their carbohydrate intake in the future in order to assure the just allocation of healthcare resources.

However, I have argued against this, firstly because carbohydrate intake only causes obesity and disease if someone is programmed to become insulin resistant by eating carbohydrates. This 'programming' is to a great extent determined by factors individuals cannot control, e.g. by the way one is born or by whether or not one was treated with antibiotics early in life. Furthermore, there are other factors besides carbohydrate consumption that can lead to insulin resistance like sleep deprivation or stress, which may be due to working and living conditions individuals cannot control either. Thus, whether someone is programmed to become insulin resistant is the result of brute luck and it would be unjust to restrict access to healthcare for people who happen to be programmed in a way to become insulin resistant easily.

Secondly, I have argued that it would be unjust to demand carbohydrate restriction from people who got obese or diseased due to carbohydrate consumption, because of the important role carbohydrates play in most modern cultures. Carbohydrates are staples and part of one's cultural identity. Giving up eating carbohydrates therefore means to give up a part of one's culture and identity, which is especially difficult without the support of family and society. Even if someone is willing to give up eating carbohydrates, this decision may be hampered due to financial reasons. Carbohydrates are relatively cheap and restricting their consumption, means replacing them with more expensive foods, which may not be possible on a low income. Also, a lack of cooking skills or time to cook can hamper the decision to restrict carbohydrate consumption. Therefore, if we want to make LCHF an effective treatment for obesity and its related diseases, we need to think of ways to enable this choice.

As the example of Sweden shows, LCHF diets have the potential to turn the rising obesity trend around and could be a tool for health promotion, too. However, I have argued that we should re-evaluate the ethical issues surrounding obesity prevention carefully before we promote LCHF diets in order to avoid the ethical pitfalls Ten Have et al. (2012) described. Using their ethical framework, I have considered how promoting a LCHF lifestyle would affect physical health, psychosocial well-being, equality, informed choice, social and cultural values, privacy, responsibility as well as liberty and autonomy. Based on these considerations, I argued that although adopting a LCHF lifestyle can be effective for preventing

disease in individuals, who are programmed to become insulin resistant easily, promoting a LCHF lifestyle with a population approach can be problematic.

This is because of the fact that not everybody is programmed in the same way, so that adopting a LCHF lifestyle is not necessary for everybody and can even be harmful for some, since there are some medical conditions, which make some carbohydrate intake necessary. Rather than promoting a universal limit for carbohydrate consumption, health promotion programmes should show strategies to reduce carbohydrate intake that can be adapted according to individual needs. For some, such a strategy could be to raise awareness of the high carbohydrate content of many processed products, which may lead to healthier choices, either by choosing products low in carbohydrates or avoiding them and opt more for home-cooking, while for others, strategies are needed to change their eating habits more thoroughly.

However, these choices should be made voluntarily, in the first place because of the cultural importance of carbohydrates and secondly because of the individual differences in how easily one becomes insulin resistant. Healthy individuals with no family history of obesity and its related diseases might not have to reduce their carbohydrate intake at all, but might still opt for some reduction if they want to lower their risk further. Others may not care about the risks of eating carbohydrates as long as they are healthy, but might want to reduce their carbohydrate intake once they show signs of insulin resistance and prevent its progression. Thus, giving information on the risks of carbohydrate consumption, the possible benefits of a LCHF lifestyle and how to achieve it would be a good strategy for health promotion, but it should not be forgotten that carbohydrate consumption is but one factor that can lead to insulin resistance. Health promotion should also seek strategies to improve other lifestyle factors such as working and living conditions. Under the hormonal obesity paradigm, it is now clear that these conditions can influence hormones and therefore lead to insulin resistance and other hormonal defects that cause obesity and disease. Strategies to reduce stress and sleep deprivation are important as well as improving income-inequality.

In fact, if we look at all the possible factors, which can cause hormonal defects, we have to admit that most aspects of our modern lifestyle can be made responsible for disease, which is why they are sometimes called ‘diseases of civilization’. They began when human beings invented agriculture and thus introduced carbohydrates into their diet. Weston Price, an US American dentist and anthropologist, has

documented how fast changes in bone structure occur when so-called 'primitive' diets rich in animal foods are replaced with 'civilized' diets in his 1939 book *Nutrition and Physical Degeneration. A Comparison of Primitive and Modern Diets and Their Effects*. He gives many examples from various cultures who were introduced to modern, carbohydrate-rich diets and consequently developed physical degenerations – some visible like overcrowding of the teeth and some invisible like changes to the pelvis making childbirth difficult (cf. Price 1939). These effects were first accelerated by the wide spread of simple carbohydrates like sugar, then by the spread of industrially processed foods and most recently by the promotion of the food pyramid based on carbohydrates. Together with environmental toxins, the rampant use of antibiotics and stressful living conditions among other factors, we have indeed created a 'perfect storm' for obesity and disease as proponents of the 'obesogenic environment' like to call it. However, while they interpret this environment as the cause of obesity, which then causes disease, we should more accurately speak of a 'morbidogenic environment', especially since we know now that obesity is not the cause for the diseases associated with it, but shares a same cause: insulin resistance.

This is why we can observe a new trend, which emerged from LCHF diets a few years ago and goes by names such as 'ancestral' or 'paleo' diet. While this diet is often misunderstood and its proponents ridiculed as wanting to return to the Paleolithic era, its proponents usually do not want to abandon civilization and live in caves again, but they do look for more 'natural' ways of living for human beings within the civilized world. These include not eating most carbohydrates, since our ancestors did not eat them before the invention of agriculture, or working at standing desks because our bodies were not constructed for sitting on chairs most of the time. A key feature of paleo diets is also opting for organic produce and meat from grass-fed animals, which shows that more and more people are not only concerned about what they eat, but about how their food is produced.

Secondly, another trend that is emerging is called 'bio-hacking'. 'Bio-hackers' aim to optimize their eating, exercise and sleeping habits and other aspects of their lifestyle to improve their health and performance. Examples for this include adopting a LCHF lifestyle, maybe combined with intermittent fasting, doing certain exercises at certain times followed by certain meals. This description might sound odd, but it illustrates that there are no universal rules to follow in order to maximize one's health. 'Bio-hackers' search for the best way to reach their personal goals with their bodies

that are programmed in a unique way and in doing so find strategies that others can adapt to fit their own goals and bodies. They have understood that there are no one-size-fits-all solutions to health, which is an important lesson for medicine and health promotion, too.

Finally, I think that the paradigm shift in obesity research is only part of a paradigm shift away from mechanical models in the whole field of medicine and health promotion. We are beginning to understand that our genes do not determine every aspect of our bodies in advance, but that they can be switched on and off by our behaviour or by our environment – a big part of which can actually be found inside our bodies. The gastrointestinal tract is a barrier in form of a tunnel between our bodies and the outside world and it is more important to our health than previously thought. Not only is it crucial for digestion, but also for our autoimmune system. This becomes clear when the functioning of the gastrointestinal tract is compromised and substances that should not enter the body do enter it. The result can be infections, allergies or autoimmune diseases. More and more physicians recognize that many diseases in fact have their origin in the gut and therefore pay more attention to nutrition as treatment.

This development is accompanied by intensified research on the microbiota living inside the gut and elsewhere in and on the human body: the *Human Microbiome Project* was established in 2008 in order to characterize the human microbiome (similarly to sequencing the human genome by the *Human Genome Project*) and understand its role for health and disease.[56] This research completely changes the understanding of the human body and its relationship with its microbiota as Suvorov describes:

> The entire concept of the human organism being located at the top of the evolutionary tree is deeply rooted in the brain of many people due to traditional, cultural or religious modes of thinking. This concept was reanalyzed deeply due to the recent findings of the damages caused by the modern civilization to the outer environment and general public health. Serious ecological catastrophes, global warming, nuclear waste contamination and chemical leaks are accompanied by the appearance of novel important bacterial or viral pathogens, spread of antibiotic resistance strains and the

[56] http://hmpdacc.org/overview/about.php

> dramatic increase in cancer or cardiovascular diseases. All these exo- and endoecological changes lead to novel modes of thinking and seeing of the human being as a complex organism tightly bound to its outer world and its endoecology. […]
>
> The former attitude of microorganisms as something alien to humans or even dangerous changed into the understanding that bacteria (more correct would be the term "microbiota," including viruses, bacteria, archaea and some eukaryotes) are normal and even necessary for proper functioning of the human organism, populating the entire body with large a prevalence of microbes in such loci as the gut, skin, mouth and urogenital system. The gut is the human organ the most populated by bacteria, the number of which exceeds by at least by two orders of magnitude the total number of human body cells.[57] This understanding gradually allowed change the entire concept of the indigenous microbiota as a vitally important part of the body and its role in the maintenance of human health. (Suvorov 2013: 81)

However, this maintenance is reciprocal, because we also need to care for our microbiota. For example, our gut microbiota feed on what we eat, which is another reason why nutrition will become much more important in medicine and health promotion in the future. This is perhaps the biggest change that is going to happen in medicine soon, but it is a step back to the origins of medicine, since Hippocrates already new that all disease begins in the gut and that food is medicine. Unfortunately, nutrition was separated from medicine so that contemporary physicians know notoriously little about nutrition (cf. Devries et al. 2014), which may also be a reason for why they are so reluctant to let go of the energy balance paradigm. For them, food is hardly more than energy and nutrients and not something that can trigger whole cascades of reactions in the body. Accepting the hormonal obesity paradigm will be a first step to recognize that the body does not work and cannot be fixed like a machine, but must be treated like a complex organism that constantly interacts with its environment. This means that the treatment of diseases has to consider the environment, of which food is but one part, too, and that in order

[57] Note that this estimate has recently been rejected. The number of bacteria is now believed to be similar to the number of body cells (cf. Sender et al. 2016). However, this does not change the fact that microbiota are crucial for human health.

to stay healthy, we have to seriously think about how we live in and care for our environment.

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This thesis started out with the vague idea that something is wrong with current obesity treatment. As a Japanologist with an interest in medical ethics, I had researched the discourse on obesity in Japan in the context of measures the Japanese government took against metabolic syndrome in 2008 before turning to obesity in general. I got especially interested in the ethical issues involved in obesity treatment and prevention, which until today consist of diet and exercise. However, having struggled with overweight since childhood myself and watched my grandmother growing fatter and fatter despite trying one diet after the other, I knew that the solution to obesity was not that simple. During my research, I encountered the work of Gary Taubes, which was a revelation to me. Not only did it liberate me from constantly counting calories and worrying about my weight, but it also gave my research a new direction. I began reading Thomas S. Kuhn's work on scientific revolutions to learn about paradigm shifts and gained a clearer vision of what my thesis should be about. That this vision finally turned into this thesis is thanks to many people who supported and guided me on the way.

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