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1. Introduction

In the last decades, various forms of complementary and alternative medicine (CAM)[1] are enjoying an increasing popularity, and a growing range of therapeutic approaches besides those offered by biomedicine are available to patients. This rising influence of CAM has, for example, been related to the increasing prevalence of chronic illnesses for which biomedicine often has no solutions to offer, to a growing scepticism towards conventional medicine and scientific expertise, a greater influence of patients in the medical realm, the commodification of healthcare and a related focus on personal responsibility, as well as to the globalisation of various healing practices (Brosnan, Vuolanto, & Danell, 2018; Siahpush, 1999). While these factors may collectively foster the prominence of CAM, the field is also subject to continuous controversy and scepticism, and CAM practices are being challenged from various sides. Debates surrounding CAM can be encountered in popular media, in the scientific literature, as well as in many private conversations, where promoters usually praise the various advantages of CAM over biomedicine, while opponents often simply dismiss it as quackery. What is particularly salient in such discussions is the issue of 'proving' the effectiveness and safety of CAM practices in scientific frameworks and clinical trials, which is demanded by many, while others highlight the impossibility of doing so. In such debates, questions of worth and valuation seem to be constantly implicated: What kinds of therapeutic practices are worth being employed in a healthcare system? How and why is the application of CAM practices considered as valuable or not? (Why) Is it valuable to investigate such practices through standardised clinical trials and to explain them in biomedical terms? How can and should different forms of knowledge be integrated with biomedical understandings? These and many other questions arise in relation to the debates about CAM – questions that seem very relevant to investigate from the perspective of Science and Technology Studies (STS).

One particular practice that is usually subsumed in the category of CAM is that of yoga – an especially interesting example since yoga is as such not a medical system or practice. While yoga is currently by many people in the Western world primarily known as a physical practice, it may equally be described as a "complex and comprehensive philosophy of transcendental consciousness that crystallized into a school of thought sometime between 150 and 500 CE"(J. Alter, 2004, p. 4). Though yoga was also in its ancient forms already connected to ideas of healing, Alter (2018) emphasises that

[1] When employing the term CAM, I am aware that this categorisation is not entirely unproblematic. The term CAM groups together a rather heterogeneous set of practices and medical traditions, ranging from non-European traditional medical practices such as acupuncture, traditional Chinese medicine, or Ayurveda, to alternative healing practices developed in the Western context such as herbal medicine, osteopathy, or homeopathy. The subsumption of these diverse practices into the category of CAM can be seen critically since this often blurs the manifold differences that exist between them, and frequently reduces them to, for example, their supposedly 'holistic' character (Newcombe, 2012). In spite of these problems linked to the uncritical use of the term CAM, the concept can still be useful since it groups together these practices which are developing alongside (rather than within) institutionalised biomedicine (Keshet, 2010). Beyond this, what further seems to justify its use is that while the researchers I interviewed situated themselves in various different fields, such as mind-body medicine or integrative medicine, the most frequent self-classification of their work was equally that of CAM ("*Komplementärmedizin*" or even literally CAM).

this understanding was fundamentally different from the modern Western conception of healing as treating disease. Furthermore, yogic understandings of health and the body are quite different from modern Western ones, and essentially connected to ideas of spirituality which has no place in modern biomedicine (Fields, 2001). Nowadays, especially after a radical transformation during the colonial period in India (Singleton, 2010), yoga can be encountered in a variety of versions which are more or less removed from its origins and which may comprise physical, philosophical, or spiritual elements to different degrees.

Since some years, yoga is increasingly investigated in medical studies. This growing field of research has already generated many interesting insights, showing promising results for the employment of yoga interventions for various medical conditions (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012). The biomedical investigation of yoga sparked my interest when I previously conducted research on yoga from a biomedical perspective myself (Falkenberg, Eising, & Peters, 2018). More precisely, my colleagues and I reviewed randomised controlled trials (RCTs) that studied the effects of yoga on different immune markers. When conducting this previous research, I became increasingly aware of many ostensible tensions entailed in the attempt to investigate yoga from a biomedical perspective. In contemporary biomedicine, and especially within the dominant framework of evidence-based medicine (EBM), the RCT is regarded as the gold-standard for the investigation of clinical interventions, contributing the most systematically to build a robust body of scientific knowledge. Some features of the RCT methodology, such as the demand for a placebo control or the need for the intervention to be standardised as much as possible seem, however, to be difficult to implement in the case of yoga. Furthermore, the outcomes that are measured in an RCT need to be addressable in a standardised and numerical manner, which may equally seem in tension with some of the elements yoga brings along. Beyond this, and probably needless to say, medical yoga research aims to find biomedical explanatory models for yoga – another aspect that is possibly at odds with yoga's philosophical and spiritual dimensions.

When I set out to engage with this topic from an STS perspective, I considered some issues in the medical yoga research as potentially problematic. This critical stance was crucially informed by a postcolonial STS perspective, where medical yoga research can quickly come to be seen as the appropriation and domination of an ancient non-Western practice by Western science, the latter being regarded as superior and more valid than the former. When engaging with topics such as the medical yoga research, I consider it as very relevant to be sensitive to such issues, to be aware of the equal value of different knowledge systems, and to question the supposedly superior position of scientific knowledge on its "pedestal of universality and neutrality" (da Costa Marques, 2014, p. 86). Hence, I regard work from the field of postcolonial STS as opening up a particular "thinking space" (Harding, 1998, p. 17) which may sensitise my research to power asymmetries between different knowledge systems (Harding, 1998; Turnbull, 2000; Watson-Verran & Turnbull, 2010). Yet, in line with other scholars who have highlighted the importance of attending to how different knowledges are woven

together in practice, I consider it as crucial not to assume an a priori subjugation of yoga to biomedical knowledge, and to be open to trace more complex transformations, relations, and valuations that may be present in the encounter of yoga with biomedicine (Brosnan et al., 2018; Farquhar, 2012; Law & Lin, 2017). In this respect, it is moreover essential to realise that – as I will illustrate later in more detail – there is in the first place no such thing as 'traditional yoga', but that yoga has already been heavily altered, making it important to ask what it actually is that is nowadays subjected to modern biomedical science.

Against this background, I decided that my thesis should take some postcolonial sensitivities along, but go beyond these lines of reasoning, and focus on the multiple and complex values that are implicated in medical yoga research and the tensions that may arise between these – values relating to doing justice to yoga as a spiritual and 'holistic' practice, finding (cost-) effective medical interventions, publishing in highly ranked journals, or being recognised in the field of mainstream medical research, to name only some. With this focus on the study of value(s), my research is situated in the broader field of valuation studies. This strand takes a social constructivist stance to the study of value(s) and regards these not as something fixed and stable, but as continuously enacted in practice. In line with this, research related to the field of valuation studies is interested in studying *valuation practices*, i.e. how values are made and ordered in various contexts. A crucial assumption here is moreover that values have performative character and participate in processes of signification – ordering the world in distinct ways and enacting certain realities. Last, valuation studies scholars have also highlighted the importance of overcoming the binary between moral or social values and economic value (Stark, 2009), and have emphasised the complex entanglements of multiple values in real-world situations, especially in the field of life sciences and medicine (Dussauge, Helgesson, & Lee, 2015).

In line with this, the aim of my research was to investigate the complex valuations that are implicated in biomedical yoga research, asking: **How do researchers conducting RCTs on yoga negotiate its encounter with biomedicine and what valuations are performed in doing so?** More specifically, I intended to inquire how the researchers handle the encounter between yoga and biomedicine first, on the level of knowledge, and second, on the level of methods. In addition to a focus on these concrete practices and valuations that are enacted in the biomedical yoga research, it was another crucial aim of this thesis to examine how these valuations are related to the broader structural and discursive context of the field of medical research. I thus aimed to reconstruct *regimes of valuation* (Fochler, Felt, & Müller, 2016) that influence the researchers' practices and decisions, allowing me to see these as situated within a wider context. Thus, through focusing on the investigation of value(s) in practice, my aim was not only to provide a detailed account of the knowledge production in biomedical yoga research, but also to unravel some of the supposedly black-boxed normativities entailed in the domain of medical research. As Colleen Derkatch (2016, p. 71) has suggested, studying its intersections with CAM provides a unique opportunity for unpacking assumptions and practices taken for granted in biomedicine, because CAM produces an estrangement effect ("*Verfremdungseffekt*") in biomedicine,

hence allowing to question many of its otherwise tacit assumptions. Along these lines, my research may contribute to shedding more light these value frameworks and norms and the way they shape medical research practices, potentially opening up a space for discussing knowledge production in this domain more broadly.

In empirically answering the questions I posed in this thesis, it was important for me to put the perspectives of researchers that are conducing RCTs on yoga centre stage. Therefore, I explicitly wanted to go beyond the level of publications, in order to get a more detailed and direct impression of their understandings, valuations, and relevances with respect to the biomedical yoga research, and to inquire into how they perceive and negotiate potential tensions that are implicated here. I decided that qualitative interviews would be the most feasible method for doing so in the scope of my master thesis. My empirical argument is thus based on five qualitative interviews with biomedical researchers which are informed by an exploratory analysis of publications of RCTs authored by these researchers.

In order to tell a comprehensive and coherent story about biomedical yoga research and the valuations that are entailed here, my thesis proceeds in the following manner. First, I situate my research within literature from the fields of STS and medical sociology that has studied medicine as such and the issues of EBM and CAM research in particular. Furthermore, I introduce literature from the field of valuation studies, thereby specifying my take on the study of value(s) and sketching some particularly relevant strands of work from this field. After describing the state of the art of the current research, I briefly introduce my case study, expanding my descriptions of yoga as such, its relation to medicine, and the biomedical research on it. Subsequently, I further specify my research questions as well as my methodological approach, and I give an overview of different concepts from the field of valuation studies that theoretically framed my thesis. In my empirical chapter, I describe and try to disentangle the complex valuations that are implicated in medical yoga research, which is followed by a concluding section where I explicitly come back to my research questions, discuss my findings in greater detail, and relate them back to the literature.

2. State of the art

My study is situated at a nexus of many, partially overlapping fields of investigation – it connects research from the fields of STS, medical sociology and anthropology, it links to investigations of both biomedicine as well as CAM, and it situates all this within the overarching framework of investigating valuation practices in medicine and beyond. In this respect, it becomes relevant to introduce various different strands of literature to contextualise my study. In the following, I first situate my research within work that has examined medicine from a sociological and STS perspective more broadly, thereby providing the wider context to my inquiry. I then particularly focus on the concept of EBM which is central to current biomedical practice and research and thus crucial to understand the context in which biomedical research on yoga is conducted. Moving on, I introduce work dealing with CAM and its relation to biomedicine. One especially salient issue that I focus on is the topic of boundary work (Gieryn, 1983), since questions of how CAM challenges biomedical boundaries and how these boundaries are in turn reinforced and negotiated inform a large part of the literature in this field and are very relevant when it comes to examining research situated at the intersection of biomedicine and CAM. Beyond this, I deal with the topic of examining CAM as an epistemic object, meaning to treat CAM not only as a homogeneous sphere in relation to that of biomedicine, but seeing how particular CAM practices are shaped and altered in encounters with biomedicine. In the last section of the state of the art, I turn to literature from the field of valuation studies. First, I introduce the general perspective on the study of value(s) that is taken in this field, i.e. a social constructivist approach, seeing value(s) as enacted in practice and having performative character. Having introduced this general background, I situate my study within literature dealing with valuations in academia more broadly and in the life sciences and biomedicine more specifically, thereby further setting the context for my inquiry and underlining the importance of investigating valuations in biomedical research on yoga.

2.1 Examining medicine from an STS perspective – some words on heterogeneity, multiplicity, and ontological politics

The sociological investigation of medicine is not a recent development, but can already be traced back to the beginnings of the 20th century (Bloom, 2002). Within the field of STS, medical issues have equally played an important role since the inception of the discipline: A paradigmatic example is microbiologist, immunologist and epistemologist Ludwig Fleck, who essentially paved the way for work in the field of STS, and who largely based his theoretical considerations on the study of syphilis (Fleck, 1935). Fleck highlighted that scientific and medical theory and thought cannot be seen detached from their social context, but that they are essentially influenced by the social surroundings they are situated in. Moreover, he showed that accepted ideas in medicine and science more broadly are to be seen as relative to currently dominant *thought collectives* which share a certain *thought style*, rather than being absolute and universal truths.

Since these early beginnings, STS has studied medical research and practice from a wide variety of perspectives, often highlighting that medicine, similar to science, is no homogeneous and clearly bounded institution, but is constituted through messy and contingent everyday practices. Marc Berg and Annemarie Mol (1998), for example, have attended to *Differences in Medicine*, lucidly illustrating that medicine is "an amalgam of thoughts, a mixture of habits, an assemblage of techniques" (p.3) rather than a coherent unity. These authors highlight that even the often invoked entity of a 'Western' biomedical belief system (in contrast to healing practices found in different cultures and places) does not exist as such, but that also this supposed unity is characterised by multiplicity and various inherent tensions. Taking this further, Annemarie Mol (2003) has, in her seminal work *The body multiple*, illustrated that there is not only epistemic variety in medicine, but that instead, treatments, diseases, and the body itself are practiced, produced, enacted differently in different situations – that they are multiple. Dealing with the example of atherosclerosis and elsewhere with that of anaemia, she highlights that a disease itself does not exist independently of the practices that enact it, but only comes into being through these very practices and hence also differs from situation to situation: "Here it is being cut into with a scalpel; there it is being bombarded with ultrasound; and somewhere else, a little further along the way, it is being put on a scale in order to be weighed. But as a part of such different activities, the object in question varies from one stage to the next" (Mol, 1999, p. 77). Hence, Mol has convincingly argued for the ontological multiplicity of medicine, of the body, and of reality. She illustrates how these multiple versions can be in tension with each other and more or less tightly cohere. Furthermore, she emphasises that if we acknowledge this multiplicity, that we are dealing with a medicine full of tensions and differences, we moreover find that medicine has politics – inherently entangled in the ways problems are approached and solved, diseases are defined, bodies are investigated, and treatments are designed (Mol, 1999; Mol & Berg, 1998). If objects do not exist independently of practices, if they do not speak for themselves, then it is medical research and practice that choose to enact them in particular ways and not in others, with important consequences for potentially each and everyone of us.

With respect to my own inquiry, these considerations are important in different ways. First, acknowledging the diversity and multiplicity of 'Western' biomedicine is especially significant with respect to often invoked binaries between CAM and biomedicine. It allows to conceive neither of these as coherent and homogeneous but rather as heterogeneous and loosely bounded entities. When investigating biomedical research on yoga, it is essential to be aware of both the loose boundaries between these fields as well as of their internal diversity. Furthermore, I regard it as crucial to acknowledge the performative character of medical practice and research, and hence to be sensitive to the "ontological politics" that are entailed here. Such a perspective highlights that also biomedical yoga research has important real-world consequences – choosing to implement yoga in a certain way in a medical study, to measure certain outcomes, and to investigate a particular group of patients – all these decisions are containing politics, as subtle as they may be.

Beyond this, another aspect that has often been highlighted in social studies of medicine, and that seems to be important to my inquiry as well, is what Collins and Pinch (2005) call medicine's dual role as both a science and a "source of succor" – needing to answer both "the big and the small questions" (p.2). In other words, we do not only want medicine to find the ultimate cure for cancer and to generate, provide, and apply scientifically accurate knowledge, but we also want it to alleviate people's suffering in a particular moment, to care for individuals in the here and now. Yet, these two facets of medicine may not always go hand in hand, since in caring for individuals in the present moment, scientifically accurate knowledge may sometimes not be of highest priority (Mol, 2008). This dual role of medicine becomes particularly important with respect to the field of CAM, since it is sometimes assumed that a focus on care, on how to alleviate people's present suffering is more emphasised in CAM, but falls short in (scientific) biomedicine. This is then often invoked as one of the main reasons for why people turn to forms of healing and treatment other than biomedicine – these may feature as a source of succor which is missed in biomedicine (Siahpush, 1999). When dealing with biomedical research on yoga, it is crucial to bear this dual function of medicine in mind, as well as the tensions that may go along with trying to unite these two facets. Having said this, I have started to touch upon the complex relationship between biomedicine and CAM. Yet, before delving more closely into this, I first want to shed some more light on a specific facet of current biomedicine that is of particular importance to my study – the 'paradigm' of evidence-based medicine.

2.2 The 'paradigm' of EBM

While I have located myself in strands of work that do not conceive of biomedicine as a clearly bounded and coherent unity, it is still important to consider some dominant ideas and concepts in contemporary biomedicine, in order to understand the structural and discursive context that medical yoga research is embedded in. Of particular relevance to my inquiry is what is often called the current 'paradigm' in biomedicine – that of evidence-based medicine. EBM, often defined as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients" (Sackett, Rosenberg, Gray, Haynes, & Richardson, 1996, p. 71), is a movement that set off in the last decades of the previous century (Timmermans & Berg, 2010). While the demand that medical practice should be based on 'best evidence' does not seem too astonishing and innovative, the EBM paradigm favours a very particular type of evidence – that coming in the form of numbers and statistics. Essential to the EBM framework is the so-called evidence pyramid (see for example https://hsls.libguides.com/pyramid)[2], in which the most decontextualized and aggregate forms of evidence are ranked highest, and the most qualitative and context-dependent forms of evidence are located at the bottom. As medical anthropologist and sociologist Vincanne Adams (2013, p. 56) has put it, in the context of EBM, "for evidence to say anything valid about how to prevent or treat a known health problem it must speak the language of statistics".

[2] Last accessed 14.05.2019

In their book *The Gold Standard: The Challenge of Evidence-Based Medicine*, Stefan Timmermans and Marc Berg (2003) have lucidly illustrated that with the rise of EBM, statistical thinking and standardisation have "penetrated every corner of contemporary medicine" (p.3) – informing, for example, international research protocols, clinical practice guidelines, as well as reimbursements procedures. Timmermans and Berg have extensively dealt with the consequences that accompany the paradigm of EBM in medicine and have highlighted its performative character, shaping medical practice and research in various ways. Most important for the contextualisation of my thesis are the impacts of EBM on medical research, where they manifest in a clear hierarchy of some kinds of study designs over others. In this framework, the RCT figures as the gold-standard for the assessment of the safety and efficacy of medical interventions. In an RCT, participants are randomly allocated to receive either the treatment under investigation, or to a control group. All other variables are intended to be kept constant, and at best both participants and trial personnel are being blinded to the allocation. The RCT can thus allow to identify statistical correlations between an intervention and a certain outcome, which is considered a reliable basis for medical practice. Moreover, 'high-quality', i.e. very rigorously conducted RCTs lend themselves well to a synthesis in systematic reviews or quantitative meta-analyses, which are considered as of even greater value due to their aggregate character (Timmermans & Berg, 2003). However, RCTs are expensive to run and labour intensive, they demand interventions to come in a very standardised format and require homogeneous patient populations – conditions which are not always given or easy to meet (cf. Lakoff, 2007; Timmermans & Berg, 2003) .

Asking why the EBM movement could gain such traction in the second half of the last century, different scholars have highlighted that it is not an inherently statistical character of clinical medicine that gave rise to EBM, and that the demands for standardisation did not arise 'naturally' within the medical community (Porter, 1995; Timmermans & Berg, 2003). Historian of science Theodore Porter (1995, preface) instead defines two major reasons for the rise of statistical thinking in medicine, the first of these being external regulatory pressures medicine was facing. As described by Timmermans and Berg (2003), in the middle of the 20th century the medical profession was confronted with an increasing pressure to justify their actions – facing increasingly emancipated patients, mounting costs in the healthcare system, and generally a growing societal scepticism towards the role of (scientific) experts. EBM with its emphasis on what Porter (1995, p. 6) has termed "quantitative objectivity", detaching knowledge from those who make it, figured as a way to rebuild trust in the medical profession, and to satisfy the demands of regulatory authorities. This function of guaranteeing accountability is still essential to EBM today. The second reason for the rise of EBM that Porter (1995, preface) identifies is being a response to an "internal disciplinary weakness" of medicine. He suggests that EBM was essential to create a shared discourse for medicine, thereby uniting a rather weekly bounded community.

In line with this, Colleen Derkatch (2016), who studies rhetoric in science, medicine, and health, has described EBM as a form of invisible boundary work. She highlights that discourses of evidence do not only perform a medical and scientific function, but also a social and political one, and she illustrates

how EBM's "discourse on quantification" (Derkatch, 2016, p. 31) becomes both seemingly natural and inevitable in the medical field. She argues that it performs a kind of "protective work" (Derkatch, 2016, p. 31), defining what belongs to the realm of biomedicine and what does not. Derkatch then especially focuses on the RCT as the most highly regarded assessment of the efficacy and safety of medical interventions in the evidence-hierarchy of EBM. She argues that the RCT, usually associated with an ethos of disinterestedness, is a "rhetorically interested construct" (Derkatch, 2008, p. 371) securing biomedical boundaries – it is the "surrogate metric of reasonableness" (Derkatch, 2016, p. 69) that defines what is considered credible and valid in medical research. In other words, she suggests that a method that is heralded for its objectivity and neutrality attains an essentially political function in defining who or what belongs to the realm of scientifically accepted biomedicine, and who or what not.

Along these lines, several other scholars related to the field of STS have emphasised the importance of attending to the political character of EBM, and partially also criticised the sole privilege ascribed to quantitative evidence in this framework (Timmermans & Berg, 2003; Trnka & Stöckelová, 2018; Wahlberg & McGoey, 2007). Yet, as highlighted by Timmermans and Berg (2003), instead of merely debating the advantages and disadvantages of EBM (which is often enough done within medicine itself as well as in more sociological and philosophical investigations), it seems crucial to further investigate the performative character and the consequences of prioritising standardisation and statistical thinking for medical research and practice, centrally shaping work in these fields. This aim is essential to my thesis – rather than discussing whether or not the standards set in the EBM framework are suitable or 'good' for the investigation of yoga in clinical trials, I aim to shed more light on how this broader structural, discursive, and epistemic context plays out in practice, how it influences the work of researchers conducting medical studies on yoga, and how the researchers navigate within this framework. Most importantly, I aim to privilege the researchers' own perspectives in all this, rather than imposing some theoretical argument from the outside.

Having situated my work within these considerations and perspectives from the field of STS on the dominant paradigm in contemporary biomedicine, I now turn to the field of CAM, situated on the other side of a supposed boundary that biomedical research on yoga is bridging.

2.3 Examining CAM from an STS perspective

The fields of medical sociology and medical anthropology have already for a longer period investigated CAM and particularly its relation to biomedicine, while STS has long remained rather uninterested in these issues and the topic has only more recently gained some prominence here (Brosnan, Vuolanto, & Danell, 2018). Especially from a medical sociological perspective, a wide range of issues surrounding CAM has been examined, including aspects such as policy regulations, the status of CAM in different countries, questions of terminology, as well as views and characterisations of CAM users and practitioners (Brosnan et al., 2018; Gale, 2014; Siahpush, 1999). While certainly interesting, a discussion of this broad field of investigation would by far exceed the scope of my thesis. What is most

relevant for my purpose are questions concerning the knowledge bases of CAM and biomedicine, and how the relation between the two is negotiated, epistemologically as well as methodologically.

2.3.1 CAM challenges biomedical boundaries

In discussions surrounding the knowledge bases of CAM and biomedicine, it is on the one hand frequently demanded that CAM practices are to be scientifically proven in order to be integrated into healthcare systems. This has been quite radically expressed already 20 years ago by Phil Fontanarosa, executive editor of the *Journal of the American Medical Association*: "There is no alternative medicine. There is only scientifically proven, evidence-based medicine supported by solid data or unproven medicine, for which scientific evidence is lacking" (Fontanarosa, 1998, p. 1618). Hence, CAM practices are to be 'proven' in the EBM framework, preferably in RCTs, and then they will be readily integrated into biomedicine. On the other hand, especially proponents of CAM emphasise that CAM practices are often based on entirely different philosophical foundations and are rather unsuited to be evaluated in RCTs. In contrast to biomedicine, which is based on the idea of disease specificity according to which "illnesses are understood as stable entities that exist outside their embodiment in particular individuals" (Lakoff, 2007, p. 59) and which can be explained through one specific causal mechanism, many CAM practices do not treat isolated symptoms, but take a much more context-embedded approach to health and disease (e.g. Barry, 2006; Degele, 2005; Trnka & Stöckelová, 2018). Contrary to the logic of the RCT which tries to eliminate as many contextual variables as possible, many CAM practices rather see the actual intervention, the therapist, the placebo effect, and influences of the social surrounding as an entire system of healing. Thus, evaluating such interventions in an RCT framework requires to neglect many elements that are essential to them and may often be at odds with their epistemological approach. In line with this, it is frequently noted that for the evaluation of CAM, different forms of evidence than those obtained in rigid clinical trials are called for (Barry, 2006; Trnka & Stöckelová, 2018). Overall, what is centrally linked in these discussions are questions of how to (scientifically) evaluate and generate knowledge about CAM, as well as the issue of (re)negotiating boundaries between and around biomedicine and CAM. In the following, I review some work from the field of STS that has dealt with both of these aspects.

To begin with, the topic of boundary-work (Gieryn, 1983) has been a focus of many investigations of CAM research and practice, which have shown that how these boundaries are drawn and negotiated varies from site to site and from case to case (Danell & Danell, 2009; Derkatch, 2008; Mizrachi, Shuval, & Gross, 2005; Shuval, Gross, Ashkenazi, & Schachter, 2012). For instance, Nissim Mizrachi et al. (2005), who have investigated boundary demarcations between biomedicine and CAM in a hospital in Israel, paint a picture of a clear marginalisation of CAM, describing that though being practised in the hospital setting, the knowledge base of CAM still remains outside of biomedicine, often being regarded "a matter of personal belief" (p.32) and to be proven by "real objective research" (p.31). Unlike these authors, Yael Keshet (2009) has focused on the site of research, conducting a discourse

analysis of different publications from the medical field. Contrary to Mirzahi et al., who depict a rather clear boundary between biomedical and CAM knowledge, Keshet identifies a great variety of different positions and rhetoric strategies dispersed "along a 'scientific'–'non-scientific' continuum" (p.131), indicating how the boundaries of biomedical knowledge are continuously (re)constructed and negotiated. A need to continuously engage in boundary work, negotiating the boundary between what is scientifically proven evidence-based medicine, and what is an unscientific treatment, is apparently especially felt by medical researchers working in the field of CAM. Ginger Polich, Christopher Dole, and Ted Kaptchuk (2010) have found that CAM researchers feel under constant pressure to justify their work towards colleagues working in 'mainstream medical research' and to "act a little more scientific" (p.106). Overall, these investigations highlight that on the one hand, the boundaries of biomedicine are quite strongly enforced and protected, yet, on the other hand, they also seem somewhat "untenable and ambiguous" (Keshet, 2009, p. 131), and CAM research and practices constantly challenge them.

As this point, it is important to relate back to the work of Collen Derkatch (2008, 2016) I have introduced before, dealing with the function of EBM and particularly the method of the RCT in defining and securing biomedical boundaries. Derkatch argues that discussions about how to draw boundaries around and between CAM and biomedicine often directly intersect with the question of how to evaluate CAM methodologically. She suggests that arguments about how to evaluate CAM are expressions of broader concerns about how to define and secure the boundaries of biomedicine. As noted before, Derkatch especially highlights the role of the RCT as being "essential to medical-professional boundary work" (Derkatch, 2008, p. 371): CAM practices which can be proven within this methodological framework may 'enter' the field of biomedicine, while the others are dismissed as unscientific.

An interesting theoretical perspective on these struggles between research in the fields of biomedicine and CAM has been provided by Keshet (2010), who has applied Latour's (1993) notions of *hybrids* and *purification*[3] to medical research. She argues that mainstream medical research, and particularly the RCT which tries to isolate a medical intervention from its contextual embedding, engage in acts of purification, trying to separate nature from culture, mind from body, objectivity from subjectivity. Keshet then suggests that research in the field of CAM more openly hybridises many of these aspects, thereby challenging modern biomedical epistemologies and ontologies. In response to this, actors from the biomedical field again engage in acts of purification when demanding CAM practices to be proven in RCTs, thereby trying to disentangle many of the hybridities they bring about, and to secure biomedical boundaries.

From a more practical and applied perspective, STS scholars have investigated how research in different CAM disciplines deals with the norms and standards set in the field of biomedical research in

[3] In his book *We Have Never Been Modern*, Latour (1993) has suggested that modern societies continuously engage in two distinct kinds of practices which are characteristic of them: On the one hand, they perform acts of 'purification', i.e. they constantly engage in the creation and maintenance of distinct ontological spheres of nature and culture, separating the non-human and the human. Yet, simultaneously, they mix these two spheres together in acts of 'translation', thus creating nature-culture 'hybrids'.

trying to enter the domain of accepted medical science. Nina Degele (2005) has focused on homeopathy, one of the most widespread but also most controversial forms of CAM, and examined the strategies employed by homeopathy researchers to gain acceptance in the mainstream medical community. She identifies a splitting of the homeopathic community: While one group refuses to abide by the scientific standards set in the EBM framework, others try to make homeopathic treatments fit for the evaluation in RCTs in order to allow them to enter the domain of scientifically accepted medicine. However, this leads these researchers to mostly break with the epistemological approach of 'classical' homeopathy (Degele, 2005). Another interesting instance of how CAM deals with the challenge of being recognised as scientific has been provided by Jongyoung Kim (2007). He has illustrated how researchers of Korean medicine (KM) "actively appropriate laboratory science" (p.857) and transform and translate KM's material and conceptual basis in order to make it scientifically acceptable. Kim also notes that the researchers work with a 'double standard', adapting their approach and the way they write their publications to the respective community they are addressing, i.e. the local KM community or the global biomedical one.

What is implicated in both of these publications is the tension I have outlined in the beginning of this section, namely the frequent need to 'betray' the foundations of a CAM practice in order to make it fit into the biomedical framework. These examples thus highlight that if CAM researchers – and hence supposedly also the yoga researchers – aim to enter the biomedical sphere and make CAM practices scientifically acceptable, they have to some extent to 'play according to the rules of the game'. They will necessarily be affected by the norms and standards in the field of biomedicine, and hence have to find ways, however these may look like, to deal with these norms. The aim of my research was to illuminate how researchers investigating yoga deal with these standards and norms, how their work practices are affected by a context in which "[t]here is only scientifically proven, evidence-based medicine supported by solid data or unproven medicine, for which scientific evidence is lacking" (Fontanarosa, 1998, p. 1618).

2.3.2 CAM as an epistemic object

The considerations I have outlined so far are rather situated at the macro-level, relating to the boundaries and relations between CAM and biomedicine more broadly. However, as noted before, I conceive of neither of these spheres as internally or externally coherent, but as multiple and continuously enacted in practice. In line with this, I was also interested in the micro-level processes that are at work in the encounter of yoga and biomedicine, and their potential to alter both of these spheres. The aim of my thesis was not only to investigate how the work of the researchers is influenced by its contextual surroundings, but also to examine how yoga as an object of research is treated, conceptualised, valued, and potentially changed and/or valorised in and through this encounter. As sociologist of science, medicine, and health Caragh Brosnan and her co-authors (2018) have argued, little attention has so far been given to CAM practices as epistemic objects that are transformed in processes of research and to

their potential hybridisation with biomedical knowledge. Brosnan et al. (2018) emphasise the importance of opening "the black box of CAM" (p.7), not treating it as a stable object, but investigating how CAM practices themselves are affected by processes of social and scientific transformation. As they put it: "Rather than being 'timeless' traditions, various CAM therapies and techniques merge ancient philosophy with cutting-edge bioscience, vitalistic with biomechanical ontologies, or Eastern with Western customs" (Brosnan et al., 2018, p. 6) – processes and practices that seem very relevant to attend to. A related argument has been made by Wen-yuan Lin and John Law (2014) who have proposed that the field of STS may particularly benefit from studying intersections between Western and other forms of knowledge and the hybridisations that may occur here, as it is the case in many encounters of CAM and biomedicine.

Paying attention to such small-scale transformations in encounters of distinct CAM practices with biomedicine is of particular importance with respect to the frequent subsumption of these practices in general categories that often reduce them to their 'holistic' character. Given the great diversity of practices that are merged in the category of CAM, it is crucial to do justice to both the differences between distinct CAM practices as such, as well as to how this is in turn reflected in different relations towards biomedicine and different ways of researching such practices. Brosnan (2016), for example, has explicitly sought to investigate the differences between knowledge making practices in university departments of Chinese medicine and osteopathy in Australia. She identifies these CAM disciplines as very different epistemic cultures (Knorr-Cetina, 1999), with Chinese medicine academics mostly embracing the biomedical model but Osteopaths being more critical of it and calling for different forms of evidence. Her investigation thus highlights the importance of attending to distinct forms of CAM and to how their encounter with biomedicine is negotiated differently.

Some other scholars have equally provided telling examples of how such investigations can look like. Anna Ning (2018) has, based on ethnographic fieldwork with practitioners of traditional Chinese medicine (TCM) in Canada, illustrated how knowledge production in the field of TCM takes place and shifts in complex ways in local settings. She highlights that TCM comprises both incompatibilities as well as intersections with western biomedical knowledge, and identifies an "epistemic hybridity" (p.247), meaning that the practitioners combine multiple frameworks of evidence in these settings, instead of sticking entirely to the traditional TCM framework or subjecting completely to biomedical epistemologies and ontologies. Moreover, Ning points out that also within TCM itself, there is an "epistemic disunity" (p.261), and that the researchers are establishing hierarchies between more or less 'authentic' or 'incomplete' forms of knowledge. In a similar manner, Judith Farquhar (2012) has written about *Knowledge in translation: Global science, local things*, focusing on the encounter of Chinese medicine with Western biomedicine in contemporary China. She follows Lu Guangxin, a Chinese doctor and theorist, and traces how he handles the "apparently incommensurate representations of the world" (Farquhar, 2012, p. 153) contained in these medical systems and accomplishes translations between them. She poses the question whether and how "multiple natures, with their incommensurate entities

and untranslatable first principles [can] co-exist and even be usefully linked in both knowledge and practice" (p.167). Rather than explicitly answering this questions, Farquhar suggests that different 'natures' are being woven together all the time in everyday medical practices, and not only in such encounters of different medical systems – that entities are constantly being constructed, that (medical) objects are local and relational, and present themselves in a great variety of manifestations – considerations that are very much in line with those of Annemarie Mol (2003). The studies of both Ning and Farquhar thus illustrate the relevance of attending to how different knowledges are brought together in encounters of CAM and biomedicine, to the potential transformations of these knowledges, and to the epistemic and ontological multiplicity that can be implicated here. Such considerations have figured as an essential inspiration for my thesis – attending to how researchers bring the at first glance incompatible realities of yoga and biomedicine together in RCTs, what entities are enacted hereby, potentially changing both of the 'original' forms of knowledge. Moreover, these considerations link back to one of the basic underlying assumptions of my thesis, i.e. that entities implicated in medical research are continuously enacted in local practices, that they are multiple.

So far, I have situated my thesis within different strands of work dealing with biomedicine and EBM, with the relations between CAM and biomedicine, and with CAM as an epistemic object in itself. Though not explicitly mentioned, what seems to be present in many of the outlined debates on EBM and on how to evaluate CAM practices, are questions of worth and valuation – what is worth knowing and researching from a biomedical perspective? What forms of evidence are valued most? (Why) Is the value of a CAM intervention increased when it is 'proven' in a biomedical scientific framework? By what broader sets of values are researchers working at the intersection of CAM influenced in their work? These are only some of many questions related to worth and valuation that arise in biomedical research on yoga, highlighting the omnipresence and multifaceted nature of these issues. Already the classification of a certain intervention as biomedicine or CAM is a valuation practice, and in choosing to investigate yoga in the biomedical model of the RCT, the researchers perform important valuations as well. In my work, I am explicitly tracing questions such as those outlined above, arguing, in line with scholars from the field of valuation studies (see, e.g. Kjellberg & Mallard, 2013), that is important not to black-box those valuations implicated in biomedical yoga research. In order to further contextualise this focus on valuations, I now introduce the field of valuation studies and with that the study of value(s) from a social constructivist perspective.

2.4 Approaching value(s) from a social constructivist perspective

Questions of worth have long been of interest to the sociological investigation of science, yet in recent years, a growing community of research focusing on these issues has formed, largely around the journal *Valuation Studies* that was first published in 2013. Scholars working in this area are concerned with the study of worth and valuation as a social practice and process, being implicated in nearly every aspect of the worlds we live in, and playing an important role in ordering these worlds. Informed by earlier work

in the sociology of valuation such as that of John Dewey (1939), who showed that values are something that needs to be performed, this field of research takes a pragmatist approach to the study of valuation. This means seeing values not as fixed and stable objects that determine action and decision-making in specific ways, but rather as complex and malleable entities that are continuously created and enacted in practice (Helgesson & Muniesa, 2013; Heuts & Mol, 2013; Muniesa, 2011). Thus, instead of a static, realist conception of value, scholars working in this field adopt a social constructivist take where "value is then seen as the outcome of a process of social work and the result of a wide range of activities (from production and combination to circulation and assessment) that aim at making things valuable" (Helgesson & Muniesa, 2013, p. 6). Accordingly, the concern of the field is not to get at the essence of certain values, but rather to investigate *valuation practices* in various situations – focusing on how objects, practices, forms of knowledge, etc. are ascribed worth in specific contexts.

When dealing with the question of how to define valuation, Kjellberg and Mallard (2013), both members of the editorial board of *Valuation Studies*, have noted that while valuation functions to some degree as classification and ordering, it goes beyond that – valuation does not pretend to give an accurate account of the world, but is more openly concerned with signification. In other words, "the meaning of valuation is not to be found in the object to which it refers, but in how that object is being referred to" (Kjellberg & Mallard, 2013, p. 18) – a quote that once more foregrounds the aspect of practice. Moreover, what is also implicated here is the performative character of valuation. Being involved in processes of meaning making, valuations participate in ordering the world, in enacting certain realities.

Besides this focus on valuation as a social practice that has performative character, another aspect that is characteristic of most work in the field of valuation studies is the attempt to overcome what David Stark (2009) has called "Parson's pact" – i.e. the historical distinction between economic value (in the singular) and moral or social values (in the plural). Stark (2009) tries to overcome this division through introducing the notion of *worth* which does not buy into the binary of economic value vs. moral/social values, but allows the investigation of many different forms of worth and the multiple relations between them (Dussauge et al., 2015). Moreover, the notion of worth again entails a focus on processes and practices of valuation (Stark, 2009).

Such a perspective that focuses on valuation as a social practice and that sets aside the binary between economic and moral/social value(s) is essential to my work. As I outline in the following, in biomedical research on yoga, various kinds of worth beyond the moral and the economic are entangled and performed, thus demanding an approach which acknowledges multiple, potentially interrelated values as being continuously enacted and having performative character. Having situated my research within this general approach to the study of value(s) that I am adopting, I now turn to the more specific topics of (e)valuation in academia and that of studying worth in the life sciences and medicine. The more specific theoretical concepts from the field of valuation studies that inform my analytic perspective are described in the sensitizing concepts section.

2.4.1 (E)valuation in contemporary academia and its consequences

Related to the broader field of valuation studies, research that investigates valuations in academia has been growing in recent years, accompanying the rise of New Public Management (NPM) and the growing development of an 'audit culture' in this sector. Though not being at the core of my research interest, such investigations are nevertheless important to provide another contextual framework in which biomedical research on yoga takes place. This is crucial since, as Hutter and Stark (2015) have emphasised, valuation practices are always temporally and spatially located. Besides being influenced by the paradigm of EBM and struggles between the fields of biomedicine and CAM, research on yoga is situated within the norms, structures, and orders of worth of the academic system more broadly, necessitating a further description of this context and work that has dealt with it from a STS perspective.

With respect to the issue of (e)valuation in contemporary academia, much scholarship has investigated the manifold impacts of the introduction of NPM to the field of higher education and research and the related increase in importance of various metrics and performance measures (Burrows, 2012; Felt, 2009; Hazelkorn, 2011; Stöckelová, 2012). Considering the reasons for the rise of an audit culture in academia, scholars have highlighted links to broader neoliberal transformations (Lave, Mirowski, & Randalls, 2010), while there is at the same time an awareness for the role that researchers taking themselves part in the "indicator game" (Fochler & Rijcke, 2017) play in perpetuating this system. Besides this, an important issue for scholars from the field of STS are the epistemic consequences of these developments. Investigating the epistemic impacts of performance indicators in the field of life sciences, Ruth Müller and Sarah de Rijcke (2017) have highlighted that research metrics have a strong impact on the choice of research topics – shaping, changing, and limiting the contents of academic inquiries, and becoming 'obligatory passage points' when it comes to ascribing worth to academic activities. As a result, epistemic diversity becomes limited, and other forms of valuing academic work become harder to maintain. A similar argument has been made by Maximilian Fochler, Ulrike Felt, and Ruth Müller (2016), who have examined how being socialised into the contemporary highly competitive academic world affects individual researchers, their actions, epistemic decisions, as well as their valuation practices. These authors have found that throughout the researchers' careers, the evaluative principles they draw upon become increasingly narrow and more and more dominated by a focus on productivity and succeeding in the international competition through, for example, publishing in highly ranked journals, and obtaining grant money or citations. Overall, what is salient in these investigations is the growing importance of "a single final criterion of value [i.e.] a quantitative, economic criterion" (Burrows, 2012, p. 356), where worth is increasingly defined in terms of individual productivity and international competitiveness.

With regard to my thesis, these considerations are of importance since medical researchers working on yoga are supposedly equally subjected to the wider competitive academic environment, centrally dominated by research metrics. Yet, while some studies so far have dealt with the quite fast-paced field of life sciences, the area of biomedical yoga research may be described as a less popular and

hence somewhat slower field. In this respect, it seemed interesting to examine in how far the value orientations described for the life sciences are reflected in this field, or whether different orderings of value(s) can be encountered here. Indeed, despite the hierarchies of worth in contemporary academia that some scholars have pointed to, it is important to bear in mind that research in the life sciences and medicine implicates many different kinds of worth which often become intertwined in complex ways, as I further elaborate in the ensuing section.

2.4.2 The study of value(s) in the life sciences and medicine

When looking more closely at questions of worth and valuation in the life sciences and medicine, it quickly becomes apparent that in these fields many different kinds of value(s) are entangled, ranging from the scientific reputation and success of the individual researcher over economic efficiency, considerations of fairness and accessibility of healthcare, to fundamental questions such as what lives are worth living (Dussauge, Helgesson, Lee, & Woolgar, 2015). A seminal contribution to this field has been provided by Isabelle Dussauge, Claes-Fredrik Helgesson, and Francis Lee (2015), who have studied *Value Practices in the Life Sciences & Medicine*, investigating how values are made and enacted at different sites in these fields. These authors have highlighted a range of important questions that arise across these various sites, including aspects such as: What is proper conduct in the field of medical science and healthcare? What is the role of the market in these fields and what is economically and socially valuable? What is worth knowing, and how are valuations of scientific research linked to other interests? Hence, in line with the pragmatist approach to the study of value(s) that I have introduced before, these authors aim to examine "the ongoing composition of […] values in the life sciences" (Dussauge, Helgesson, Lee, & Woolgar, 2015, p. 1). In doing so, they also explicitly focus on potential discordances that arise here and how these are negotiated by various actors.

To give a few examples, in one of the case studies presented in their book, Sergio Sismondo (2015) follows so-called key opinion leaders acting at the boundary between medicine, science, and the pharmaceutical industry. Drawing on this case, he illustrates the clashes between different values that arise at the intersection of these spheres, centrally expressed in scientific and economic 'conflicts of interest' related to the marketing of pharmaceutical products. In another case study, Francis Lee (2015) examines how *Purity And Interest* are negotiated in biomedical research. This chapter breaks with traditional assumptions about interested science and the corruption of research and highlights that in medical research, various different interests are enacted alongside epistemic valuations. Lee thus highlights again that in this field, questions about epistemic value, economic efficiency, and clinical utility cannot easily be disentangled. Without giving a more extensive overview of the book by Dussauge et al. (2015), their general credo – i.e. the importance of studying the multiple values that are implicated and intertwined in the fields of life sciences and medicine – has probably become clear, and this motivation is already as such informative for my project.

Another interesting example of how various kinds of worth are enacted, articulated, and ordered in medical research that seems worth recounting due to its empirical focus that is quite close to mine, has been provided by Claes-Fredrik Helgesson, Francis Lee, and Lisa Lindén (2016). Starting from the assumption that every act of setting up a research design involves a series of valuations, these authors have examined how different valuations are intertwined, balanced, and hierarchized in two distict kinds of clinical trial designs – in 'traditional' RCTs and in rather recently emerging biomarker trials (BTTs). Through examining textbooks as well as journal articles, the authors found that in these trial designs, ethical, epistemic, and economic values are entangled and enacted in different and complex ways. For example, they identify differing valuations of prior knowledge and of what counts as ethical in relation to this prior knowledge. Moreover, they observed different valuations of false positive and false negative findings, which are again intertwined with other registers of value such as the economic feasibility of the trials and the ethical treatment of patients. Overall, their inquiry further highlights the importance of investigating the valuations entailed and enacted in biomedical research, especially in the design process as a "site where we glimpse the making of different stakes in biomedical knowledge production" (Helgesson et al., 2016, p. 158). My study shares concerns that are quite similar to theirs, in particular the broader aim to "shine light on shifting yardsticks, values, and pressures in the contemporary research landscape" (Helgesson et al., 2016, p. 157). Yet, my inquiry also extends their work by focusing not only on valuations implicated a specific type of trial design as such, but on the valuations that are implicated in designing particular kinds of trials to investigate a particular kind of therapy – hence adding another dimension to the considerations of Helgesson and co-authors. Moreover, these authors themselves note that through their methodological focus, they cannot capture valuations implicated in other sites of valuation such as that of publication, which however equally shape medical research in important ways. Thus, my thesis also extends the work of Helgesson et al. (2016) through taking a different methodological approach which allows to access a wider range of sites of valuation in the research process.

Overall, what I hope to have shown with the exemplary case studies outlined above are the complex entanglements of values in the field of medical research that various authors have observed, and the relevance of studying these. Taking this further, I argue that investigating valuation practices in CAM research in general, and in biomedical research on yoga in particular is of specific interest and relevance since this is a site where especially complex and potentially changing valuations meet and interplay – i.e. valuing a 'traditional' knowledge system in its own sake, valuing a holistic view on the human being, adding valuable new knowledge to the body of biomedicine, being evaluated by and wanting to succeed in 'standard' academic performance measures and rankings, conducting research and finding treatments that are economically valuable, etc. As argued by the members of the editorial and advisory boards of the journal *Valuation Studies*, cases or sites such as this one, where multiple valuations are entangled in complex ways, can be of particular interest for the study of valuation as social practice (Kjellberg & Mallard, 2013). In particular, it seems important to investigate how different

values are combined, hybridised or prioritised here, and how particular institutional or discursive infrastructures may impede or further the reconfiguration of values. These considerations have essentially informed the research questions that I am addressing in this thesis. Yet, before outlining these questions, it is important to say a few more words about the actual case I am studying, i.e. yoga and the biomedical research on it.

3. Case description

Though not yoga itself, but biomedical research on yoga is the empirical object of my thesis, it is nevertheless important to contextualise yoga, its roots, historical developments, and modern manifestations. This seems crucial in order to understand many of the tensions that arise in medical yoga research and the conflicts or problems that researchers may encounter. Importantly, my aim is by no means to give a comprehensive or authentic description of what yoga is. Rather, I provide a glimpse on its different manifestations, a situated selection of impressions that I considered important to my thesis. After providing this background, I turn to the relation between yoga and (bio)medicine and I consider some of the differences in the two fields' understanding of the human body. Last, I further describe the actual case of my thesis, i.e. the biomedical yoga research, giving some insights into how this field has developed so far, and pointing to some problems that it is currently facing.

3.1 Some words on the multiple realities of yoga

From my perspective, what makes the biomedical research on yoga so interesting is that yoga is not only gaining attention as a medical intervention, but is at the same time a highly popular phenomenon in contemporary 'Western' societies. As David Gordon White (2012) has put it – it has become part of our *Zeitgeist*. Indeed, it is probably hard to find a person who does not have at least one friend or relative practicing yoga. Yoga is nowadays an integral component in the offer of most fitness studios, and new yoga studies keep popping up in cities all over the world, indicating that yoga is currently also a huge commercial business. Yet, what is this yoga that is so popular nowadays? When thinking of yoga, what will probably come to mind for most people are images of skinny girls in tight leggings engaging in complex physical postures. This already indicates that the term yoga is today nearly synonymous with the practice of *asanas*[4] – the physical postures of yoga. While most people equally have a more or less vague idea of yoga being an 'ancient Indian tradition', scholars engaging more closely with the history of yoga have emphasised that yoga as we know it today is by no means to be seen in a direct lineage with 'traditional yoga'. As White (2012) has noted, most of the assumptions we hold about yoga actually do not date back more than approximately 150 years.

But what, then, is this 'traditional yoga'? This question is probably even more difficult to answer than the one asking what yoga is today. It seems to be agreed upon that the fist textual references to yoga can be encountered from around 300 BCE onwards in Buddhist, Hindu, and Jain sources, and they multiplied rapidly in the following centuries (Singleton, 2010; White, 2012). As White (2012) described, it was around this time that the fundamental principles of yoga theory and practice were first formulated. Yet, in the third- to fourth century CE *Yoga Sutras* and the *Bhagavad Gita,* two of the most frequently cited references to 'traditional yoga', mentions of posture practice are virtually absent. At that time, yoga was much more concerned with the issue of human salvation, it was a technique to raise and expand

[4] Sanskrit terms are indicated in italics and listed in the appendix.

consciousness, to attain omniscience and even supernatural capacities such as entering into different bodies (White, 2012). It was only at the end of the first millennium CE that with the emergence of *hatha yoga*, physical practices became for the first time a more integral component of yoga, together with a strong focus on the regulation of the breath through different exercises (*pranayama*). However, as emphasised by Singleton (2010), modern postural yoga can still not be seen in a direct linear relationship to the medieval *hatha yoga*. In the late 19th century, strongly shaped by Anglophone influences of the colonial period, yoga experienced a 'renaissance' in India itself, and it was in the following century radically transformed in this encounter with modern Western epistemologies and ontologies. As emphasised by different authors, yoga was at that time heavily influenced "by the practice and discourses of modern physical culture, 'healthism', and Western esotericism" (Singleton, 2010, p. 22), becoming an "eclectic blend of training in postures with teachings from the Yoga Sutras" (White, 2012, p. 21). Hence, rather than standing in an unbroken lineage, modern and traditional forms of yoga may rather be seen as in a dialectical relationship with each other.

Another aspect that I want to emphasise here is that when referring to 'traditional' and 'modern' yoga, it is important not to idealise any of these spheres. This firstly entails recognising that neither of them can be regarded as a clearly bounded entity, but that both the yoga tradition as well as its modern forms can be encountered in a plurality of manifestations. Hence, when encountering the terms 'traditional' and 'modern' yoga in my thesis, both of these should be seen as comprising a multiplicity of what yoga is. In addition to this, I do, in line with Singleton (2010) consider it as important to regard and judge these different manifestations of yoga in their own terms, and not to establish crude hierarchies between supposedly more or less 'authentic' forms. While it may with some certainty be said that the postures that are nowadays practiced in yoga studios all over the world do not have much in common with the ideas of human salvation and reaching omniscience and supernatural capacities that were essential to yoga 2000 years ago, this does not mean that these postures should be easily dismissed, but they may be of value in their own right. In this sense, Singleton (2010) has suggested to see the term yoga as a homonym, referring to different things in different instances. In line with this, it was from the outset essential to my research that I conceived of yoga as multiple, as something that is enacted very differently at different sites and in different contexts, with each of these realities having their own legitimacy. It was a central aim to see what realities of yoga the medical researchers enact, what it is for them, and in how far this potentially differs from situation to situation.

3.2 On the relation between yoga and (bio)medicine

Besides giving a general account of what yoga is, it is necessary to address the relation between yoga and medicine. If yoga is nowadays increasingly considered as a medical intervention – did it also have similar functions or connotations in its traditional forms? Moreover, how compatible are the views on the human body that are entailed in yoga and in modern biomedicine? To begin with the first question, it is important to say that yoga (in contrast to most other practices subsumed in the category of CAM)

did not originate as a form of medicine or treatment, which however makes it particularly interesting to study how yoga is currently integrated into biomedicine. While yoga is in contemporary biomedicine often discussed and investigated as a medical intervention like any other, Joseph Alter (2018) has pointed out that though traditional yoga was indeed connected to ideas of healing, yoga as medicine, in the sense of an "apparatus for treating disease" (p.134), is an entirely modern phenomenon with a history of no more than 80 years. As Alter argues, in order to understand the references to healing in classical yoga, we need to set aside the "modern prioritisation of the direct and reciprocal interlinking of health and disease" (p.133). Healing my here rather be seen as a "pure positive" (J. S. Alter, 2018, p. 133), not being connected to the alleviation of poor health, but rather aiming to reach enlightenment and embodied immortality. Alter (2018) has described, it was only in the late colonial period in India that yoga's spiritual ideas were tried to be reconciled with modern notions of health and disease. Here, yoga was first framed as a treatment against disease and its medical effectiveness and physical effects began to be measured.

Having said this, it is moreover important to briefly highlight the different conceptualisations of the body that are inherent to yoga and biomedicine. Since the biomedical understanding of the human body will be familiar to most of my readers, I focus on outlining a few aspects of the traditional yogic views. As emphasised by Fields (2001), traditional yoga perceives embodied life as centrally connected to the spiritual dimension. Essential to the understanding of the human body was the idea of a 'subtle physiology' where the body consists of *nadis,* thousands of subtle energy conduits through which the bodily energy flows, and which are connected at certain focal points of nodes called *chakras,* (Singleton, 2010). These energy conduits are then supposed to be purified and balanced through yoga practice. While only providing a glimpse on some of the aspects that characterised traditional yoga's understanding of the human body, what becomes obvious very quickly is that these ideas are in no way reflected in modern medical understandings and seem to be in tension with these in many ways. Interestingly, references to the *chakras,* and even to the body's subtle energy conduits can sometimes be encountered in contemporary yoga teachings and discourse (though usually without a deeper explanation of their background), sometimes even side by side with biomedical terms and explanatory models. This already indicates how the tensions between some of the understandings inherent in traditional yoga and modern biomedicine may be encountered in the field of yoga practice. In my thesis, I aimed to investigate in how far these tensions can be encountered in the biomedical research on yoga and how they are negotiated by the researchers working in this field.

3.3 Biomedical research on yoga

Having introduced the general background of yoga as well as its relation to biomedicine, I now turn to my actual object of research – the biomedical research on yoga. While the first publications in this area can be found in the 1970s, the field has particularly gained traction since the turn of the millennium, and is today still a growing and dynamic area of investigation. As reported by Cramer, Lauche, and Dobos

(2014), between the years 2010 and 2012, the number of RCTs on yoga that were published almost doubled from year to year. Moreover, these authors note that while in the early 2000s, a large part of the yoga studies that were published still originated from India, the research has since then also become more prominent in different countries, with for example the US now being a major player in the biomedical yoga research community.

Medical research investigates the effects of yoga in a great variety of different conditions, ranging from psychological ones such as depression, fatigue or anxiety, to somatic conditions such as hypertension, cardiovascular problems, or asthma (Büssing et al., 2012; Michalsen & Kessler, 2013). For many of these conditions, trials have already shown beneficial effects of yoga interventions, though yoga is currently, especially for severe conditions, rather considered a supportive intervention than a standalone treatment (Büssing et al., 2012). In addition to researching its efficiency, medical research is moreover concerned with the development of explanatory models for the effects of yoga: Besides the obvious benefit of physical activity, yoga is described as affecting the autonomic nervous system, especially the balance of the sympathetic and parasympathetic branches. Yoga is thought to enhance parasympathetic activity and hence to induce a physiological relaxation response, which also entails effects on various different physiological parameters such as heart and respiratory rate or the functioning of the immune system (Büssing et al., 2012; Field, 2016). On a psychological/cognitive level, yoga is besides is stress-reducing effects described to enhance emotional regulation and to increase self-efficacy (Büssing et al., 2012).

Hence, medical yoga research has progressed remarkably in the last years and many effects of yoga are quite well explainable from a medical perspective. Nevertheless, the field of research is considered to have some problems, which are also emphasised by researchers working in the field itself. These problems become especially apparent when taking a look at how RTCs on yoga – the gold-standard in biomedical research and hence the method that I am especially interested in – actually proceed. In RCTs on yoga, a group of participants that is recruited through advertisements or actively approached, and that is selected according to criteria that are specified for each particular study, are randomly allocated to either a yoga group or to a control group. This control group can be a so-called waitlist group which does nothing during the observation time and receives the same yoga intervention afterwards. Otherwise, yoga can be compared to a group which receives a different kind of intervention, such as physiotherapy, psychological counselling, or healing eurythmics. The different groups are then evaluated for the specific outcomes the study focuses on, usually at baseline (i.e. at the beginning of the study) and at the end of the intervention period, while few studies also include a follow-up measurement some weeks after the intervention has been completed. Subsequently, different statistical methods are employed in order to determine significant changes after the yoga intervention within one group, as well as significant different changes between the groups[5]. This already implies that the outcomes that are

[5] Importantly, this is a very rough and general overview of how RCTs on yoga proceed. Certainly, there is quite some variety between different trials, and often additional statistical operations such as, for example, the

addressed in an RCT are usually of numerical character, and also aspects such as quality of life are assessed with standardised questionnaires, in order to allow to test for statistical significance.

What is considered as an important problem of the medical yoga research is the high degree of heterogeneity of different studies. First, studies differ widely with respect to the chosen control groups, which makes their comparison difficult. Another point of criticism with respect to RCTs on yoga is that the yoga interventions often vary a lot between different studies. For example, some studies include only *asanas* and thus enact yoga as a purely sportive intervention, while others put a greater focus on meditation and *pranayama* and include very little physical activity. Moreover, also the yoga style, as well as the duration and frequency of the interventions often differ, making it hard to compare different studies to each other (Büssing et al., 2012). Hence, also within the medical research, yoga manifests in a multiplicity of appearances. This heterogeneity of yoga studies is especially pronounced when holding studies from Western countries against those conducted in India. As Cramer (2014), for example, has emphasised, Indian studies often use interventions of a much higher duration and frequency, and yoga is here understood in a much more spiritual way than in Western studies. This lack of comparability for which the medical yoga research is often criticised also makes it more difficult to summarize its results in systematic reviews and meta-analyses. In light of this, calls for more and especially 'more rigorous' research are omnipresent throughout the medical yoga literature (e.g. Büssing et al., 2012; Field, 2016; Michalsen & Kessler, 2013).

Overall, this brief overview of the field of medical yoga research, its current developments, and some problems it faces, may help to better situate my empirical findings and to understand some of the issues that come up here. While I have here provided a general perspective on the field as such, the specific participants that I have dealt with in my research are described in the chapter on methodology.

calculation of effect sizes are employed. In the scope of this thesis, I cannot sketch the complexity of procedures that are employed in RCTs on yoga, yet the description delivered here shall suffice to provide a general idea of how these trials proceed.

4. Research questions

Having situated my inquiry in different bodies of literature, and having introduced yoga and the biomedical research on it as the empirical case that I have investigated, I can now more clearly articulate the research questions that I aimed to answer in this thesis. As should have become clear from the brief description of yoga, this practice (or maybe rather – this philosophy) is in tension with biomedicine in various ways. On the level of knowledge, these two systems of thought are grounded in very different assumptions about the human body and about health, and on a methodological level, the practice of yoga seems in some ways to be difficult to reconcile with the framework of the RCT that is the current gold-standard in biomedical research. The aim of my work was thus to see how researchers handle this encounter between yoga and biomedicine, whether they perceive it as difficult to investigate yoga in the framework of the RCT, and how they deal with potentially arising challenges. Furthermore, it was, in line with Helgesson, Lee, and Lindén (2016) essential to my approach to regard the design of a medical study as a process that entails various situated valuations, relating, for example, to what intervention seems valuable to investigate in the first place, why a certain method is considered best for doing so, what outcomes to focus on, etc. Along these lines, the aim of my thesis was to investigate the valuations that are entailed in biomedical yoga research, particularly in designing and conducting RCTs to investigate yoga. In line with this, the main research question I addressed with this thesis was:

How do researchers conducting RCTs on yoga negotiate its encounter with biomedicine and what valuations are performed in doing so?

Though this question summarises the different aspects of my inquiry quite well, I found it nevertheless important to make some more specifications to it, in order to put greater emphasis on particular dimensions, and to thereby structure my analytical take in a particular way. In line with what I have stated above, two specific dimensions I was interested in were on the hand the level of knowledge and on the other hand the methodological level, and how the encounter of yoga and biomedicine is negotiated on each of these. These two dimensions are addressed in the following sub-questions:

SQ1: **How do the researchers negotiate the encounter of yoga and biomedicine on the level of knowledge?**

SQ2: **How do the researchers handle the encounter between yoga and biomedicine on a methodological level?**

With sub-question one, I aimed to understand how the researchers perceive the relation between what I call the different knowledge systems of yoga and biomedicine, how they situate themselves within these knowledge systems, how they bring the two together, and how they shift and mediate between them in assembling new knowledge. This, for example, entails aspects such as what yoga is for them, how, or

as what they value yoga, in what terms they understand the human body, health and disease, and why they think it is valuable to integrate yoga into biomedicine and to understand it from this perspective.

The second sub-question then particularly relates to the aspect of investigating yoga in the framework of the RCT and the challenges that are (presumably) entailed here. I aimed to explore how the researchers practically approach the investigation of yoga in RCTs, how they 'make it happen' and what is required in order to do so. Moreover, I intended to understand their perspectives, experiences, and attitudes towards the investigation of yoga in RCTs. In line with my analytical focus on valuations, this sub-question also entailed understanding whether or why the researchers consider it as valuable to investigate yoga in a RCT in the first place and what factors influence their methodological decisions and which ones may be placed back.

The latter aspect already hints at a last yet very important aspect that I was interested in in my inquiry, namely the larger frameworks that influence the researcher' practices and decisions and valuations they perform in their work. In order to conceptualise the broader discursive, material, and institutional backgrounds by which the researchers are influenced, I employed the concept of *regimes of valuation* as articulated by Fochler, Felt, and Müller (2016), asking:

SQ3: What larger regimes of valuation influence the concrete practices and decisions of the researchers?

This sub-question was crucial to my work since I considered it of primary importance to not see the work of the researchers and the valuations they perform as detached from their institutional and discursive surroundings, but as locally and temporally situated and hence also influenced by a certain context. I my state of the art, I have already outlined the most important features of the context that biomedical research on yoga is situated in: A crucial aspect is the dominance of EBM in biomedical research with the RCT as the gold-standard method to investigate medical interventions. Furthermore, since medical yoga research is situated on the boundary between CAM and biomedicine, I also expected it to be subject to the struggles between these fields that I have outlined above, and likely to be affected by the dominance of the biomedical framework in certain ways. In a wider sense, the medical yoga research is also situated in the regimes of research governance that dominate the contemporary academic world, including the pervasiveness of research metrics and evaluative procedures – another aspect that I hypothesised to have an important influence on the researchers' practices, decisions, and valuations. While these contextual factors were the ones that I anticipated to play a role on the basis of the existing literature, my aim was to empirically reconstruct how and to what degree they would actually affect the researchers' work. Moreover, in addition to these regimes that I hypothesised beforehand, I was interested in other discursive and institutionalised frameworks that would potentially play a role in the medical yoga research, and thus in identifying additional regimes of valuation in a bottom-up manner.

5. Methodological approach

In some sense, the research for my master thesis started long before I even decided to write my thesis about the topic. During my bachelor studies, I had written a paper about the effects of yoga on the immune system and since then I engaged with this field of research in manifold ways. This background that I have in the field and the previous work that I have done here certainly influenced my research in various ways which I cannot grasp within the scope of this thesis. Yet, it is crucial to say that I had thus in many respects an 'insider perspective' on the medical yoga research, while I was at the same time also somewhat critical of it, especially with respect to the many apparent tensions that seem to arise when investigating yoga in RCTs – a perspective that however fundamentally changed in the process of my research.

During my second semester of the STS master programme I began to more specifically engage with the medical yoga research from an STS perspective and I decided to deal with this topic for my master thesis. Thinking about the topic from an STS point of view, it was soon clear to me that I wanted to engage with medical researchers working in this field directly instead of, for example, only focusing on their publications. Hence, after thinking through different ways of combining the investigation of medical studies on yoga with direct interactions with medical researchers, I decided that qualitative interviews based on an exploratory document analysis would be the most feasible method to approach my research questions within the scope of my master thesis. In the following, I first describe the process of gaining field access as well as the participants I interviewed. Subsequently, I specify my approach to the document analysis and to the interviews, both on a pragmatic and applied as well as on a more theoretical level. Furthermore, I reflect on the benefits and limitations of the approach I have chosen and I conclude by describing the procedure of data analysis.

5.1 Field access and participants

My thesis mainly builds on five semi-structured qualitative interviews with medical researchers conducting clinical studies on yoga. While there is a growing international research community in this field, I decided to only interview researchers I could talk to in person and not to conduct skype interviews to different countries all over the globe. Hence, in the preparatory phase of my master thesis in November and December 2018, I immersed myself further in the biomedical literature on yoga and explicitly tried to identify researchers working in the field who are situated in Germany or Austria. In Austria, hardly any research seems to be done on the topic, yet Germany has a small but growing and quite active community of researchers investigating yoga from a medical perspective. As I highlight later, the German case is in some respects different from research in, for example, the US or India – hence, my findings should be seen in relation to this particular context and are not to be generalised to medical research on Yoga in general.

The identification of researchers who would be suitable participants for my work functioned quite smoothly. Through searching the medical yoga literature for studies authored by researchers

located in Germany, I quickly identified two larger research groups who are working on the topic and I approached these 'centrally' through the department or chair with which they are affiliated. In addition, I directly contacted individual researchers who seemed to be suitable participants. Both the departments and the individual researchers then also referred me to other colleagues who they thought might be interesting participants. In this process, I identified six researchers who would be feasible participants for the interviews. While field access was difficult in so far that the researchers all seemed to be very busy and often did not reply to my e-mails for weeks or months, they finally all were open to my research and willing to talk to me. Only one researcher I had initially intended to interview declined my request due to a scarcity of time. Most of the researchers I interviewed then were so flexible in their timetables that I could schedule all interviews in one week, which was logistically quite important for me due to the need to travel to Germany to conduct the interviews. This openness and complaisance on the part of the researchers facilitated my research process immensely and I am very grateful for it.

The researchers I interviewed all conducted (varying numbers of) RCTs on yoga, which was the essential selection criterion for me to include a person or not. However, beyond that they were a quite diverse sample in so far that they had very different personal as well as professional backgrounds and were at different points in their careers. Two of the researchers were studied physicians and had worked as doctors for some time, while two other participants had studied psychology, one of them had an additional degree in social sciences, and the fifth researcher had studied nutritional sciences. Moreover, some of the participants had a license as alternative practitioners (the German *Heilpraktiker*) or studied different forms of alternative medical practices such as Ayurveda or TCM. All of the participants had made different personal experiences with yoga or some other forms of mediation, most of them still being active practitioners, and one even being a yoga teacher. In terms of career stage, three of the participants may be described as junior researchers – two of them held a doctoral degree and had dealt with yoga in their dissertations, and another participant was in the process of writing his doctoral thesis, equally dealing with the implementation of yoga for a certain medical condition. These researchers were thus still relatively new to the field of research in comparison to the two other participants who were more experienced in so far that they had worked for a longer time and published more in the field. Overall, I think that this multi-dimensional diversity of the sample was very interesting and valuable for my research. Though I can of course only hypothesize about the influence of these different variables on the researchers' positions, this allowed for an interesting range of partially very similar, partially rather different perspectives on my research questions.

5.2 Exploratory document analysis

Before conducting the interviews, I carried out an exploratory analysis of publications of the researchers I interviewed, in order to further immerse myself in the field of medical research on yoga and to become aware of particularly important aspects to focus on in the interviews. Initially, I had intended to focus on publications of RCTs, systematic reviews, and meta-analysis of studies on yoga, yet during the

process of analysis, I mainly shifted my focus towards publications of RCTs, since these yielded the most fruitful and interesting insights. While RCTs were my main focus, I partially also reviewed 'meta-articles' on topics such as biomedical yoga research in general, yoga therapy, or associations between yoga practice and health authored by the researchers, which complemented the insights gained in the RCTs in interesting ways.

In order to obtain the publications for this exploratory phase, I searched the PubMed database as well as Google Scholar, mainly using the search terms 'randomized controlled trial', 'yoga', as well as the names of the participants. In addition to that, I directly searched the institutional homepages as well as the Researchgate profiles of the participants. In selecting the publications, I did not focus on particular medical conditions investigated in the study. In case that a researcher had conducted only very few RCTs, I reviewed all of them. Only one researcher had conducted a considerable amount of RCTs, systematic reviews, and meta-analyses – in this case I read as many studies as needed until I felt that theoretical saturation was reached.

Since the document analysis was to serve only exploratory purposes, I did not employ an extensive method of analysis but approached the publications with very particular questions. These included on the one hand a focus on the methodological aspects of the studies, including questions such as what kinds of participants were included, what outcomes were measured, how was the yoga intervention designed, which elements of yoga (asana, pranayama, meditation, philosophy) were included, what 'type' of yoga was administered, what kind of control group was used, etc. On the other hand, I considered how yoga was more generally implemented and framed in the respective study. In this respect, I was attentive to how or as what yoga was described and based on what references, to reasons given for the need to investigate yoga in the respective trial, and to potential explanatory models for the effects of yoga that were given. Moreover, another aspect that I considered as relevant was where the respective studies were published (i.e. in 'mainstream' or CAM journals).

This analysis of publications already generated some interesting insights and stimulated various questions to follow up on in the interviews. I collected and summarised the information gained here in different tables and used it as a basis to design my interview guidelines. The analysis of publications was moreover particularly helpful to tailor the interview guidelines to the individual participants, since the approaches taken in their studies partially varied which I could thus incorporate and pay justice to in the interviews. In addition, the 'meta-articles' and other studies by the researchers I read also helped me to better prepare for the interviews. In these other articles, including for example qualitative studies or editorial letters, the researchers sometimes offered different perspectives on yoga than in the RCTs, which allowed me to gain a more comprehensive view on their respective approach or position, and opened up additional questions for the interviews.

5.3 Qualitative interviews

Building on what I found in the exploratory document analysis, the interviews I conducted aimed to generate an in-depth understanding of how the researchers negotiate the encounter of yoga and biomedicine in their work, what valuations they perform in doing so, and by which larger regimes of valuation they are influenced. Since I had to travel to Germany for the interviews, I conducted all of them in one series, on five subsequent days in February 2019. In this respect, the data collection phase was quite intense and dense, yet I also experienced this as beneficial, because I had the memories from the last interviews still very present when conducting the next one. The researchers I interviewed were located in three different cities in Germany. All interviews but one took place in the respective offices of the researchers in different hospitals, which I found interesting since I felt that it partially helped me to better contextualise and situate the researchers as persons. One interview was held in a café suggested by the participant – this was one of the most difficult ones, due to the obvious disruptive factors inherent in this setting. The interviews ranged in duration between 60 and 100 minutes, which was mainly determined by the time available to the researchers. Two of them explicitly wished to not talk for longer than an hour because they had different appointments afterwards. The different time frames available thus allowed for more or less extensive detours from my interview guideline, yet I felt that in all of the interviews I could cover those aspects that were most important to me.

The interviews were semi-structured, meaning that I relied on a previously constructed guideline from which I more or less deviated in the actual settings. During the course of the five interviews, I became more and more flexible in the questions I asked, adjusting them to the particular context, also having in mind what I had learned in the previous interviews. My interview guideline was divided into three different parts. In a short introductory section, I mainly asked about the researchers' personal history with the yoga research, i.e. how they came to work in this field, why they were interested in it, and what the aim or motivation behind their research was. In the first major part of the interview, I then inquired into methodological aspects of their work. This included rather general questions related to the RCT methodology, i.e. why they chose it and where they would see benefits and potential disadvantages or limitations. Moreover, I asked more specific questions about the many small decisions taken in the process of designing a RCT on yoga, such as why they chose a particular sample and a particular outcome to measure, why they chose a particular style of yoga and designed the intervention in a certain way, or what they considered in their choice of control group. I also asked about factors they felt would influence their study design, including aspects such as institutional guidelines, intended publication outlet, available resources, etc. The second major part of my interview guideline was focused on the encounter of yoga and biomedicine more broadly, as well as on the researchers' understanding of yoga. Here, I asked questions such as what yoga was for the researchers, what they knew about its background or history, and how they would see yoga in relation to Western biomedicine. Furthermore, I also inquired in how far they thought biomedical knowledge could change through research on yoga, and vice versa. Within this overall framework, questions were specifically adapted to the individual researchers I

interviewed, in order to do justice to the particularities of the studies they had conducted, to other publications of them, and to their personal background. An exemplary interview guideline can be found in the appendix.

5.4 Conceptualisation of the interviews

In a broader sense, the interviews I conducted may be defined as expert interviews (following Littig, 2009), though also deviating from 'classical' expert interviews in some ways. The participants were obviously experts in their research field, possessing particular knowledge, both explicit and factual, as well as more tacit and practical knowledge, much of which I was lacking. However, I was less interested in their actual knowledge about the medical yoga research and rather in their experiences and personal understandings, in their rationales, patterns of decision-making, and importantly, the valuations entailed in all this. In this respect, the interviews I conducted may come close to what Littig (2009) described as "theory-generating expert interviews", not aiming to obtain objective knowledge held by the experts, but rather seeing the generation, emergence, and functioning of their knowledge and understandings as objects of research themselves.

More generally, I take a social constructivist perspective on the interviews, meaning that I see the interview situations as being sites of active meaning creation between me and the respondents, and not as insights into any pre-given reality (Gubrium & Holstein, 2003; Silverman, 2006). Hence, I conceive of the participants not as passive respondents who gave me access to certain truths or facts they hold, but as playing an active role in enacting particular realities. As a counterpart, I am aware of my own role in enacting these realities – all of the data upon which this thesis is based has been created with my involvement and the narratives that were told in the interviews cannot be seen as independent from this. Hence, these narratives should neither be regarded as 'the interviewees' nor as mine, but as mutually coproduced realities.

From a social constructivist perspective, relationality and the ongoing construction of subject positions are essential elements to the interview situation (cf. Gubrium & Holstein, 2003) – aspects I expected to be of particular importance in the interviews I conducted. Since I have conducted biomedical research on yoga myself, I felt in the strange position of being an insider and an outsider at the same time – having a lot of knowledge about the work the researchers were doing, but at the same time looking at it from a different angle now. This somewhat ambiguous position I held here, being in some respects and insider and an outsider in others, made me initially quite unsure about how to approach the interviews, since I felt that my role was not clearly defined from the outset. However, this did not turn out to be an issue in all interviews but one. Most of the time, I felt that my own experiences in the field rather helped me to understand and relate to what the researchers were saying and to pose meaningful follow-up questions. Only in one interview, I sometimes felt uneasy because the respondent repeatedly referred to my publication in the field and what I had investigated there, which I did not find entirely easy to handle.

Another worry with respect to relationality that I had before the interviews was that the researchers might potentially conceive of me as being critical of their work and hence in some way have a negative or at least careful attitude towards me studying them. In the actual interviews, I however experienced all participants as being open and happy to talk about their work, appreciating my interest in them rather than being afraid of criticism. All of the respondents expressed interest in hearing about the development of my master thesis, which I did not expect beforehand. In this respect, I experienced all of the interviews quite positively, and felt that the interactions were based on mutual respect and appreciation.

5.5 Limitations and advantages of my methodological approach

In the process of designing my thesis project, I was often confronted (by myself and others) with the question "why don't you do participant observation"? While participant observation is a very valuable method, especially for the investigation of culturally shared understandings and meanings (Hammersley & Atkinson, 2007), as well as for the study of valuations in practice (Dussauge, Helgesson, & Lee, 2015), such an approach did not seem to be feasible for my research project. The major reason why I decided against an ethnographic approach was that, due to the limited time frame available for the work on my thesis, I would have had to limit myself to the observation of one particular stage in the process of carrying out a RCT. Which stage in the research process should I have focused on? The stage of designing a study protocol and writing grant applications? The conduction of the yoga intervention? The analysis of results and writing up of the study? Or even following the researchers in the process of publication? All this would, moreover, have been constrained by the need for a currently ongoing RCT to investigate, and the phase this would be in at the point I wanted to do my fieldwork. Certainly, a comprehensive ethnographic study, following the researchers through all the different stages of the research process and reflecting with them on the decisions they make in their research over a longer period of time would have provided very extensive and elaborate answers to my research questions, and this would be valuable for future investigations.

For the sake of my master thesis, I however decided that qualitative interviews would be a more suitable method. The interviews allowed me to talk with the researchers about all the different stages of the research process and the decisions involved therein, as well as about the overarching frameworks their research is embedded in, instead of only focusing on the particular stage of the research process they are currently in. Investigating valuations in practice through interviews is moreover an approach that has been taken and found feasible by other STS researchers before me, such as Heuts and Mol (2013), as well as Fochler et al. (2016). The latter authors also explicitly highlight the benefits of such a more person-centred approach to studying research practices and valuations, allowing to better investigate "how individual researchers navigate and cope with the complex realities of contemporary research landscapes" (p.181). It was a central aim of my thesis to give room to the researchers' own perspectives, experiences, and understandings, for which qualitative interviews proved to be a very

feasible method. Through persistently asking the participants about practices which they usually take for granted, the interviews allowed me to get manifold insights into their work and understandings, letting them be "their own praxiographers" (Heuts & Mol, 2013, p. 128).

5.6 Transcription and data analysis

I started transcribing the interviews immediately after their conduction, usually already on the same day. This was interesting and helpful since it allowed me to gain some first analytic thoughts which I could take with me to the following interviews. Being aware that already the transcription of an interview is a first interpretative act (cf. Paulus, Lester, & Dempster, 2014), I decided to transcribe the interviews in a verbatim manner. During and after transcribing the interviews I read them multiple times to further familiarise myself with the content before starting the actual analysis. Already at this stage, I started to take memos, in order to document potentially important analytic ideas and thoughts. Subsequently, I coded the interviews using Atlas.ti. In the process of my analysis, I mainly followed a thematic analysis approach as described by Rivas (2018), with Grounded Theory informed open initial and focused coding.

In a first round of open coding, I tried to stay as close to the transcripts as possible, to move through the data rather quickly, preserve actions, and to use in vivo codes whenever feasible. Hence, in line with what Charmaz (2006, p. 47) has described, I aimed to "remain open to whatever theoretical possibilities we can discern in the data". After the process of initial coding, I started to group the codes into categories, and during later rounds of focused and theoretical coding I approached the data more explicitly through the lens of my sensitising concepts, looking for evaluative principles the researchers employed, and aiming to reconstruct larger regimes of valuation these are grounded in. In this sense, my approach to data analysis was a combination of inductive and more deductive methods.

Having described how I approached my research questions methodologically, I now further specify the theoretical stance that I adopted in my thesis.

6. Sensitizing concepts

Theoretically, my thesis is primarily informed by thoughts and concepts from the field of valuation studies. As noted before, I drew upon the notions of *evaluative principles* and *regimes of valuation* to conceptualise the valuations that are performed in biomedical yoga research, and to grasp the larger context by which these are informed. In the following, I further elaborate and define these concepts and how I employed them in my thesis. I begin with the notion of evaluative principles, and in relation to that I introduce a distinction between hierarchical and heterarchical orderings of worth. This is followed by a brief consideration of the difference between the aspects of evaluation and valorising which are subsumed in the notion of valuation, and how these figure in my thesis. Last, I elaborate on the notion of regimes of valuation and I outline how it shaped the analytic perspective on my results.

6.1 Reconstructing evaluative principles in biomedical research on yoga

As I have outlined in the state of the art, research related to the field of valuation studies regards worth not as something fixed and stable, but as the outcome of social work, being enacted in multifaceted forms of valuation practices that are always temporally and spatially situated. Hence, as put by Dussauge, Helgesson, Lee, and Woolgar (2015), value(s) are not something that has explanatory power, but something that needs to be explained and explored in itself – reflecting the central concern of the field of valuation studies to study valuations in practice. In order to capture how actors ascribe worth to objects, people, pieces of knowledge, etc. in their actions and decisions, scholars have proposed different concepts. Luc Boltanski and Laurent Thévenot (2006), who have informed later scholarship in the field of valuation studies, have proposed six different orders of worth which actors draw upon when justifying their actions. In one particular domain, not only one, but all of these orders of worth may be present, "[e]ach defin[ing] the good, the just, and the fair—but according to different criteria of judgment" (Stark, 2009, p. 12). While building on these considerations, more recent work in the field of valuation studies, such as that by David Stark (2009) or Fochler et al. (2016) has rather aimed at empirically reconstructing a broader range of *evaluative principles*, or what Heuts and Mol (2013) term *registers of valuing*, that actors employ in concrete situations. Hence, instead of employing a deductive approach and relying on a priori established categories, these authors seek to specify the logics that actors draw upon in their valuations with regards to each particular case, thus paying justice to the specificities of a certain situation and context.

In a similar manner, my aim was to trace the logics that are implicated in the situated valuations that biomedical yoga researchers perform in their everyday practices. In order to conceptualise this, I decided to employ Stark's (2009) notion of *evaluative principles*, defined by Fochler et al. (2016, p.179) as "any logic or set of rules that [actors] explicitly or implicitly refer to when making a statement about worth in a particular situation". In line with these authors, I did not consider it as feasible to approach my data through the lens of pre-defined orders of worth, and the concept of evaluative principles allowed me to remain open to all sorts of situated valuations that might come up in my data. With respect to my

inquiry, reconstructing the evaluative principles that medical yoga researchers draw upon meant tracing which logics the researchers refer to when, for example, justifying certain methodological decisions in their work or when explaining why they consider it as valuable to investigate yoga as a biomedical intervention.

6.2 Clashes and orderings of evaluative principles

What can be traced throughout the literature on the study of valuations in practice is an emphasis on "tensions" (Heuts & Mol, 2013, p. 129), "dissonance" (Hutter & Stark, 2015, p. 6), "frictions" (Dussauge, Helgesson, & Lee, 2015, p. 269), or even "incommensurable principles" (Stark, 2009, p. 12) arising in the encounter of different valuations. Various authors have highlighted that moments of valuation are at least potentially also moments of dispute and conflict – when different evaluative principles clash, the actors need to decide how to act in light of this, whether and how to resolve the tensions arising between different registers of worth. From an analytic perspective, such clashes between different evaluative principles or registers of valuing are of special interest, since, as Heuts and Mol (2013, p. 129) have put it, these principles here "instantiate each other's criticism". Hence, in moments of conflict between different evaluative principles, they lose their apparent self-evidence, inviting the analyst to question them more thoroughly.

Being concerned with the relations between different evaluative principles, Stark (2009) has highlighted that these may become ordered vertically, in form of a hierarchy where one specific principles dominates and other become placed back. Yet, he also traces constellations of what he terms "heterarchies of worth" (Stark, 2009, p. 25), in which different evaluative principles exist alongside each other more horizontally, the dissonance becomes organised in some way, and actors may thus draw on a larger repertoire of evaluative principles simultaneously. Stark then suggests that such heterarchical constellations of worth create uncertainties, thereby opening up new spaces of action and for reflection on institutionalised conventions. Furthermore, he describes heterarchies as fostering creative innovation, creating "wealth by inviting more than one way of evaluating worth" (Stark, 2009, p. 27). In line with this, also Fochler et al. (2016) have found that heterarchical orderings of worth allowed PhD students in the life sciences to take more risky epistemic decisions, while postdocs working in the same field, whose work was structured by a strong hierarchy of worth, were constrained by this context to take more conservative decisions.

Given the apparent complexity of worth that is implicated in medical research on yoga, including economic considerations, the value of a traditional practice and knowledge system, moral and ethical obligations towards patients, etc., I expected that the researchers I interviewed would draw on somewhat conflicting evaluative principles. In line with Stark's (2009) considerations on heterarchical vs. hierarchical orderings of worth, it was thus an important aim of my work to examine how the different evaluative principles the researchers employ would relate to another in the participants' accounts and whether they would be ordered in rather hierarchical or heterarchical constellations.

6.3 Two facets of valuation – evaluating and valorising

While moments of valuations are often very complex and full of tensions, they are moreover performative – they do not only classify and order the world, but they also actively shape realities, and participate in processes of meaning making. The twofold character of valuation, on the one hand describing or assessing the worth of things, but on the other hand also producing or increasing their worth, is captured in the distinction between *evaluation* and *valorisation* – or, to stay with the focus on action – to *evaluate* and to *valorise*. This distinction has quite elaborately been spelled out by François Vatin (2013), starting from the French terms *évaluer* and *valoriser*. Vatin highlights that from a perspective that sees worth as something fixed and stable, evaluation seems to precede acts of valorisation, being a rather static judgement about the worth of a good that needs to be agreed upon in order to produce value in a second step. Yet, if we see value(s) as being continuously enacted, we come to see valorisations as being implicated in all acts of evaluation, because these are "provisional modalities for establishing a value that is under construction" (Vatin, 2013, p. 45). Hence, pactices of evaluation as well as those of valorisation participate in the enactment of values, and it may often be difficult to draw a boundary between these activities.

The crucial intertwinement of acts or processes of valorising and evaluation has equally been emphasised by Heuts and Mol (2013). Yet, rather than taking this as a reason for spelling out the difference between the two facets, these authors explicitly decide to employ the term *valuing* which is supposed to subsume the two aspects of valuation, hence highlighting their intertwinement. For my thesis, I equally considered it as essential to be aware of the close entanglement of practices of evaluating and valorising. However, research processes always seem to entail a rather strong valorising facet, creating value in various different ways. Especially in the field of CAM, research moreover often appears to be connoted to the idea of increasing the worth of a certain practice through generating scientific evidence for it. In this sense, I was explicitly interested in the researchers' perspectives on the valorising facet of the medical yoga research. In the description of my empirical results, I thus mostly stick with the notions of valuation and valuing, yet sometimes I more explicitly spell out the valorisations entailed in biomedical research on yoga.

6.4 Tracing larger regimes of valuation

Beyond investigating the evaluative principles that the researchers draw upon in concrete situations, it was a central interest of my work to relate these principles to broader material, discursive and institutional frameworks in the field of medical research, hence not treating the researchers' valuations as isolated, but as situated within this broader context. As Kjellberg and Mallard (2013, p. 22) have put it in the inaugural edition of *Valuation Studies*, "we have to investigate the concrete web of rules, instruments, routines, and devices engaged in valuation. How do actors set up the collective socio-technical agencements that make valuation possible, stable, credible, accountable, and liable to compete with alternative perspectives on value?" These authors thus highlight the relevance of attending to the

larger frameworks that concrete acts of valuation are situated in, which I considered of particular importance given the contextual complexity surrounding biomedical research on yoga. I hypothesised that contextual factors would quite strongly frame the researchers' work and their actions and decisions, given for example the clear hierarchy of methodological approaches in current evidence-based medicine, or the ongoing boundary demarcations between biomedicine and CAM.

In order to conceptualise the influence of these more durable contextual factors on the situated valuations of the researchers, I employed the concept of "regimes of valuation" developed by Maximilian Fochler, Ulrike Felt, und Ruth Müller (2006). In their study of researchers working in the field of life sciences, the authors introduced this concept to grasp the broader discursive, material, and institutional backgrounds that inform concrete acts of valuation. Such regimes of valuation, manifesting, for example, in institutionalised discourses and infrastructures, suggest distinct kinds of evaluative principles to the actors and have a certain normative power, framing action in particular ways. In their above mentioned study, Fochler and co-authors identified a clear dominance of one regime of valuation related to individual productivity and international competitiveness, which centrally influenced the researchers' actions and decisions, without much reflective awareness of this regime on the part of the researchers. Their work thus highlights the great impact that such regimes of valuation can have on individual researchers, and the difficulties that may be linked to criticising a dominant regime or imagining alternatives to it (Fochler et al., 2016). However, while it may not be easy to act contradictory to the evaluative principles related to a dominant regime, individual actors can nevertheless choose to comply with or resists these patterns. Indeed, Fochler and co-authors explicitly highlight the importance of considering the agency of individual actors in relation to regimes of valuation and their crucial role in stabilising or potentially transforming these regimes.

In line with this, I was in my thesis interested in examining the role of institutionalised regimes of valuation and how they inform the actions and decisions of biomedical researchers, but I also aimed to investigate how the researchers act in relation to these regimes. As put by Fochler et al. (2016, p. 120), "[a] regime's normative power may be expected to correspond with the degree of its institutionalization in discourses and practices". Considering this, I expected especially the highly institutionalised values related to EBM to play a crucial role in the work of the researchers. Moreover, in line with the findings of Fochler et al. (2006) and the growing literature on research metrics and evaluation in academia, I also expected a regime of valuation related to individual productivity and competitiveness to have an important impact on the researchers. Yet, I also hypothesised the importance of other regimes related to different kinds of worth. Considering the importance of the researchers' agency, I was then interested in how they would in their work navigate the evaluative principles suggested by different regimes of valuation, i.e. whether they largely comply with them or not, and to what extent they would show degrees of reflexive awareness towards these regimes of valuation, including potentially signs of critical distancing or the imagination of alternatives.

7. Empirical part – Disentangling valuations in biomedical yoga research

The description of my empirical findings is broadly structured in five different sections. I begin by addressing the multiple realities in which yoga seemed to manifest in medical research and in the participants' accounts, thereby setting the stage for delving further into how yoga is handled and valued in this research. After that, I turn to the surrounding context that biomedical research on yoga is situated in and describe the *regimes of valuation* that I reconstructed from the researchers' accounts, as well as how they influence their work practices, decisions, and valuations. I then elaborate on how yoga is valued within this context and on the ambivalences that are implicated here, and I describe practices of what I call *tinkering with yoga* that relate to these ambivalent valuations. After considering how yoga is valued and tinkered with, I turn to methodology and highlight that also the researchers' valuations of different methodologies are inherently ambivalent and equally implicate different practices of tinkering. To conclude my empirical chapter, I sketch the researchers' perspectives on what may be seen as the consequences of their work – potentially changing as well as valorising both yoga and medicine to different degrees.

7.1 The multiple realities of yoga in biomedical research

As a very first step in telling a story about valuations in biomedical research about yoga, about regimes of valuation and methodological and theoretical ambivalences, it is important to say some words about a major object of this story – about yoga as it was evoked in the interviews, and its epistemic and ontological status. I have already emphasised that I conceive of yoga as multiple, that I do not see it as one clearly bounded entity, but that it manifests in various different forms in different times and places. While this was my own take on yoga, I was still unsure about its manifestations in medical research – does it appear as a clearly circumscribed medical intervention where all the researchers more or less agree on what it entails, where it begins and where it ends? Or would there be signs of multiple manifestations of yoga in the research as well? During the interviews, it quickly became apparent that the latter assumption would hold true, with a multiplicity of yoga being present here – a multiplicity of which the researchers themselves were well aware. In the following, I further illustrate the different realities of yoga that were evoked in the interviews, the differing relations to biomedicine that arise from that, as well as the researchers' positions towards this multiplicity.

7.1.1 What is yoga? – a multiplicity

One question that I asked each interview participant without exception was "What is yoga for you?" As a response to this, but also independent from this explicit question, the researchers offered various perspectives on what yoga is. These ranged from very personal accounts such as: "for me Yoga is an inner attitude that feels very … soft and yeah, open, and curious"[6], "yoga is for me really the attentive

[6] „für mich ist Yoga einfach ja ne innere Haltung die sich so ganz .. weich und ja.. und.. offen und neugierig anfühlt" (interview 5)

and conscious living in the moment"[7], "[it is] also a search for the sense of life in a certain way"[8], to rather professional ones such as "yoga is for me a sort of ideal lifestyle modification"[9]. These accounts highlight that on that one hand, yoga can be a very personal thing that is also affectively coloured, while on the other hand, there is the professional reality of yoga as a medical intervention. One may now argue that these are simply different perspectives on one and the same thing, yet I suggest that yoga itself takes very different forms in different situations – that there is ontological multiplicity implicated here. Furthermore, one may argue that there are many different personal realities of yoga and a more coherent professional one. However, as I will elaborate later in more detail, these personal and professional realities cannot be entirely separated from each other, and even the professional version, i.e. yoga as a medical intervention, comes along as a multiplicity.

That yoga can be very different things in different contexts becomes probably most apparent with regard to what it actually comprises. In some instances, it may be a "relaxation technique"[10] or a sort of sports, yet it can also go far beyond that. As one participant described:

> "[It is] superficially a gymnastic intervention, which is combined with a meditative conscious aspect, and which in a wider sense also changes and affects the lifestyle, and actually, is, can change one's perspective on what constitutes life." (Q1, interview 3)[11]

This quote illustrates quite nicely the wide spectrum of what yoga can be, ranging from pure gymnastics to a life-changing philosophical perspective. For all of the researchers it seemed to be clear that yoga *can* comprise many different elements such as most importantly *asana, pranayama*, and meditation, but also spiritual elements such as chanting and philosophy, and even aspects such as cleansing rituals or certain eating habits. Yet, it seemed to be equally clear that in other instances, yoga can be only some, or even only one of these elements. This is also reflected in medical RCTs on yoga, which sometimes include only the practice of *asanas*, but sometimes also many other elements such as *pranayama*, meditation and philosophy. Thus, already this diversity of different elements that yoga can or cannot comprise illustrates the multiplicity in which it manifests in medical research.

This multiplicity is even more apparent when considering different temporal and local contexts. Some of the researchers themselves highlighted that on the one hand, "there is no real yoga tradition"[12] to which one could do justice, but that on the other hand, yoga as it was and is practiced in India is nevertheless something very different than its Western manifestations. When comparing medical yoga studies from India to those from, for example, Germany, this multiplicity is even more pronounced. As

[7] „für mich ist wirklich das aufmerksame oder bewusste Leben im Moment" (interview 4)
[8] „auch ne gewisse Suche nach dem, nach dem Sinn des Lebens in ner gewissen Art" (interview 4)
[9] „Yoga ist für mich eigentlich so ne Art ideale Lebensstilmodifikation" (interview 2)
[10] „Entspannungsverfahren" (interview 2)
[11] While for shorter quotes, I indicate the original German quote in footnotes, the translation of quotes longer than one sentence can be found in the appendix. The quotes are numbered as Q1, Q2, etc. according to their order of appearance in the thesis.
[12] „ne echte Yogatradition gibt es nicht" (interview 2)

the researchers highlighted, it is crucial to see that in studies from India, yoga interventions "are much more intensive, that they are very differently traditionally embedded, and that they understand yoga very differently"[13]. It was, for example, frequently noted that yoga interventions in India are often practiced multiple times a week, and that they are moreover more spiritual than in studies from the West. Overall, this highlights once more that also yoga as a medical intervention is not always one and the same thing.

7.1.2 Differing relations to biomedicine

The multiplicity of yoga as a medical intervention is also reflected in different relations towards medicine. In general, it seemed to be clear for the researchers that "yoga is originally no medical treatment"[14], and that it is based on a very different worldview than biomedicine, thus highlighting the tensions between 'traditional yoga' and biomedicine. However, the relation in which it currently stands to biomedicine appeared to be much more ambivalent. While it was sometimes stated that "yoga is already mainstream medicine"[15], in other instances the researchers rather emphasised that "yoga is still very far away from really moving to the core [of medicine]"[16]. In line with what I have said before about yoga being a different thing depending on whom one asks, the same seemed to hold true for the relation in which it stands towards medicine, with different persons evoking this relation in very different ways. The varying relations of yoga to medicine also seem to be strongly dependent on what yoga is in a particular instance, as for example illustrated in the following account:

> "If it is only a sportive gymnastic intervention, there are no reasons why also a hardcore medical professional should not use it as a supportive therapy […], if you try to integrate other components, let's call it spirituality, then it might become a bit complicated or problematic for some areas of mainstream medicine." (Q2, interview 3)

This quote expresses how the different realities of yoga are more or less in tension with biomedicine, with primarily its physical aspects being quite well reconcilable, as opposed to the more philosophical and spiritual manifestations. What is already implicit here is the possibility to adapt yoga accordingly, to employ particular versions of it in clinical trials to make it medically acceptable. Yet, as I will illustrate later, also in their trails, the researchers implement yoga in various ways, being in tension with mainstream medicine to different degrees.

7.1.3 The ambivalent valuations of yoga's multiplicity

What has already surfaced in what I have described so far is that the researchers were quite aware of the multiplicity of yoga, and they addressed and expressed this more or less explicitly. For example, they

[13] „dass die viel intensiver sind, dass die ganz anders da traditionell eingebettet sind, dass die was ganz anderes da drunter verstehen" (interview 1)
[14] „Yoga ist halt ursprünglich keine Medizin" (interview 2)
[15] „Yoga ist schon Schulmedizin" (interview 1)
[16] „Yoga ist noch sehr weit davon weg, dass das ganz extrem in die Mitte rückt" (interview 1)

emphasised that it is "difficult to describe where yoga starts and where it ends"[17], that "yoga can be many different things"[18], that it is "extremely broad"[19], and that when asking different people about what yoga is one will get "a different answer from each person"[20]. While this awareness of yoga's multiplicity was quite unequivocally present in the interviews, the researchers' valuations of this multiplicity were much more ambivalent.

On the one hand, they emphasised that it is fine and potentially even desirable that yoga is and can be different things for different persons. When "it is up to every individual person […] where the boundaries are"[21], this allows a broader range of people to benefit from yoga, because every person can practice it in the way that seems to fit them and include those elements that they appreciate most. Furthermore, the multiplicity of yoga also offers particular benefits when considering it as a medical intervention:

> "Yoga is extremely manifold and offers many possibilities, and some studies in the West […] employ only certain yoga postures, but yoga can also be for example only meditation, without any posture practice, it can also be only breathing and it can also, if you take it really really strict, it can also be only service to the community, or chanting or honouring Krishna – all that can theoretically be yoga, and usually if you take yoga seriously in the research you have something in between, that you at least consider mediation and breathing, but that can again be adapted to the disease – when I work with asthma patients, I certainly integrate more breathing than when I work with patients with back pain, there work on the posture will probably be more in the foreground, and there yoga really offers a lot which you can also consider in clinical studies." (Q3, interview 2)

In this quote, the researcher first lucidly illustrates the many different forms that yoga can take and then directly links this to the possibility to adapt yoga in clinical trials and to employ different forms of it, depending on the kind of patients one deals with. This quote thus nicely shows the appreciation of yoga's multiplicity and the benefits that can be drawn from it in medical research. Yet, at the same time, the researcher emphasised that this multiplicity also poses problems:

> "It is therefore a really broad field, which also allows for many more misunderstandings. Depending on who is talking about yoga, whether it is physiotherapists, or yoga-gurus, they will probably mean different things. If I talk about an antihypertensive agent, most people mean the same." (Q4, interview 2)

[17] „schwer zu beschreiben wo Yoga anfängt und aufhört" (interview 1)
[18] „Yoga kann sehr viel sein" (interview 2)
[19] „extrem breit" (interview 2)
[20] „da bekomm ich von jedem ne andere Antwort" (interview 2)
[21] „das bleibt jedem selbst überlassen […] wo die Grenzen dagehalten werden" (interview 1)

What is quite apparent in this quote is the circumstance that because yoga can be so many different things, it can be difficult to have a common reference point when talking about it. This obviously poses problems when people from different professions, but also different people in the medical field itself want to communicate about it. Moreover, the participants specifically emphasised the difficulties that yoga's multiplicity poses when assessing medical yoga studies or summarising their effects in systematic reviews. Here, different yoga interventions are often very difficult to compare, because they comprise such different elements, and two studies that have both implemented 'yoga' may differ quite widely in what they actually did. In relation to this, the researchers often emphasised the importance of describing yoga interventions as precisely as possible in a publication, thereby reducing its multiplicity to a particular version enacted in a particular situation.

Overall, what I have illustrated so far is that the central object the researchers are dealing with is not one, but is many different things in different situations, manifesting in complex relations towards medicine and in problems as well as benefits for the research. What is already implicitly implicated in acknowledging the multiplicity of yoga is the question whether some version of yoga may be 'better' than others, in the sense of, for example, being more authentic or more valuable as a medical intervention. I return to this question in more detail when describing how the researchers valued yoga in different ways, highlighting that there is by far no unequivocal answer to this. Yet, before doing so, I now turn from the very centre to the surrounding context of the research, describing the broader frameworks the researchers' work is embedded in, in order to further contextualise their valuations.

7.2 Regimes of valuation that influence the researchers' work

As I have highlighting before, I was from the outset explicitly interested in the wider context of biomedical research on yoga and how this shapes the researchers' work and their valuations and decisions. The notion of *regimes of valuation* (Fochler et al., 2016) proved to be a very helpful tool for doing so and allowed me to reconstruct five such regimes that are all to some extent institutionalised through discourses, infrastructures, and material practices. I denoted the five regimes of valuation that I identified as *good scientific practice*, *medical ethics/benefiting patients*, *personal academic success*, *EBM*, and *biomedical knowledge*. In the following, I further describe what each of them comprises and how they manifest in the researchers' work. Moreover, I highlight some tensions that arise between the different regimes and the orderings that result from these tensions.

Importantly, while the regimes of valuation denote frameworks that are to some extent stabilised and institutionalised, there are also other contextual factors that influence the researchers' work which are not stabilised in the same way and are hence less clearly circumscribed and less easily graspable. One such framework that seemed to be more loose or vague than the regimes of valuation I identified was what I decided to call *a counter-discourse to the regime of biomedical knowledge*. A second, even more vaguely circumscribed framework of valuation that seemed to influence the researchers was related to yoga itself and to the personal experiences with it, physically as well as theoretically. After

having described the actual regimes of valuation I reconstructed from the interviews, I turn to these two other aspects, i.e. the *counter-discourse to the regime of biomedical knowledge* and the topic of *valuing yoga*, describe each of them in more detail and further elaborate why I did not classify these as regimes of valuation.

7.2.1 Regime of good scientific practice

The *regime of good scientific practice* as I reconstructed it from the interviews comprises various rules, norms, and tacit assumptions related to 'how research should be'. This is made durable in shared discourses and statutes about good scientific practice, and transferred to young researchers in the course of their education. In the interviews, this regime was mostly present in evaluative principles the researchers drew upon when telling me how something in their research should be done, and often also when they criticised other colleagues who would (supposedly) do research in a way that was not good scientific practice. Valuations that were important with respect to this regime were, for example, properly discussing the limitations of one's study in a publication, remaining impartial in the interpretation of one's study irrespective of a funding source, as well as explicitly testing a hypothesis in the research instead of simply doing research 'into the blue' and seeing where a good – i.e. positive or strong – effect occurs.

The most central issue related to this regime of valuation was, however, the topic of being a "disinterested researcher"[22]. This means being open to all sorts of outcomes of a study and not wanting to 'prove' something or to design studies in certain ways to achieve a positive outcome. In the case of yoga, bad scientific practice would thus mean only wanting to show the effectiveness of yoga, and designing studies in a way that is favourable for showing such positives outcomes. This was something that most of the researchers explicitly distanced themselves from, as, for example, expressed in the following quote:

> "This means the researcher has strategically clever chosen a design in a way that there must be a positive result – that is actually not so respectable, that means that one is not open in one's expectations anymore." (Q5, interview 3)

In this particular case, the researcher's criticism was related to the use of waitlist control groups in RCTs, where a yoga intervention is compared to a group doing nothing. The participant described this as bad scientific practice, since it is very likely that yoga will come off well in this comparison. Without wanting to take a normative position towards this, it seems important to note that the waitlist control group is something that is not uncommon in medical trials on yoga, and other researchers provided comprehensible reasons for why they would employ waitlist control groups. For example, it was mentioned that if no previous studies have been conducted on yoga for a certain condition, a waitlist

[22] „ergebnisoffener Wissenschaftler" (interview 3)

control group could make sense to see whether "there are any effects of yoga at all"[23]. However, other researchers did not consider this argument as valid and rather saw the employment of a waitlist control group as always containing a certain bias in favour of yoga and hence as bad scientific practice. This indicates that what actually falls under the label of *good scientific practice* can vary and is negotiable – thus, there is some leeway with respect to this regime of valuation.

What is moreover crucial to discuss with respect to the *regime of good scientific practice* and especially regarding the evaluative principles related to being a disinterested researcher, are the tensions that arise here towards other regimes or frameworks of valuation. Most importantly, there is a tension between the *regime of good scientific practice* and *valuing yoga.* As I will describe later in more detail, all the researchers valued yoga as a medical intervention and seemed to be more or less convinced that it can have positive effects for participants. This personal appreciation is obviously in tension with the demand of being an unbiased researcher, which requires an openness to also find that yoga has no positive effects for patients. This tension was implicitly present in all of the interviews, yet only one participant explicitly addressed it:

> "It is my duty as a researcher to take a neutral stance towards this, that means that if I conduct a study, then I have to expect that yoga will maybe show no effectiveness, and then it is also my duty to present it like this, yeah and I find it is really difficult to have at the same time a deep knowledge [about yoga]." (Q6, Interview 4)

While the other researchers did not reflect so openly about this tension, they emphasised that they were not "missionaries of yoga"[24] and had "no personal agenda"[25], hence pointing out their unbiased stance in line with the *regime of good scientific practice*. In addition to these clashes with *valuing yoga*, the aspect of being a disinterested researcher and hence being open to negative outcomes of a study is of further interest because it is also in tension with the aim to publish (which is in turn linked to the *regime of personal academic success*). As commonly known, but also explicitly emphasised by the researchers:

> "If you want to publish something – negative data are not happily taken by any journal, so when you have a negative study, the probability that this is rejected by a journal is very high, and this is of course also a decision criterion." (Q7, interview 1)

Hence, designing a study in a way that is likely to show a positive outcome is not only suggested by the appreciation of yoga as a medical intervention, but also by the *regime of personal academic success*, since it increases the chances of being able to publish one's results. In relation to this, some researchers also mentioned the risk to "destroy the effect"[26] of a study, meaning that it is less likely that there will be a positive outcome if you, for example, take a too strong control group. This can, for example, be an

[23] „gibt's da überhaupt irgendeine Wirkung von Yoga" (interview 2)
[24] „Botschafter des Yoga" (interview 2)
[25] „keine persönliche Agenda" (interview 2)
[26] „dass man sich den Effekt kaputtmacht" (interview 1)

intervention that is comparable to yoga and is likely to show very good effects, so that yoga is unlikely to perform better in the comparison – which is rather unfavourable for the publishability of the study. These considerations are quite obviously in tension with the *regime of good scientific practice*, posing the need to somehow negotiate these tensions in the medical yoga research. The researchers then differed in the way they seemed to be influenced by either of these regimes, some of them rather emphasising the aim to publish, and others being more concerned with being an unbiased researcher. Some researchers also described practices that seemed to mediate these tensions in some way, such as explicitly addressing the limitations of one's study in a publication. This can mean that, for example, if a waitlist control group was employed in the study (which may lead to better results and is thus potentially in tension with the *regime of good scientific practice*), then this should be discussed accordingly in the publication, together with the potential bias in favour of yoga that may arise from it, hence still doing justice to the *regime of good scientific practice*.

Overall, from what I have described to far, it can be seen that there are various ways in which the *regime of good scientific practice* influences the researchers' work and their valuations. However, though it was in some way present throughout all the interviews, I would describe this regime as the one that the smallest influence on the researchers compared to the other ones which I will introduce in the following. What seems interesting to consider in this respect is that the *regime of good scientific practice* is quite broad in the sense that it relates to scientific work across different fields, and it seemed that the regimes that were more specifically related to medical research had a somewhat stronger influence on the researchers' practices. In the ensuing section, I turn to the *regime of medical ethics/benefiting patients*, as one such regime that is more specifically related to this particular scientific field and hence also suggests more specific kinds of valuation.

7.2.2 Regime of medical ethics/benefiting patients

I was for a long time unsure about how to name this regime, and I finally decided to keep the dual title of *medical ethics/benefiting patients*, in which the latter aspect functions as a specification or a particular focus to how I understand medical ethics here. What for me essentially characterises this regime are evaluative principles that demand to make a positive contribution to medicine and to put patients first. The principles linked to this regime are made durable in various guidelines for ethical conduct in medicine, and especially the demand to act in the best interest of the patient has already been formulated in the Hippocratic oath more than 2000 years ago.

The most obvious evaluative principles suggested by this regime relate to treating patients ethically in clinical trials. Yet, more broadly, and more prominent in the interviews, the *regime of medical ethics/benefiting patients* also entails the ethical duty of testing the effects of yoga in clinical studies because so many people use it and have expectations from it. As one researcher described:

> "Most people who start with yoga say at least they do this because they have the impression that it is good for them, it enhances their quality of life, but can also really treat diseases,

> and if something is used in this respect I find it interesting and in some way also ethically obliging to check whether this is really true. Whether it really helps and what, for example, could maybe also be dangers […] I think one really needs to know whether it works, whether it can also be harmful." (Q8, interview 2)

What is implicated in the end of this quote is the aspect of safety of yoga – something that was mentioned in nearly all of the interviews. Though yoga does not have side-effects in the way that some pharmaceuticals do, it may nevertheless lead to injuries. The *regime of medical ethics/benefiting patients* thus demands to gain more knowledge about these potential risks linked to yoga to not inflict any harm on patients. Interestingly, since the medical yoga research becomes here in some way ethically obligating, it in turn becomes unethical not to conduct this kind of research. Along these lines, one participant explicitly criticised the German funding landscape for not supporting the medical yoga research:

> "I think it is an ethical duty as a researcher to investigate things where people expect some kind of effect, […] for the scientific system, that one does not shut oneself off from this, as the German research landscape and research funding landscape still like to do." (Q9, interview 2)

Interestingly, while the line of argumentation that underlies the participants' valuation seems quite reasonable, this nevertheless shows that within the principles suggested by the *regime of medical ethics/benefiting patients*, there is again some leeway for action. While this researcher considers it unethical not to investigate the medical effects of yoga further, the German research funding landscape – which is certainly also influenced by the *regime of medical ethics/benefiting patients* – comes to different conclusions and does not financially support medical yoga research, probably being influenced by different other valuations such as those related to the *regime of biomedical knowledge* which I address below in more detail.

Besides the ethical duty of investigating the effectiveness of yoga, another important facet of the *regime of medical ethics/benefiting patients* seemed to be evaluative principles related to establishing yoga as a medical intervention from which patients can profit. The researchers all seemed to consider yoga as a quite valuable medical intervention which can help patients in various ways – something which I address below in greater detail. Based upon this appreciation of yoga, they wanted to allow patients to benefit from yoga through making it more prominent as a medical intervention. The medical yoga research was depicted as an important means in this, because it allows to verify the efficacy of yoga in scientific trials which is required to give yoga a better standing in the healthcare system. Along these lines, *benefiting patients* by making yoga more accepted as a medical intervention was often evoked as a valuable aim of the medical yoga research. As put by one researcher:

> "It [the research] should definitely benefit the consumer, the patient, however you want to call them, so the idea is that there is a greater willingness to offer it in hospitals, potentially also takeover of the costs by healthcare insurances." (Q10, interview 2)

Overall, conducting the medical yoga research as such is thus depicted as valuable in line with the *regime of medical ethics/benefiting patients*, first, because it helps to verify the effects of a practice that many people are using already, and second, because it can help to make a potentially beneficial intervention more prominent. With respect to both of these aspects, publication becomes an important means since the publication of a study is the crucial step in making its results accessible to the medical community and to the broader public. This means that without the publication of one's results, patients will not be able to benefit from it. Furthermore, as one researcher emphasised, publication, and especially publication in highly ranked journals, also becomes valuable in another way within the *regime of medical ethics/benefiting patients*:

> "If I publish this in a common or garden journal which nobody knows, then nobody will read the article, then I would not have had to do all that work, this is then a waste of A money and B of course also not respectable towards the patients who have participated, who have sacrificed their time, energy, and passion – if nobody notices this, then why did they do it?" (Q11, interview 3)

Hence, the *regime of medical ethics/benefiting patients* also suggests publication as a valuable practice because this acknowledges and does justice to the work the patients did in form of their participation in the trial.

Besides these practices that are more related to the research as such as well as to its publication, the *regime of medical ethics/benefiting patients* also entails particular evaluative principles concerning the studies itself, in particular for the process of designing a yoga intervention. As many of the researchers emphasised, it is important to design the intervention in such a way that it helps the patients best in their particular condition and is in some way adapted to this. This may, for example, entail not implementing a too strenuous intervention for patients which are already having a very hard time and thus should not be further burdened through very intense yoga practice. As one researcher described:

> "There we tried to accommodate the patients. Since in this case, they were women during chemotherapy, they should be put under stress as little as possible, also make little effort, therefore we tried to find a mild form of yoga." (Q12, interview 3)

Hence, in line with the *regime of medical ethics/benefiting patients*, the researchers tried to adapt the yoga interventions as good as possible to the particular condition of their target group. In addition, they also described practices of adapting the intervention to patients in other ways, so that it for example fits well into their everyday lives.

Overall, the *regime of medical ethics/benefiting patients* was thus present in various different ways in the researchers' work. The evaluative principles suggested by this regime sometimes go along with those of other regimes of valuation, for example with respect to publishing one's results so that patients can benefit – which is in line with the *regime of personal academic success* – or with respect to the general ethical duty of verifying the effectiveness of yoga – which is in line with the *regime of good scientific practice*. Yet, as will become more obvious when I describe the *regimes of EBM* and *biomedical knowledge*, especially those two often dominate the evaluative principles related to the *regime of medical ethics/benefiting patients*, in the sense that they 'set the rules' within which yoga as a medical intervention can be investigated and brought to the patient. This domination was also present with respect to the *regime of personal academic success*, to which I turn next.

7.2.3 Regime of personal academic success

The *regime of personal academic success* subsumes evaluative principles that are related to promoting one's career and gaining (international) academic reputation, which is mainly done through publishing in highly ranked journals. As I have highlighted in the state of the art, values related to this regime are gaining more and more prominence in contemporary academia, manifesting amongst others in the form of various evaluative procedures and research metrics. Based on what previous work has described, I thus expected this regime of valuation to have a relatively strong influence on the researchers. Indeed, the aim of promoting one's own career, and especially the aim to publish one's research was present in most of the interviews, expressed in quotes such as:

> "Of course I also want to progress with my habilitation, so of course I have an interest in generating publications." (Q13, interview 5), or

> "Of course I consider from the beginning whether one can publish this, […] and next to a gain for the research and for the patients there has to be the personal gain for the department and for me with a good publication." (Q14, interview 2).

Along these lines, publication of one's research – in the best case in a highly ranked journal – was articulated as a valuable practice by the researchers, indicating that they are to a certain extent influenced by the *regime of personal academic success*. Yet, while in other fields of research this regime of valuation is described as being very central, it did not seem to be a dominant one in this case, but was often overlaid by considerations related to different regimes of valuation. Again, this can nicely be illustrated with the aspect of publication, a central hallmark of academic success. While publishing one's work is a central value in this regime of valuation, the researchers articulated many other motivations for publishing their work that were unrelated to this regime and that often seemed to be more important than promoting one's career. For example, as I have mentioned before, publishing becomes valuable within the *regime of medical ethics/benefiting patients* because it allows to make the results of one's research accessible to the medical community so that ultimately, patients can benefit from it. In addition,

publishing one's work is also centrally related to *valuing yoga*, about which I will say more below. Such other valuations most of the time seemed to have a stronger influence on the researchers than those related to the *regime of personal academic success*.

The aspect of publication as an expression of the *regime of personal academic success* is of further interest because it shows that this regime is not only overlaid by, but also in tension with some of the other regimes of valuation I have identified. First, while the aim of publication is in many ways in line with evaluative principles suggested by the *regime of medical ethics/benefiting patients*, it can be in tension with the *regime of good scientific practice*, which demands to place the aim of publication back behind other principles. Beyond that, and of even greater importance, it seems that the aim of publishing one's work can be in tension with and dominated by evaluative principles linked to the *regimes of EBM* and *biomedical knowledge* which I have not described so far. For example, it was frequently mentioned that studies that have a different design than that of the RCT are more difficult to publish – meaning that if the researchers want to attain personal success in terms of publications, they somewhat have to comply with the rules set by the EBM framework. In other words, the *regimes of EBM* and *biomedical knowledge* pose various constraints to the publication of medical studies on yoga and hence to the promotion of the researchers' careers as demanded by the *regime of personal academic success.*

While I will say more about some of these constraints when describing these other regimes of valuation in more detail, the most important message at this point is that the *regime of personal academic success* is, and sometimes has to be, subordinated to different ones. This is interesting since it poses questions about the relative non-dominance of this regime in contrast to other fields of academia – questions that I will address in more detail when discussing the implications of my research.

7.2.4 Regime of EBM

As indicated before, I perceived the *regime of EBM* as having a quite strong influence on the researchers' work, also dominating many of the other regimes in some way. As a brief reminder to what I have described in the state of the art – EBM demands medicine to be based on the 'best available evidence', yet comes along with a privileging of quantitative evidence and statistical thinking. In the EBM framework, there is a clear hierarchy of different types of studies, with the RCT being considered the gold-standard to evaluate clinical interventions. This regime is made durable in the form of a very prominent discourse that is pervasive in contemporary healthcare and is reflected in terms such as 'evidence hierarchy' and the 'gold-standard'. Moreover, there are nowadays institutions which are specifically concerned with the promotion of EBM, such as the *German Network EBM* (Deutsches Netzwerk Evidenzbasierte Medizin), or the *Cochrane Collaboration* – institutions to which some of the researchers also referred in the interviews.

The norms and values linked to the evidence hierarchy that is at the heart of EBM could not be overlooked in the interviews. Especially the prominence of the RCT played quite an important role, and

all of the researchers highlighted its central and inevitable status in contemporary research. This was sometimes expressed very explicitly in quotes such as "the rules are called RCTs"[27], or "RCTs are in medicine something about which you do not have to discuss, where the methodology is not questioned"[28]. This lucidly illustrates the normative impact of this regime as well as the researchers' awareness of it. Another aspect that was mentioned in many interviews was the dominance of quantitative over qualitative methods within the EBM framework as, for example, expressed in the following quote:

> "These are medical professionals and partially hardcore medical professionals and maybe also geneticists or so, and they have no idea about it [qualitative research], they do not know which treasure it contains, they are not interested in that. There are no numbers contained and thus it is per se not interesting for them." (Q14, interview 1)

In relation to these 'rules' set by the EBM framework, the researchers also noted the importance of needing to conform with them if one wants to be recognised in the field of medical research:

> "If I do research which I want to be recognised beyond the field of yoga and CAM, then I have no other choice than doing RCTs, because if I say in the development of a clinical practice guideline that we have a great observational study which shows some kind of efficiency, then I am directly out, that means if I want to have an impact in the current healthcare system, I have to abide by the dominant rules." (Q16, interview 2)

These quotes suggest a quite strong and coercive influence of the EBM regime of which the researchers are also somewhat critical. As equally visible here, the researchers' criticism of the EBM regime was primarily related to the methodological hierarchies it brings along, i.e. the privilege of the RCT and of quantitative methodology more broadly. Most of the researchers noted that they would see the right methodology as dependent on what kind of question one is asking, and that there is no universal gold-standard method. In this respect, they also emphasised the value of qualitative research methods and criticised their lower standing within medicine. Furthermore, related to this criticism of the evidence hierarchies of EBM, some of the researchers noted that it was simply not fair if yoga is demanded to be evaluated in RCTs which are measured against the standardised criteria of the EBM framework, because trials on yoga cannot live up to these. As one researcher put it:

> "And this I find, in quotation marks, not fair, because it simply does not work, we cannot blind participants, that does not work. So, basically a therapy is forced into a frame here for which it is not made." (Q17, interview 1)

[27] „die Regeln heißen RCTs" (interview 2)
[28] „RCTs sind in der Medizin halt das wo man nicht groß drüber diskutieren muss, da wird dann die Methodik nicht hinterfragt" (interview 2)

Here, the participant refers to the problem of blinding patients to the intervention they receive which is an important feature of the RCT methodology, yet hardly possible in the case of yoga – a problem that I discuss later in more detail. While this quote and most of what I have described so far points towards a rather critical, and often even explicitly critical attitude towards the EBM regime, valuations related to this regime were present more implicitly as well. The researchers not only drew on evaluative principles that were critical of this regime, but also on others that seemed very much in line with the values linked to the EBM framework. For example, they often referred to the importance of doing "clean work"[29], in the sense of using proper statistical methods, and making yoga research reproducible and comparable through, for example, establishing international reporting guidelines for yoga studies. In this respect, they also criticised other colleagues for doing less "clean work", as for example visible in the following quote:

> "These studies are really bad, and I would say that our research group really stands out through trying to work methodologically very clean." (Q18, interview 1)

What is interesting is that there seems to be quite a strong tension here between criticising the rules set by the EBM framework and at the same time positively emphasising the own compliance with them. In one interview where this tension was the most prominent, I explicitly asked the participant about it, and as a response, the researcher gave me a quite interesting metaphorical answer:

> "If we want to have any impact, we have to float with the current. So, I cannot go there and say – my brezel is great, so the shape of the brezel is great, […] but I do something very creative now and do a heart-shaped brezel, but nobody likes it initially, and I only sell my heart-shaped brezel […] and nobody wants it, then maybe I have to put the other brezel next to it and say, but we have also another shape, maybe you also want to try this… as a visual example..." (Q19, interview 1)

With this metaphor, the participant wanted to illustrate that if one abides by the rules set by the EBM framework and conducts methodologically flawless RCTs in a first step – represented by the 'classical' brezel in the example – this can help to gain a general recognition within medical research. This recognition can in a next step help to conduct different kinds of studies – "heart-shaped brezels" – or to somewhat vary the methodology of the RCT without being dismissed as unscientific or using improper methodology. Hence, compliance is here depicted as a first step in trying to change the rules, which may be seen as an interesting kind of subversive action within the EBM regime.

Yet, while this example again highlights the critical stance of the researchers towards the EBM regime, it is important to say that not all participants seemed to feel constrained by the EBM framework and the dominance of the RCT methodology in the same way. Interestingly, especially the more

[29] „sauberes Arbeiten" (e.g. interview 1)

experienced researchers seemed to be somewhat less critical of the structuring effect of this regime of valuation. In general, many of the participants emphasised that at least for examining the efficiency of an intervention, the RCT is simply the best available method. Hence, while they often showed some critical distancing, in other instances the researchers seemed to align very much with the norms set by the EBM framework. It seemed that they – some more than others – actually internalised many evaluative principled linked to this regime of valuation, showing the importance of people who comply with a certain regime and thereby strengthen it and make it more durable.

Having illustrated the various ways in which the *EBM regime* influences the researchers' work– whether they are critical of it or not – it is important to relate this back to evaluative principles suggested by the other regimes of valuation. As I have noted before, in many cases, such evaluative principles linked to the other regimes seemed to be subordinated to and dominated by those related to the *EBM regime*. For example, as some of the researchers noted, RCTs are often better publishable than studies with a different design. Hence, when the researchers want to generate publications in line with *regime of personal academic success*, they have to adhere to the rules set by the EBM framework. Moreover, as noted before, publishing one's studies is also valuable within the *regime of medical ethics/benefiting patients*, as well as with respect to *valuing yoga* in general, since publication allows to promote it as an intervention from which patients can potentially benefit. Thus, also these considerations have to be subjected to the valuations suggested by the *EBM regime*: Even if the researchers may think that there are many kinds of questions that cannot be answered with an RCT and that it might make sense to conduct other kinds of studies which would maybe do more justice to yoga as such or to the individuality of patients, the values implicated in the EBM framework rather discourage this. A comparably dominating influence was only linked to the last regime of valuation – the *regime of biomedical knowledge* to which I turn now.

7.2.5 Regime of biomedical knowledge

The *regime of biomedical knowledge* as I reconstructed it from the interviews seemed to have the strongest influence on the work of the researchers, and they often appeared to feel affected or constrained by it. The *regime of biomedical knowledge* for me subsumes evaluative principles that signify the dominance of this form of knowledge, and related devaluations of other forms of medicine or medical knowledge and research which cannot be explained with biomedical terms and are to some extent at odds with its understandings. This is quite obviously institutionalised in the separation between biomedical practices and theories that are taught in medical education and applied in hospitals, and CAM practices and knowledge that are usually rather excluded from these spheres. Furthermore, these valuations are further strengthened in so far as there are – and as was often emphasised in the interviews – no official budgets in Germany to conduct research in the field of CAM. The researchers also highlighted that this is very different in, for example, the US, where the NIH has official budgets for research in the field of CAM, and thus also medical yoga research is well supported by state funding.

This is important because it highlights that *the regime of biomedical knowledge* as I present it here is specific to the local context the researchers I interviewed are situated in and cannot necessarily be generalised to different countries.

A further specification that is important to make when describing the *regime of biomedical knowledge* concerns its relation to the *regime of EBM*. In some ways, it may seem that the *EBM regime* is a subset of the *regime of biomedical knowledge*, yet, it actually carries along some other important values. One manifestation of the *regime of biomedical knowledge* is, for example, the demand to explain yoga in biomedical terms for it to be accepted in mainstream medicine. While according to the *EBM regime*, one may think that good evidence is enough for yoga to be accepted, different researchers emphasised that this is not the case, but that at least some idea of how a practice works physiologically is required for its acceptance in biomedicine:

> "Even if you offer a proper study and show that it has an effect, the real sceptics then say – I don't care, how does it work, then there is the next step where you have to justify yourself […] Thus, it has definitely a justificatory function to argue in medical terms." (Q20, interview 1)

> "With yoga we do not have this weak point because yoga has proven physiological effects, and if yoga would not have these we would face very much larger resistance, even with a positive evidence from clinical studies." (Q21, interview 2)

Hence, beyond good evidence as demanded by the *EBM regime*, the *regime of biomedical knowledge* further demands an explanation of yoga in medical terms. What is implicated in the second quote is that yoga actually fulfils this demand quite satisfactorily. As often emphasised by the researchers, many, though not all, of the effects of yoga can be well explained in a biomedical framework, making it much more acceptable than other forms of CAM where this is less possible. One example that was sometimes mentioned in the interviews was homeopathy. In this case, it is very hard to conceive from a biomedical perspective how it could work and hence homeopathy struggles much more to become accepted in this field. However, while yoga is in many respects well explainable in biomedical terms, due to yoga's multiplicity there are varying degrees to which it is acceptable within the *regime of biomedical knowledge*. Quite obviously, the more spiritual and philosophical yoga becomes, the more difficult it is to reconcile with biomedicine. The evaluative principles related to the *regime of biomedical knowledge* thus rather suggest to leave these aspects aside to make yoga accepted in mainstream medicine. Therefore, this regime in some way invited – or necessitated – practices of tinkering with yoga, meaning to adapt it to a certain context, making it, for example, less spiritual or philosophical. Such practices of tinkering with yoga – related to the *regime of biomedical knowledge*, but also to other aspects – were very apparent in the interviews and I will discuss these below in more detail.

Another essential expression of the *regime of biomedical knowledge* that was more or less present throughout all the interview was a general devaluation and a scepticism towards research in the field of CAM. The researchers all mentioned this in one way or the other, and while some of them took it more as a given, most of the participants seemed quite critical of it, as illustrated in the following quote:

> "I definitely think that in the field of CAM research we always have to be twice as good as the rest, because we are always regarded with this a priori suspicion, that it is quackery what we do […] and we really have to fight against this and when researchers from outside come to us, that is always like – I will show you how research works, because you don't know that – that is really interesting I think […] that there is this prejudice, if people who have published a third of what I have published in worse journals want to tell me how to do research because mine has the label CAM on it." (Q22, interview 2)

This quote highlights that the researchers often seemed to feel treated somewhat 'unfair' in a sense, because of a general prejudice that is often put forward against research in the field of CAM. As implied in the beginning of this quote, some of them also had the feeling that research in the domain of CAM is measured by a higher standard than that in mainstream medicine, meaning that they would need to work more 'clean' and fulfil every tiny standard that their colleagues in mainstream research cannot live up to either. Moreover, many of the participants also expressed the need to justify their work to other colleagues and to instances such as funding agencies or ethics commissions. One researcher, for example, explained that they would often have many problems with the ethics commission due to seemingly minor aspects of a research protocol, which he related back to a lack of openness towards yoga and a lack of knowledge about it.

The same lack of openness was voiced with respect to funding agencies, and all of the researchers I interviewed remarked the lack of money that is available for medical yoga research as a huge problem. I would see this as another important expression of the *regime of biomedical knowledge*, highlighting that research which does not entirely fit into the biomedical framework is devalued in the German research funding landscape. As noted before, in Germany there are no official budgets for research in the field of CAM, and many of the researchers spoke about the great difficulties they have with attaining state funding for their research. For example, different researchers described their experiences with grant applications at the DFG and BMBF, and noted that it seemed nearly impossible to get these accepted. As one researcher noted:

> "We only see what has been rejected, and we also see which other applications are accepted and how easy it is for others in comparison to us, and there one simply has to draw one's conclusions... so when we see that others apply and get every year a grant or two from the

> DFG or BMBF, and we try for ten years and don't get a single one, then you have to draw a certain conclusion." (Q23, interview 1)

Hence, also here, there seemed to be a feeling of being measured by a higher standard than mainstream medicine and being disregarded in this system, making research on yoga more difficult to carry out. For the yoga researchers, this necessitated a constant acquisition of money from different sources, needing to "sell oneself from door to door"[30] at different foundations which are open – or mostly explicitly dedicated – to research in the field of CAM.

The *regime of biomedical knowledge* was thus implicated in the interviews in very different respects and it seemed to set many impediments for the yoga research. Yet, interestingly, this regime appeared to be present to different degrees in different 'domains' of medicine. One of the researchers proposed an interesting separation between *the underlying principles of biomedicine* – such as physiology, anatomy, or other fundamental understandings of medicine – and *medicine as therapy*. The participant then attributed a much greater possibility of influence and openness towards therapies such as yoga to the latter sphere. Hence, while changing basic understandings of medicine through the findings of yoga studies is supposedly more difficult, it is easier to convince medicine of the usefulness of a yoga intervention. Such a perspective that sees a greater openness towards yoga in the realm of medicine as therapy was reflected in some of the other interviews as well. For example, this domain was also described as being 'more pragmatic'. Overall, it may be said that here, the *regime of biomedical knowledge* has less influence, meaning that also practices that are not entirely explainable in biomedical terms can gain therapeutic recognition.

However, despite this somewhat gradual presence of the *regime of biomedical knowledge* in different 'areas' of medicine, the researchers' work as such was still largely dominated by this regime. Importantly, this regime was also in tension with most of the other regimes of valuation: Investigating yoga as a medical intervention to clarify its effects and to give it a better standing was made more difficult by this regime, showing the tensions towards the *regime of medical ethics/benefiting patients*. Furthermore, also publishing one's research to promote the own career was impeded by the *regime of biomedical knowledge*, since as many researchers noted, "the word yoga sometimes poses problems"[31] when it comes to publishing one's results, especially in mainstream medical journals. Moreover, and somewhat ironically, the *regime of biomedical knowledge* even stands in a somewhat ambivalent relation to that of EBM: as noted before, the former demands explanations in biomedical terms, whereas within the latter, good evidence should be sufficient for the acceptance of a practice in biomedicine.

Finally, it is important to note that, as in the case of the *EBM regime*, also with respect to the *regime of biomedical knowledge*, there was quite some awareness and critical distancing on the part of the researchers. As already visible in many of the quotes I have invoked in this section, the researchers

[30] "Klinken putzen" (interview 1)
[31] "das Wort Yoga macht manchmal Probleme" (interview 2)

often criticised the lack of openness and the prejudices that exist towards CAM research in general and towards the yoga research in particular. In relation to this, also the lack of support for research in their field, mainly in terms of funding, was often explicitly criticized by the researchers. In doing so, they often referred to the US system, where yoga research is supported much better. As they noted, the lack of funding in Germany is especially problematic since money is an essential limiting factor to what can be done in a study and what not. Thus, the lack of funding crucially constrains the possibilities of yoga studies and thereby often also diminishes their quality. In line with this, some researchers mentioned that due to this scarcity of funding, they simply cannot live up to the standards of studies from the US. Overall, one may imagine a sort of vicious circle, where a disregard of yoga research, a lack of money, and a rather poor quality of studies mutually sustain each other.

Beyond that, another aspect of the researchers' criticism of the *regime of biomedical knowledge* was the general separation of medicine into the spheres of CAM and biomedicine. Some of them explicitly emphasised that medicine should not be separated in these two domains and that a much broader set of interventions should be taught in mainstream medicine. Yet, importantly, most of the researchers at the same time emphasised their general appreciation of mainstream medicine. They did not seem to be opposed to it in any sense and neither to explaining yoga in biomedical terms. However, as soon as it came to the dichotomy of CAM and mainstream medicine and to the impediments this creates for the yoga research – which I consider as an essential expression of this regime of valuation – the researchers positioned themselves quite critically. Many of them emphasised that they would not see an opposition between the spheres of biomedicine and CAM as being so necessary, which may be seen as a call for opening up the *regime of biomedical knowledge* to more diverse forms of knowledge. This already highlights the presence of some sort *counter-discourse to the regime of biomedical knowledge*, which I describe next.

7.2.6 A counter-discourse to the regime of biomedical knowledge

In the interviews, I sometimes identified what I called a *counter-discourse* to that of biomedical knowledge, not necessarily entailing a devaluation of this knowledge, but going along with a different set of values that are in tension with the sole privilege of biomedical knowledge in medical research and practice. In relation to these considerations, I was facing the question whether there might be counter regime to that of biomedical knowledge, let me call it a regime of CAM, which is institutionalised in itself, with an own shared discourse and a set of values. What supports this hypothesis is that the researchers sometimes evoked a sort of binary between the community of biomedicine and that of CAM, visible in expressions such as "*they* [in mainstream medicine] don't have any idea of…"[32], or "*we* in the field of CAM"[33]. Yet, in other instances it was visible that these communities are much less clearly bounded and homogeneous as these quotes may suggest. Still, what seemed to unite most of the

[32] "die haben keine Ahnung" (interview 1)
[33] "wir in der Komplementärmedizin" (interview 2)

researchers was an, often rather implicit, idea and a set of values related to what may be called a *holistic approach to medicine*. This entailed the idea that medicine should address all the "different levels of the human being"[34] and acknowledge "that the human being is not only a breathing machine"[35] – a stance that this participant ascribed to biomedicine. As another researchers put it, "health always includes the balance of body and mind, and the one is not to be seen separated from the other"[36]. In line with this, many participants emphasised the importance of medical interventions not only addressing physical aspects, but also psychological and even spiritual ones, because all these contribute to human health. As one researcher described it:

> "We know nowadays that also a spiritual component can be a very important health factor, […] spirituality or also belief – it does not even have to be spiritual, but a belief in something higher is a very, very strong factor that is relevant to good health." (Q24, interview 5)

Having said that there is this sort of a shared set of values related to a *holistic approach to medicine* between the participants, I am back at the question whether this is not the expression of a regime of valuation in itself. While one could probably find arguments to contend the presence of such a regime, I would nevertheless, based on what I heard in the interviews, argue against this. Primarily, I did not have the impression that the set of evaluative principles related to valuing a *holistic approach to medicine* could be related to one clearly identifiable background. Rather, these valuations seemed to arise from various different personal experiences, both on a professional and theoretical level as well as on a very private and embodied level. I do not think that these valuations can be linked to a coherent and institutionalised community of CAM, even though the institutionalisation certainly exists to some extent. From the interviews, I got the impression that the evaluative principles the researchers drew upon when criticising the *regime of biomedical knowledge* and arguing for a *holistic approach to medicine* were not informed by another coherent regime of valuation, but rather by a diverse set of experiences and backgrounds. These different personal and professional, theoretical and practical experiences then related to each other in a shared discourse, yet this discourse was often rather vague and difficult to grasp. Moreover, in this discourse the aspect of demarcation from the *regime of biomedical knowledge* seemed to be more prominent than a coherent set of values that would indicate the existence of another regime of valuation.

Importantly, when I refer to the coherence and non-coherence of regimes of valuations, it may be noted that I have initially argued for the multiplicity and heterogeneity of medicine, yet still proclaim the existence of a single *regime of biomedical knowledge*. However, in claiming the existence of such a

[34] "die verschiedenen Ebenen des Menschen" (interview 3)
[35] "dass der Mensch halt nicht nur ne atmende Maschine ist" (interview 1)
[36] „Gesundheit eben immer das Gleichgewicht von Körper und Geist mit einschließt, und das eine vom anderen nicht getrennt zu betrachten ist" (interview 4)

regime I do not conceive of it as being entirely homogeneous and clearly bounded. Nevertheless, I would still argue that the value(s) linked to what I called the *regime of biomedical knowledge* form a more graspable and, more importantly, also more durable, institutionalised, and hence powerful entity than those that counter it. This is why I do, based on my interview data, argue for the existence of a *regime of biomedical knowledge*, and not for a counter-regime to this.

Having introduced this *counter-discourse to the regime of biomedical knowledge*, I now want to move on to another set of evaluative principles – related to *valuing yoga* – that were equally quite present in the interviews, but that I could neither trace back to one single regime of valuation. As I describe in the ensuing section, these evaluative principles are in some ways very closely related to those of valuing a *holistic approach to medicine*, making it sensible to introduce them in a next step.

7.2.7 Valuing yoga

As I have already mentioned a few times before, an important theme in the interviews was that of *valuing yoga*. The researchers strongly appreciated yoga as a medical intervention due to various reasons, they often emphasised its benefits over other interventions, and argued for its value especially with respect to chronic or lifestyle-related diseases. The strong presence of these valuations led me to the question whether they might equally be informed by a larger regime of valuation in the background. When I discussed parts of my empirical findings with colleagues during the process of writing my thesis, it was suggested that there might be a regime of *valuing yoga* with related evaluative principles being conveyed in, for example, yoga classes or teacher trainings. Yet, I could not reconstruct such a regime of valuation from my empirical material, which is why I think that it does not have a valid place within this thesis. The evaluative principles that the researchers drew upon when valuing yoga rather seemed to be informed by various different backgrounds. In many instances, they had made very personal and also embodied experiences with yoga itself, but also with other practices such as different forms of meditation which, however, still contributed to their appreciation of yoga. Yet, in other cases, the researchers' valuations of yoga rather seemed to be related to quite theoretical considerations about why yoga was a valuable medical intervention, some of these in line with the discourse of holistic medicine.

Hence, at least in my interview data, there was no single regime of *valuing yoga* present, but the background that valuations of yoga drew upon seemed to be fragmented and often remained rather vague and implicit. In addition to that, also the resulting valuations of yoga were very ambivalent and contained multiple tensions. These tensions were quite apparent in the interviews and one of the aspects that I found most surprising in the analysis of my empirical material. In the following section, I further discuss these ambivalences of valuing yoga and the practical consequences that arise from this for the researchers' work, thereby providing many bits and pieces of an answer to the first sub-question I aimed to answer in this thesis.

7.3 The ambivalences of valuing yoga

I started my thesis with a curiosity about what yoga would be in the researchers' work and how and as what the researchers would value yoga. While I certainly expected that no single and simple answer to this would emerge, I was nevertheless surprised by the strong and often quite striking ambivalences that surfaced in how the researchers valued yoga. These ambivalences can mainly be captured in the clash between valuing yoga *as a whole* and valuing it *as a toolbox*, a tension that I further describe in the following. Moreover, I suggest that these ambivalent valuations are often related to, and sometimes necessitate, practices of tinkering with yoga, both on a practical and methodological as well as on a theoretical level.

7.3.1 Yoga as a medical intervention – valuing it as a whole or as a toolbox

Throughout the different interviews, whether explicitly asked about it or not, the researchers often pointed out multiple benefits of yoga as a medical intervention, and all the participants seemed to value it rather strongly in this respect. However, as quickly became apparent, the valuations related to yoga as a medical intervention and the evaluative principles the researchers drew upon when talking about it were partially quite conflicting or even entirely contradictory. On the one hand, evaluative principles related to what I called valuing yoga *as a whole*[37] were quite present: The researchers often emphasised that yoga is especially valuable because it combines many different elements – it is some sort of sports or gymnastics and hence comes with the obvious benefits linked to that; it can include meditative elements which are important to create awareness and to become more mindful in everyday life, thereby reducing stress and bringing along related physiological benefits; it also includes breathing practices which can, for example, affect the nervous system and hormonal secretion; furthermore, it even comprises a sort of life-style philosophy, including thoughts on healthy eating and ethical conduct towards oneself and others; last but not least, the spiritual elements that yoga includes can equally have important health benefits. Hence, the researchers seemed to strongly appreciate a version of yoga that includes such a diversity of components, as for example, expressed in the following quotes:

> "So movement is simply good for the body […], but it is equally important to calm the mind, and equally important to, with the breath you can really strongly influence the nervous system, yeah, and I think that means all this should be contained, and I think in the best case also the aspect of yoga philosophy should be included, that means how do I actually perceive the world […], I think the aspects of philosophy, meditation, breathing,

[37] In implementing the notion of valuing yoga *as a whole*, I want to clarify my take on this a bit further. I am aware that the term 'whole' might imply that I regard forms of yoga that encompass many different elements as 'true' yoga, and versions that include only some of these elements as incomplete. However, as I have outlined in the very beginning of my empirical chapter, I conceive of yoga in medical research as a multiplicity, and I consider all the different forms of yoga as having value in their own right. The term yoga *as a whole* thus simply aims to describe forms of yoga that comprise many different elements and are thus more encompassing. Moreover, it also tries to capture the spirit in which my interview partners talked about yoga – here, I sometimes got indeed the impression that there is something such as a 'whole' of yoga, and other things that are only parts of it.

> and of course asana, this is really what constitutes the broad efficacy spectrum of yoga." (Q25, interview 4)
>
> "Yoga is actually a quite holistic approach, I do not only have my habits which are changed, I have a sportive component, my lifestyle is changed, I have a reflexive component, that means the different levels of a human being, the physical, the emotional, as well as the spiritual, they are all addressed, and that I find of course really interesting, and there are really not many other interventions which do exactly this." (Q26, interview 3)

As expressed in these quotes, the researchers valued yoga as something that is not only a sportive intervention or only relaxation, but something that, as put in the second quote, addresses all "the different levels of a human being". Based on this comprehensiveness that yoga can offer, it was often described as being especially valuable as a sort of lifestyle modification:

> "It is actually nearly the only intervention that can meet all requirements that are given for a healthy lifestyle – it is said you should be physically active, the stress management should be considered, nutrition should be included – there are American studies that show that spirituality is really supportive of life […] so yoga is really a blueprint for being a quite ideal lifestyle modification for many diseases." (Q27, interview 2)

In relation to this, yoga was described as especially valuable with respect to chronic and lifestyle-related diseases which are increasing in prevalence, or even as a response to the problem of the aging society. Hence, yoga was often considered valuable not only as a medical intervention that is applied once such as a medication, but as something that people can practice for a longer time, that can be integrated in the lifestyle and hence also bring along more fundamental and enduring health benefits and lifestyle changes.

This appreciation of yoga *as a whole* was in practice related to valuations that demand that all, or at least many of the different elements that yoga can comprise should be included in a medical intervention. Many of the researchers emphasised that it was important to, for example, also include the spiritual or nutrition-related components of yoga more in clinical studies, and to not implement "yoga light"[38], where it would e.g. only be a kind of sports. In this respect, some of the participants also stated that they did not want to adapt themselves too much in order to please mainstream medicine, but that they found it important to do justice to yoga *as a whole* in some sense. In relation to this, they also made references to the yoga tradition from which yoga should not be detached. One researcher, for example, emphasised that "yoga should not lose its roots"[39] which was reflected in many other accounts as well.

[38] „Yoga light" (interview 2)
[39] „Yoga soll die Wurzel nicht verlieren" (interview 4)

Overall, such valuations thus seemed to indicate that versions of yoga that comprise e.g. only *asanas* are less valuable, because these lack many important elements of yoga.

These valuations, however, stood in stark contrast to some of the actual practices of the researchers and valuations they voiced in other instances. At other times, the researchers expressed that it was okay to implement yoga as only a physical practice or as only relaxation if that helps patients in a particular situation. Furthermore, in contrast to valuing and emphasising the importance of yoga coming as a combination of many different elements, they even highlighted and seemed to appreciate the possibility of experimenting with the different elements that yoga can comprise in other instances. Thus, yoga was in other instances by one and the same person valued as a sort of *toolbox*[40] from which particular elements can be taken to create a specific version of yoga that suits the particular context. This may mean to leave spiritual aspects aside because these would not be accepted by a particular patient clientele or by the medical community, but also to adapt yoga to a certain medical condition. Especially the latter aspect was quite prominent in the interviews and seemed to be strongly appreciated by the researchers, because it allows to adjust yoga interventions quite specifically to patients' needs – it can be more physically intense if needed or very relaxation focused, it can be quite spiritual and encompassing or limited to the practice of physical postures or breathing exercises. In the actual research, this is reflected in practices of *tinkering with yoga*, where the researchers take those elements that seem to fit best for the particular version of yoga they want to employ in their study.

Hence, in medical research different versions of yoga all seemed to have a place and to be appreciated for different reasons. Yet, in the participants' accounts, valuing yoga *as a whole* and valuing it *as a toolbox* often stood in an unresolved tension, because the very different valuations that are linked to these aspects were frequently evoked side-by-side without being explicitly set in any relation. One researcher, for example, voiced in one sentence that "of course you can have the specific question whether a yoga intervention that only consists of yoga postures, if that helps, that is also completely fine"[41]. Yet, in the directly subsequent sentence the participant enumerated the many different components of yoga and how beneficial they are, concluding by noting that "it was definitely our idea that we also consider that, that we not only check whether it helps if you do yoga instead of a sports, but that we really use all the possibilities that are there"[42]. Such obvious tensions and contradictions between the valuations linked to the different realities of yoga were present in many of the interviews and often left me somewhat puzzled.

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[40] At first glance, also the notion of yoga *as a toolbox* might seem somewhat contradictory to the idea that yoga is not one but a multiplicity. Indeed, it would have been more in line with my own terminology to employ the notion of valuing yoga *as a multiplicity*. Yet, also here I decided to try to stay close to the meanings of the researchers' accounts, which rather seem to be captured in the notion of valuing yoga *as a toolbox*.

[41] „man kann natürlich auch die spezifische Fragestellung haben ob ein Yogakurs der nur aus Yogahaltungen besteht, ob das wirkt, das ist auch völlig in Ordnung." (interview 2)

[42] „es war schon unsere Idee dass wir das auch berücksichtigen, und das wir nicht nur gucken, ob wenn man Yoga statt Sport macht, ob das hilft, sondern dass wir da auch all die Möglichkeiten nutzen die da sind." (interview 2)

Interestingly, one researcher explicitly addressed the multiplicity of yoga – that it can be very different things in different instances – and thereby somewhat managed to reconcile these tensions in his account. The participant emphasised a difference between two different realities of yoga, where it comes either as a reactive intervention or as a proactive lifestyle modification. On the one hand, yoga as a reactive intervention is prescribed in a particular moment with a particular goal. For example, it might be administered to a patient who has back pain or headaches or just underwent chemotherapy, where thus specific symptoms should be alleviated through yoga. The participant contrasted this with yoga as a proactive lifestyle modification on the other hand, which may also address a particular problem in the first instance but then goes far beyond that, with long-term and also preventative effects on patients' health. Considering this explicit distinction between two realities of yoga, it becomes understandable that the first – yoga as a reactive intervention – can be related to evaluative principles that foreground the benefit of using only individual components of yoga which can help the patient best in a particular situation. In contrast, the latter – yoga as a proactive lifestyle modification – is rather related to valuations that emphasise the importance of a version of yoga that comprises many different elements.

Having described the ambivalent valuations of yoga that surfaced in the interviews, it seems important to consider where these valuations come from and by what factors they might be influenced. Especially the aspect of valuing yoga *as a whole* seemed to be to some extent influenced by the researchers' different backgrounds and their diverse personal experiences with yoga and similar practices. In addition, what I denoted as a *counter-discourse to the regime of biomedical knowledge*, i.e. the appreciation of a *holistic approach to medicine* appeared to strongly influence the researchers' valuations of yoga *as a whole*. This could be seen particularly well when they, for example, emphasised the importance of yoga addressing the "different levels of a human being", because this of course presupposes that they consider it important for a medical intervention to address these different levels in the first place.

Beyond this, the *regime of medical ethics/benefiting patients* seemed to have an important influence on the participants' valuations of yoga, interestingly suggesting evaluative principles that favour both yoga *as a whole* and *as a toolbox*. On the one hand, yoga *as a whole* becomes valuable within this regime because it is such an encompassing intervention, because it can help patients to lead a healthier life more broadly, and because it supports them in various different ways. Hence, valuing yoga *as a whole* is related to considering patients as holistic beings who should and can be helped through yoga on different levels. Yet, on the other hand, yoga is also valuable in relation to the *regime of medical ethics/benefiting patients* because it can be adapted to patients' individual needs. It can be adjusted to their condition and hence be made particularly beneficial for a specific patient with a specific condition. Thus, the appreciation of yoga's multiplicity and versatility – allowing it to be a *toolbox* in medical research – is equally related to benefiting the individual patient and their needs.

While the *regime of medical ethics/benefiting patients* thus seemed to be in line with the different ways in which the researchers valued yoga, the *regimes of EBM* and *biomedical knowledge* seemed to be less so, rather suggesting evaluative principles that clash with valuing yoga *as a whole*. With respect to the *EBM regime*, this is the case since valuing yoga *as a whole* obviously implies that it is valuable and necessary to investigate a version of yoga that comprises many different elements, which is, however, rather difficult to do in an RCT. Especially the reality of yoga as an encompassing lifestyle intervention is in an apparent tension with the RCT methodology, since this form of yoga can hardly be investigated in a trial that runs for approximately 8 or 12 weeks, and should show some conclusive results by this time. Moreover, also addressing the effects of such a comprehensive intervention with standardised numerical tools seems somewhat difficult. Hence, the researchers have to mediate these tensions between valuing yoga *as a whole* – which often rather suggests the use of different study designs or longer observation periods – and the evaluative principles suggested by the *EBM regime*, i.e. conducting quantitative research and at best RCTs as the gold-standard within this framework.

In a similar manner, valuing yoga *as a whole* is also in tension with the *regime of biomedical knowledge*. As noted before, this regime demands the explanation of yoga in biomedical terms. However, as some of the researchers explicitly stated, while the effects of some of the individual elements of yoga can be quite well explained in biomedical terms, when regarding *yoga as a whole* with the manifold elements it includes and their potential interactions, such an explanation becomes much more difficult. While the researchers often referred to explanatory models that capture the effects of individual elements of yoga such as meditation or *asanas*, they hardly offered a comprehensive account of how yoga *as a whole* functions and affects the human organism. As one researcher put it:

> "In the complexity of possibilities for change that yoga brings along I have so many mechanisms of action that run in parallel, that unequivocally being able to explain how yoga really functions would be very difficult to achieve." (Q28, interview 3)

Hence, it is here depicted as somewhat illusory to expect a complete explanation of yoga in biomedical terms, highlighting the necessary tensions with this regime of valuation. In addition, some elements of yoga, mainly the philosophical and spiritual ones, are as such in quite an obvious conflict with the *regime of biomedical knowledge*, where such components do not have a place and are hence also hard to explain. Thus, also in this respect, the *regime of biomedical knowledge* seems difficult to reconcile with valuing yoga *as a whole* with all the different elements it brings along.

Thus, both the *regime of EBM* as well as that of *biomedical knowledge* rather favour yoga *as a toolbox*, and the evaluative principles related to these regimes are rather in conflict with those related to valuing yoga *as a whole*. With respect to the *EBM regime*, versions of yoga that are only *asana* or only breathing practice can be better investigated in an RCT framework and are thus more in line with the evaluative principles suggested here. Within the *regime of biomedical knowledge*, yoga is better explainable if it is only *asana* practice or only breathing or meditation, and such versions of yoga which

leave aside the spiritual and philosophical components are better reconcilable with biomedical knowledge in general. A consequence that arises from these tensions for the researchers' work is what I called practices of *tinkering with yoga*. This means that on a practical level, they often implement versions of yoga that do not include all of the elements that it could comprise, and on a theoretical level, yoga is explained differently depending on whom one talks to. These practices of tinkering with yoga, which were present in all of the interviews, are further described in the ensuing section.

7.3.2 Tinkering with yoga

The multiplicity in which yoga manifests in biomedical research is essentially related to practices of tinkering with yoga. This means that the researchers in a sense create a new version of yoga for each different trial, they experiment with different forms of it, and moreover evoke different realities of yoga when explaining it to different target groups. In line with what I have just described, one reason to do so seemed to be the dominance of the *regimes of biomedical knowledge* and *EBM* which favour particular versions of yoga over others. The *regime of EBM*, for example, often seemed to set a strong reference framework for how long a yoga intervention can last in an RCT, and it favours the implementation of such forms that are better investigable with standardised methods such as questionnaires. Yet, yoga interventions that combine many different elements and may hence also have a more diverse range of effects which are more difficult to capture in standardised measures seem rather difficult to investigate in this framework. In addition, what seemed to be an important motivation for tinkering with yoga was the goal of making it acceptable to patients as well as to medical colleagues, which may in a wider sense be seen as form of compliance with evaluative principles related to the *regime of biomedical knowledge*. As one researchers put it:

> "That can deter some people I think, especially this philosophy, the chanting, I think you have to be ready for that, and I think if somebody has an aversion to that, that can really have a deterring effect […]. If we would offer this here, especially in the [region of Germany] which is rather secularly oriented, then nobody would come anymore, they would say – here, we don't do that. […] In Germany you are quickly put into the esoteric corner and there you have to be a bit careful." (Q29, interview 1)

Hence, the researcher rather did not want to include too many spiritual and philosophical elements into a yoga intervention, because this might stop patients from participating, and patients as well as medical colleagues might regard it as too esoteric. Especially this aspect of rather leaving the spiritual components of yoga aside was very present in the interviews, and the researchers often emphasised that if one wants to include these, this should happen in a way that is appropriate to the contemporary time, and not too "eso-incense-style"[43].

[43] „eso-Räucherstäbchen-mäßig" (interview 5)

Besides this practice of tinkering with yoga to make it more acceptable and more aligned with mainstream medicine, another very prominent way of tinkering that I have already briefly mentioned before was related to adapting yoga to patients. This means that the researchers chose or rather created a particular version that suits best for patients in a specific situation:

> "We try out of all components of yoga – movement, so the *asanas*, breathing techniques, and relaxation – to offer something where we think that is helps the patients with their particular condition." (Q30, interview 1)

> "You can also adapt yoga to the disease, so when I work with asthma patients I will certainly employ more breathing than when I work with patients with back pain, there probably the work on the posture will be more in the foreground." (Q31, interview 2)

As can be seen in these quotes, this form of tinkering with yoga where it is adapted to patients is centrally related to the evaluative principles that go along with the *regime of medical ethics/benefiting patients*, because it allows to do justice to patients in their individual situation.

Beyond that, there was however another facet of tinkering with yoga which rather seemed to arise from a curiosity and a genuine scientific interest in how the individual components of yoga actually work. Hence, while practices of tinkering with yoga were to a large extent related to external reasons and considerations, the researchers seemed to be independently from these factors motivated to experiment with the different aspects of yoga and the effects they have. Different participants expressed that they find it interesting to conduct studies in which different versions of yoga are tested against each other, for example, a purely physically oriented form of yoga against one which comprises only meditation and breathing techniques, or a version of yoga without against one including spiritual elements. This wish to experiment with and discriminate the effects of different versions of yoga found its most extreme form in the suggestion to examine the differential effects of individual *asanas*, an aim that was however not shared by all the researchers.

Importantly, practices of tinkering with yoga were not only present on a methodological but also on a theoretical level. This means that the researchers stated that it was important to explain yoga differently in different contexts and to different people:

> "If you tell the medical professionals, I stretch myself when doing yoga in the *asanas*, I work with the fasciae, then – great – then they suddenly understand it, but that there is also another aspect, which is in my opinion also really important, if I for example have problems with my back and I stretch myself, there is this – focus on your breath, focus on your sensations, maybe also accept that there is some kind of pain – this is something that they do not understand." (Q32, interview 1)

> "To explain the effects of yoga on pain or on metabolic parameters I do not need philosophical aspects which are in conflict with biomedicine […] and I think if you present

> yoga accordingly, then there are very few points of conflict concerning the underlying assumptions. You can really explain a lot physiologically, and if I employ yoga in a non-medical setting, then I maybe also do not have to explain it physiologically." (Q33, interview 2)

Hence, the researchers described that they vary their explanations of what yoga is according to the context – while for yoga practitioners it can very well be depicted as a philosophical and spiritual practice, these aspects should rather be left aside when talking to medical professionals. Moreover, the researchers even emphasised the possibility of explaining yoga differently within the medical profession, depending on what discipline the counterpart belongs to. For example, to an orthopaedist, one would rather refer to yoga as being work with the fasciae, while to a psychiatrist one would rather speak about neurotransmitters and hormones. As can be seen from the above quotes, it seemed to be considered as quite valuable by the researchers that it is possible to explain yoga in these different terms – that it can, for example, be something very philosophical, but that it can also be detached from this background and become something purely physiological. Thus, what is again implemented here is valuing yoga *as a toolbox*, which can also on a theoretical level be adapted and assembled differently depending on what seems needed in a particular context.

So far, I have described how the researchers valued yoga and tinkered with it in their practices. While questions about methodology were sometimes already touched upon, I have so far not explicitly addressed how the researchers valued different methodologies in their work, and how they tinkered not only with yoga but also with methods in order to mediate the valuations suggested by the different regimes of valuation. In the next section, I turn to what I call *methodological ambivalences* in the researchers' work, thereby addressing the second sub-question I am posing in this thesis.

7.4 Methodological ambivalences

The *EBM regime* which was very present in the researchers' accounts suggests particular valuations of study designs and hence particular methodological choices to the researchers, with which they seemed to be sometimes more, sometimes less willing to align. In this section, I outline the ambivalences that are linked to the methodological orderings suggested by the EBM framework, being criticised and perceived as a constraint in some instances, yet appreciated in other situations. After sketching the researchers' positions towards these 'rules' that are given by EBM, I elaborate on how this plays out practically in the researchers' work. This entails what I call practices of *tinkering with methodology*, meaning to adapt methodologies to one's particular purpose and to create some leeway within the evaluative principles suggested by the *EBM regime*.

7.4.1 Ambivalent stances towards the 'rules' set by EBM

As I have described before, the *EBM regime* sets quite strong 'rules' for medical research – rules which one, as the researchers often noted, has to comply with if one wants to be recognised in the field of

medical research. The researchers were partially quite critical of this regime and the methodological hierarchies it imposes. Central to this criticism was that they often seemed to regard the methods suggested by the EBM framework as having important limitations and hence not allowing to do research in the way they would like to do it. Moreover, the researchers also emphasised that it was in many regards difficult and not entirely feasible to investigate yoga in the framework of an RCT and to conduct meta-analyses of RCTs about yoga – as would be most highly regarded in the EBM framework.

With respect to the investigation of yoga in RCTs, some obvious problems arise. For example, one major problem is the issue of blinding participants to whether they receive the intervention in question or the control. This is obviously difficult in the case of yoga since patients will quickly realise whether they do yoga or not, in contrast to pharmaceutical research where participants can simply take a pill without having any idea about whether it contains active substances or is a placebo. In line with this, it is also very difficult to implement a placebo control of a yoga intervention. This would need to be an intervention which is very similar to yoga, yet here it can become difficult to draw a line between what is actually yoga and what not. As one researcher stated:

> "For yoga there is also something in the direction of a sham intervention, but that was in the end a yoga intervention which was simply not called like that, so there is really no approach where one could say we have a placebo, that the patients think that this is something that is effective but it is not really effective. And I don't think that we will ever have this, to be honest." (Q34, interview 2)

Here, this participant describes the problems that are linked to constructing placebo interventions for yoga and subsequently denies the possibility of achieving this. This might be seen as a sort of acceptance of some of the limitations of investigating yoga within an RCT, which was present in many of the interviews. These limitations are simply an omnipresent reality for the researchers, something they have to deal with and hence to approach pragmatically to some extent.

Another limitation of the RCT methodology that was mentioned in the interviews is the somewhat limited timespan that it allows for a study to last. As many of the researchers described, for an RCT there is a common sense timeframe of investigation, which is often not questioned: RCTs on yoga usually run for about 8 to 12 weeks, but not much longer than that. When considering reasons for the choice of this timeframe, some participants invoked the issue of compliance, which becomes more problematic the longer a study lasts. Yet, many of them also noted that this was simply the standard observation duration for RCTs on yoga, and one participant even stated to have actually "honestly never really thought about this"[44]. While some of the researchers did not consider this standard observation timeframe as very problematic, others expressed the wish to investigate yoga over longer time spans, because this may allow different insights into its effects, which seems especially important when

[44] „hab ich mir ehrlich gesagt noch nie Gedanken drüber gemacht" (interview 5)

considering yoga as a more encompassing lifestyle intervention. Another aspect that was mentioned as being problematic in relation to the temporality of RCTs was that these usually only include measurements in the beginning and at the end of the study, and thus not allow a very fine-grained view on the changes that occur for the individual patient over time.

In relation to these limitations posed by the RCT for the investigation of yoga, the researchers did, on a more general level, emphasise that RCTs are simply not suited to investigate all kinds of questions. While some sorts of questions can be well answered with an RCT, other insights cannot be gained through this methodology. This is especially the case since RCTs focus on investigating an a priori defined set of criteria in line with a certain hypothesis, usually with standardised methods and questionnaires which are equally only sensitive to certain a priori defined dimensions. Thus, aspects that differ from these initially anticipated ones can hardly be grasped within an RCT. As one researcher described:

> "We did a study on chronic neck pain where we could show that yoga reduces chronic neck pain and the functional impediments, but we also did an accompanying qualitative study, which gave us the idea that this is probably not the case because I do 10 minutes of yoga postures every day, but because the body perception changes, and the patients said – if I am somewhere in my everyday life I realise that my posture is not healthy – and this is something which we would never have realised through an RCT because we would not have had this particular question." (Q35, interview 2)

Hence, in this case, the use of qualitative methods allowed for additional insights which were not initially anticipated and would therefore not have been graspable within an RCT that is not sensitive to these new dimensions.

Besides such limitations and criticism linked to the RCT methodology, some researchers also criticised the high standing that is ascribed to meta-analyses within the EBM framework, equally highlighting that these are simply not suited for all kinds of purposes and questions. Moreover, it was remarked that, similar as with regards to the RCT, also this standard brings along some problems with respect to the medical yoga research. For example, for a meta-analysis, studies need to be assessed according to very standardised criteria, in which, for example, a lack of blinding of participants is considered an important disadvantage of a study because it introduces a sort of bias. This means that studies on yoga, where blinding of the participants is hardly possible, are automatically ranked lower in such assessments. In this respect, the participants criticised these dominant standards in medical research, noting that yoga is here often "squeezed into a frame"[45] in which it does not really fit.

While the researchers' considerations and valuations related to the methodological hierarchy of the *EBM regime* and especially the RCT that I have described so far were mostly negative, this section's

[45] „in einen Rahmen gepresst" (interview 1)

title already indicates that their valuations of particularly the RCT were inherently ambivalent. Indeed, when being asked about whether they saw the investigation of yoga in the RCT framework as suitable and feasible, many of them gave answers such as "yes and no" – highlighting their ambivalent stance towards the RCT methodology. On the one hand, the researchers described the several limitations that are linked to investigating yoga in RCTs, yet, on the other hand, some of them noted that "the limitations are actually not that big"[46], and all participants highlighted the value that the RCT methodology has for some kinds of questions. As repeatedly emphasised, "for answering questions of efficacy, we have at the moment no good alternatives"[47]. Hence, if the aim is to test the pure efficacy of a certain intervention, then the RCT is the best available method. The same holds true with respect to directly comparing different kinds of interventions to each other, which is equally considered an important strength of the RCT. As one participant put it, "I think that if I directly want to compare something, there is nothing that is stronger than an RCT, because through randomisation I eliminate certain effects"[48]. Hence, while criticising the RCT methodology and highlighting its limitations in many instances, none of the researchers seemed to be generally opposed to using this method. They were at the same time well aware of its benefits, and voiced many valuations that are in line with the evaluative principles suggested by the *EBM regime*.

Yet, what seemed to be important for the researchers, and what essentially mediates the tensions between criticising the limitations of the RCT methodology and emphasising its value was what I denoted as *valuing methodological diversity*. This means that many participants highlighted that different methods all have a value in their own right, and that what can be considered the best method simply depends on the kind of question that is asked. As one researcher emphasised,

> "It is also possible to do pre-post single-arm studies[49], you can also do qualitative interviews, there is no argument against a specific method in the first place. I would rather ask the other way round – what do I actually want to know and with which method do I want to answer that. […] If I simply want to measure efficacy and I have defined outcome parameters which I know in advance […] then I can steer this a lot better, but if I have new kinds of questions […] then qualitative interviews are the best approach, except if I already have that many prejudices, or let's call it pre-experiences, that I can already construct questionnaires which contain exactly this dimension […]. The methodological diversity should always be used for posing clever questions." (Q36, interview 3)

[46] „die Einschränkungen sind eigentlich gar nicht so groß" (interview 3)
[47] „für Wirksamkeitsfragestellungen haben wir momentan einfach keine guten Alternativen" (interview 2)
[48] „Ich glaub es gibt nichts stärkeres wenn ich etwas direkt vergleichen will als ne RCT, weil durch die Randomisation ich halt bestimmte Effekte rausnehme." (interview 1)
[49] This denotes a kind of study where there is only one group which receives a certain intervention („single-arm"), and which is evaluated with respect to certain outcome parameters before and after having received this intervention („pre-post").

What can be seen in this quote is the notion that the 'best method' or the gold-standard is not given as such, but depends on the specific situations and on the kind of question that is of interest. This perspective is of course in some tension with the valuations entailed in the *EBM regime* with its clear ordering of different forms of evidence, irrespective of a particular situation or context. This evidence hierarchy was sometimes criticised more subtly, as for example in the last sentence of the quote cited above. Yet, especially one researcher talked quite explicitly about the evidence hierarchy of EBM and emphasised to understand David Sackett, one of the 'fore-fathers' of EBM, as suggesting that different kinds of evidence and hence different kinds of studies are of equal value:

> "If you look at Sackett himself, there is really no valuation here, and this is also how it should be, it depends on what you want to know." (Q37, interview 1)

While the other participants referred less explicitly to the evidence hierarchy of EBM, all of them seemed to share the appreciation of multiple methods, and many of them specifically emphasised the value of combining different methods such as qualitative and quantitative ones, and of measuring objective as well as more subjective parameters:

> "I think mixed methods designs are really good, where you do not only have these questionnaires, but the more subjective is also really important, so to consider these other aspects, the qualitative side, that I find really important." (Q38, interview 5)

These valuations related to different kinds of methodologies and the appreciation of a combination of multiple methods had important consequences for the researchers' practical work and for how they designed their studies. When they talked about their considerations in designing a study to investigate yoga, it seemed that they were in many ways *tinkering with methodology* – something that I describe further in the next section.

7.4.2 Tinkering with methodology

In analysing the interviews, I identified two ways in which the researchers seemed to tinker with methodology in relation to the valuations of different kinds of methods I have just described. The first of these entailed to creatively handle methodology in order to mediate the tensions between the evidence hierarchy of EBM and their own appreciation of methodological diversity. As I have just described, most of the researchers ascribed value to the investigation of both subjective and objective parameters and hence often combined these two facets in their studies. As one participant described:

> "We just published a study […] about arterial hypertension, and there our primary outcome was of course the blood pressure, and then we additionally investigated other parameters such as quality of life." (Q39, interview 2)

Important to note, when this participant refers to the investigation of quality of life, this still means a form of quantitative research where quality of life is assessed using a standardised questionnaire. Yet,

many participants also emphasised the value of conducting not only quantitative research (as suggested by the *EBM regime*), but also qualitative investigations since these can give important insights of a different kind. In line with this, many researchers described that "there are certain kinds of studies where we think that an additional qualitative assessment is sensible, then we plan an RCT but also interview the patients qualitatively"[50]. Hence, when they carry out an RCT, they would conduct additional qualitative interviews which can complement the evidence from the actual RCT in interesting ways. This seemed to be quite a common practice, since all of the researchers at some point referred to such combinations of qualitative and quantitative methods. From my perspective, such approaches are an interesting way to somewhat reconcile the evaluative principles related to the *EBM regime* with the researchers' own appreciation of a broader array of methods. While many participants emphasised that "qualitative aspects are valued less, especially within medicine"[51], and are hence also more difficult to publish and to get funded, through combining such qualitative assessments with an RCT, the researchers still do justice to the *EBM regime*. This, for example, allows them to publish the RCT part of the study in a mainstream medical journal, and the qualitative aspects in a CAM journal.

Besides this practice of combining quantitative and qualitative methods, the second facet of *tinkering with methodology* that I observed in the interviews was related to handling the problems that arise when wanting to investigate yoga in an RCT. As I have described before, important issues linked to this are the difficulties to administer a placebo control as well as to adequately blind participants. Some researchers described attempts to eliminate these problems and to keep up with the standards of the RCT. What was mentioned most frequently were attempts to find ways to blind the participants, as described in the following account:

> "In the study we are planning at the moment, yoga vs MBSR[52], we only told the participants beforehand that they are participating in a relaxation course, and relaxation course A has a higher proportion of movement, and relaxation course B has a higher proportion of relaxation." (Q40, interview 1)

While some of the researchers described similar attempts, most of them seemed to agree that it is not really feasible to blind participants and to live up to all standards of the RCT, but that one rather needs to accept that there are some limitations. As one participant put it, "if you have accepted these, then a lot actually works"[53]. In relation to this, many of the researchers emphasised the need to simply be pragmatic in the medical yoga research, to work with what is possible rather than focusing on what is not possible, and to adapt the available methods to one's purposes.

[50] „es gibt bestimmte Studien wo wir denken da macht qualitativ noch Zusatzauswertung Sinn, dann planen wir ein RCT, befragen aber die Patienten nochmal qualitativ" (interview 1)
[51] „qualitative Aspekte werden geringer geschätzt, gerade in der Medizin" (interview 1)
[52] Mindfulness-based stress reduction
[53] „wenn man die einmal akzeptiert, dann funktioniert viel" (interview 2)

Along these lines, many participants highlighted that while comparing yoga with placebo interventions is hardly possible, it works well to compare yoga with different other interventions, which is indeed a very common practice in the yoga research. Many of the researchers described studies they had conducted in which yoga was compared to, for example, MBSR, physiotherapy, or healing eurhythmics. Interestingly, in relation to this aspect of choosing a control group against which yoga is compared, another facet of tinkering became important in the interviews. Some researchers mentioned the possible danger of "destroying the effect"[54] of a study when choosing a too strong control group, where it is unlikely that yoga will show better effects. Such a study would hence run the risk of having a negative outcome, which would for some of the researchers be a reason to choose a less strong control group where there is still an interesting comparison, but yoga is more likely to perform well. This practice, which is quite obviously in contrast with the *regime of good scientific practice*, was however not considered as appropriate by other researchers. Another approach that I have mentioned before when describing the *regime of good scientific practice*, and that was considered as even less appropriate by some researchers, was to compare yoga against a waitlist control group which does nothing during the intervention time. This was criticised by some researchers, while other described this as being quite feasible, especially when no previous studies exist, and it would thus be important to investigate whether yoga works at all for a certain condition. Hence, while all participants found ways to handle methodology creatively in order to account for the problem of not being able to compare yoga against a placebo, they differed in what they found appropriate approaches for doing so.

Overall, as I have described in this section, the researchers had quite ambivalent relations to the methodological choices suggested by the *EBM regime*, and they employed different practices of tinkering with methodology in order to mediate conflicts between different kinds of valuations, as well as to account for the problems linked to investigating yoga in an RCT. While these considerations relate to the actual practices of the researchers, I now turn to a more abstract aspect, namely what one could see as the consequences or the implications of their work.

7.5 Valorising yoga, valorising medicine?!

As I have described in my sensitising concepts section, the notion of valuation is twofold – it does not only mean to evaluate things, i.e. to assess their worth, but also to valorise them, hence to actively create or increase worth. These processes are the often inseparably intertwined, as captured in the single notion of valuation. However, despite their entanglement, it seems interesting and relevant to pay attention to these two differential facets, and to sometimes spell them out more distinctly. Much of what I have described so far is rather concerned with the aspect of evaluation – with the researchers' assessments of the worth of yoga and of different methods. However, all these valuations have simultaneously performative character, they participate in processes of meaning making and ordering. This is probably most evident when considering the consequences of medical yoga research for both yoga and medicine.

[54] „den Effekt kaputtmachen" (interview 1)

Here, it becomes apparent that the valuations that are enacted in this research also have a valorising character – increasing and creating worth for both yoga and medicine. Yet, there is again an ambivalence to this, since what some people see as a beneficial valorisation of yoga may in other instances become a peril, a threat to yoga as a valuable system of thought and practice that might potentially even lose worth through the changes that medical yoga research can bring along. In the following, I further spell out these ambivalences related to valorising and changing yoga. Moreover, I describe in how far not only yoga, but also medicine was in the interviews perceived as being changed and valorised through the medical yoga research.

7.5.1 Medical yoga research as promise and peril for yoga

That medical yoga research has on the one hand many benefits for yoga, but can in other respects also bring along some difficulties and problems, does not seem all to astonishing. Yet, I still was surprised about how extremely some of the researchers perceived and expressed this. One researcher noted seeing the medical research on yoga and the potential changes it brings along as the "greatest peril and greatest potential"[55] for yoga. While this ambivalence was present in nearly all of the interviews, most of the time, the benefits of the medical yoga research – its valorising character – seemed to predominate.

In this respect, it was seen as a major contribution of the medical research that it can, through delivering scientific evidence for the effects of yoga, contribute a lot to its standing in medicine as well as in society. This was seen as very beneficial by most of the researchers, and sometimes expressed as an explicit aim of their work:

> "I find it really important that such interventions as yoga and ayurveda or similar things, that these are not in a sense seen as unscientific, or as something with which people associate esotericism or something like that, but I wish, and I hope to contribute to that, that these methods are at some point as much taken for granted as any kind of pills." (Q41, interview 4)

In line with what I have described before, what was seen as essential to this growing acceptance of yoga in medicine was the conduction of well-designed RCTs, and hence to some extent a compliance with the rules set by the EBM framework. As one participant put it:

> "I think slowly the attitude is changing, and the studies also contribute to this, these larger studies which really did everything very accurately according to strictly defined criteria, this definitely contributes to the acceptance of yoga." (Q42, interview 5)

Hence, complying with the rules of EBM is here an important means with respect to the aim of giving yoga a better standing in medicine, and hence valorising it. Another important means in this is the explanation in biomedical terms. As I have described before, this is demanded by the *regime of*

[55] „größte Gefahr und größtes Potential" (interview 4)

biomedical knowledge and if medical yoga research can generate such biomedical explanations for how yoga works, this largely increases its worth within this system.

However, finding physiological explanations for how yoga works was not only seen as valorising yoga with regards to its acceptance in medicine, but also in relation to the *regime of medical ethics/benefiting patients*: Some of the researchers emphasised that when finding more or better physiological explanations for how yoga works, this can help to find out how yoga can best be employed as an intervention. In this sense, its worth as a medical intervention from which patients can benefit is increased, because it can be better adapted to patients or better employed in particular situations. Besides this, next to this instrumental character of finding medical explanations in order to valorise yoga, some of the researchers also seemed to consider medical explanations for yoga as valorising it in a more abstract sense. One researcher noted that one could "take advantage of medicine to make yoga more describable"[56] which seems to imply some sort of advantage that arises 'for yoga itself'. Beyond this, some of the researchers even seemed to regard it as a value in itself and as a "human need"[57] to be able to explain things and make them theoretically and cognitively graspable. However, this perspective on medical research as valorising yoga in a more abstract sense was not shared by all the researchers, and some of them seemed to mainly hold the 'instrumental view', seeing the medical yoga research and the resulting physiological explanations rather as a means to an end than as valuable in themselves. As one researcher put it, when being asked about why it was important to explain yoga in biomedical terms:

> "So the questions is – important for whom – for some people it is of course very important to be able to explain this very exactly, especially of course for those who are interested in a biomedical worldview, there it is of course important […] but yeah, to be honest, for me personally, I don't have to know what is happening there exactly with some immunological parameter." (Q43, interview 5)

This account thus reflects such a more instrumental perspective on explaining yoga in biomedical terms, without seeing such an explanation as valuable in itself or having an inherent desire to be able to explain yoga in medial terms.

As I have mentioned at the outset of this section, while finding physiological explanations for yoga and 'proving' it scientifically was on the one hand seen as increasing the worth of yoga as a medical intervention, the researchers also emphasised the ambivalence of this. Many participants noted that "yoga is in the West often curtailed to some extent"[58], meaning that many of its elements or dimensions are not considered. In a similar manner, also the processes of making yoga scientifically acceptable through its investigation in clinical trials often go along with leaving out many of the elements that yoga can comprise, and employing rather 'limited' versions of it. As I have described before, research that

[56] „sich die Medizin zunutze zu machen um Yoga beschreibbarer zu machen" (interview 4)
[57] „Bedürfnis des Menschen" (interview 5)
[58] „im Westen ist Yoga oft n stückweit verkürzt" (interview 2)

employs yoga *as a toolbox* and omits aspects such as spirituality and philosophy is better reconcilable with the *regimes of biomedical knowledge* and *EBM*, and hence helps to valorise yoga within these frameworks. Yet, if one values yoga *as a whole*, these developments rather seem to threaten its worth, because they potentially rob yoga of important aspects. This was what one researcher meant when describing the yoga research as the greatest promise, but simultaneously the "greatest peril"[59] for yoga. Along these lines, different participants emphasised that "yoga should keep its roots"[60] , and hence also its spiritual and philosophical elements.

With respect to quotes such as the above, related to "the roots" of yoga, it is important to note that the researchers often evoked a difference between a 'traditional' and a 'modern' version of yoga which are differently affected by the medical yoga research. Indeed, many of them emphasised that they did not think that 'traditional yoga' and its philosophical principles could and would be changed through the medical yoga research. As one researchers put it,

> "Yoga has such an old tradition and so many established structures – would these teachings really change only because someone did a study and a study result showed this and that – probably not." (Q44, interview 3)

Hence, while the researchers thought and to some extent also feared that yoga in its 'modern' manifestations would become too far removed from its origins and be reduced to only a relaxation technique or a kind of sports, they did not think that these origins themselves would be affected by the yoga research. It is only the 'modern' forms of yoga that are affected by the research, that become changed as well as valorised through medical research.

So far, I have considered how valuation practices in medical research change and valorise yoga. Yet of course, processes of change and valorisation can, at least in theory, happen in both directions between yoga and medicine, and I explicitly asked all of the participants what they thought about both of these directions of influence. Although the relation I have described until now, i.e. the effects that medical research has on yoga, played a much more prominent role in the interviews, also the other direction of change seems important to briefly consider here.

7.5.2 Valorising and changing medicine?

While the researchers had quite an ambivalent view on how yoga is changed in medical research, seeing this as both a promise and a peril, they seemed to have a more unambiguous perspective on how medicine is affected by this research. It seemed that all of them thought that the research has the potential to valorise medicine, even if only to a small extent. Yet, in these considerations, medicine, similar as yoga, seemed to occur in a multiplicity, where the researchers distinguished between *medicine as therapy* and *the underlying principles of medicine*. As one researcher put it:

[59] „größte Gefahr" (interview 4)
[60] "Yoga muss die Wurzel behalten" (interview 4)

> "What is now medicine – if you take a multi-layered perspective on this, then in some parts yoga has certainly already influenced the way of thought." (Q45, interview 3)

What is implicated in this quote is that the participant thought it was important to distinguish between different parts – or different realities – of medicine, some of which are more and others less influenced by the medical yoga research. All of the researchers seemed to agree that *medicine as therapy* can definitely benefit from the medical yoga research, since it basically enlarges the spectrum of medicine by another potential intervention that can be offered to patients. As one researcher described:

> "It [medicine as therapy] is enriched by everything where you can offer new methods, so if I show the efficacy of some method, then I open up possibilities of choice for therapists as well as for patients." (Q46, interview 2)

In addition to this facet of adding another therapeutic intervention to the repertoire of medicine, some of the participants also noted that medical yoga research can valorise medicine in the sense of changing its *approach to therapy*. This means that by showing the efficacy of yoga and giving it a better standing in medicine, also similar interventions might become more accepted in medicine, and doctors may, for example, more often prescribe behavioural therapies such as yoga instead of pharmaceuticals.

However, while the researchers agreed that *medicine as therapy* can be valorised through the yoga research, they differed in their perspectives on how *the underlying principles of medicine* could be changed and valorised in this process. To some extent, there was a consensus that this aspect of medicine was definitely harder to change than *medicine as therapy*, as described, for example, in the following quote:

> "Physiology, anatomy is for me not really medicine, but these are the underlying principles that medicine is based upon, and these can also be enriched to some extent, but this is a much more difficult path." (Q47, interview 2)

While this researcher described it as "more difficult" to change these parts of medicine, other participants completely denied the possibility of such a change or valorisation, noting that views such as "that a bacteria causing that someone has a sepsis – that does not change through yoga"[61]. Yet, what seemed to be an assumption in many of the interviews was that yoga might be a puzzle piece in a broader and maybe more subtle change of medicine. For example, some of the participants noted that psychophysiological connections were nowadays already much more understood and gaining attention in medicine than some years ago – something to which research on yoga and related practices such as meditation has already contributed, and which was seen as a positive valorisation of medicine.

Overall, the researchers thus somewhat differed with respect to the extent to which they saw a valorisation and change of medicine through their research as possible. Yet, they all regarded such a

[61] „dass ein Bakterium dafür da ist, dass jemand ne Sepsis hat - ändert sich durch Yoga nicht" (interview 3)

change as something unequivocally positive, seeing their research as a smaller or bigger yet certainly valuable contribution to biomedicine.

8. Discussion and conclusions

The first ideas for this thesis have largely been sparked by wondering about the many ostensible tensions that seem to be involved in medical yoga research, such as those between the spiritual and philosophical aspects of this ancient practice and the rather rigid approach of the RCT. As I have mentioned in the introduction, I had initially a somewhat critical perspective on the yoga research, but I set out to acquire a more nuanced picture of how researchers negotiate the encounter between yoga and biomedicine on a methodological and on an epistemic level, and to investigate the complex valuations that are enacted in these processes. Moreover, I was interested not only in these concrete valuations, but also in the broader structural, discursive, and epistemic context they are embedded in, how this influences the researchers' work and how they navigate within these frameworks. In the process of research, my view on the medical yoga research changed more and more, and I became increasingly aware of the many different kinds of valuations the researchers have to handle and of the creative and multifaceted work they are doing. Being situated at the border between biomedicine and CAM, and moreover working in the German context where research in their domain is institutionally not well supported, the researchers' work is certainly much more difficult than if they would decide to, for example, focus on a purely biomedical topic, or to investigate the effects of yoga in a non-medical context. Yet, because they choose to work at this intersection, their work involves manifold negotiation processes between various different values which seems in itself important to acknowledge.

In this concluding section, I more explicitly come back to the research questions I have posed in this thesis, thereby once more pointing out the work that the researchers do in bringing together yoga and biomedicine on the levels of knowledge and methods and in handling the contextual factors that influence their work practices. Furthermore, I consider my findings from a more abstract perspective, thinking about how to conceptualise the orderings of worth that are implicated in the medical yoga research, as well as how they relate to the multiplicity of yoga that I have observed in my findings. Finally, I address the question of where these considerations may lead, i.e. what the observations I have made in this thesis may mean for medical research in the context of diverse valuations and multiple realities.

8.1 Negotiating the encounter of yoga and biomedicine on the level of knowledge

The first sub-question I aimed to answer was concerned with how the researchers perceive the relation between the different knowledges of yoga and biomedicine, how they situate themselves within them, and how they bring them together in their research. For me, this question also entailed understanding what yoga is for the researchers in the first place – whether it would be a medical intervention as any other, or whether it would be 'more than that'.

As I have illustrated in the previous chapter, there is no unequivocal answer to this question. Yoga appears in biomedical research as a multiplicity, and hence also its relations to biomedicine are manifold. Yoga can and does take many different forms, ranging from a sportive intervention to an

encompassing ‘lifestyle modification’, and it may be said that in each of these, ‘traditional’ yogic knowledge and biomedical knowledge are implicated and of relevance to different degrees. As the researchers described, such different versions of yoga can be of value for various reasons: On the one hand, yoga *as a whole*, including many different elements, is a very valuable and encompassing lifestyle intervention that can help patients in a variety of ways. Yet, on the other hand, yoga is also valuable *as a toolbox* from which different aspects can be taken to adapt yoga to the particular condition of a patient, and it can also be beneficial to, for example, leave out the rather spiritual aspects to not deter people with this. Hence, the researchers employed different practices of *tinkering with yoga*, both on a theoretical and practical level, in order to adapt it to a particular context.

While these practices of tinkering with yoga were to some extent informed by considerations about, for example, what is best for patients, they seemed to be ultimately framed by the need to adapt yoga to the biomedical audience the researchers want to address. As the participants emphasised, even though they would value yoga *as a whole*, when wanting to be accepted in the biomedical community, especially the spiritual and philosophical elements of yoga should rather be left out or at least adjusted in a certain way. This signifies the strong dominance of the *regime of biomedical knowledge* to which I will come back later, demanding an explanation in medical terms if yoga should be accepted in this sphere. Through omitting some of its elements and framing it in physiological terms when talking to ‘hardcore medical professionals’, yoga can become accepted in the medical domain, which the yoga research has to a certain degree already achieved. Thus, while medical and yogic knowledge seem in many ways difficult to reconcile, the researchers do important work in trying to make it possible for yoga to go along with biomedicine through tinkering with these knowledges and leaving out different aspects in different contexts, while at the same time trying not to lose these elements entirely. Importantly, the researchers were themselves well aware of the ambivalences entailed here, on the one hand valorising yoga through allowing it to enter the medical domain, but on the other hand potentially curtailing it to some extent through omitting important elements.

Many patterns that surface here then seem to be very similar to what other scholars have found with respect to different forms of CAM and their encounter with biomedicine. In many of these cases, it is described that the ‘alternative’ form of knowledge needs to be subordinated to scientific biomedical knowledge and an explanation in biomedical terms is necessary for the acceptance of a certain practice – signifying (though other scholars have not employed this term) the dominance of the *regime of biomedical knowledge*. For example, Nina Degele (2005) has examined the great difficulties of homeopathy to be accepted in biomedicine, because its explanatory principles are in many ways entirely contradictory to those of biomedicine. In contrast to homeopathy, yoga, or at least some versions of it, can be well explained in biomedical terms, making its acceptance within this framework much easier. Despite this difference between the two cases, they nevertheless both highlight the crucial role of biomedical explanations for the acceptance of a CAM practice in biomedicine.

Another parallel between the case of yoga and what other scholars have described regarding different CAM forms is the necessity of theoretical and practical tinkering. For example, both Degele (2005) and Kim (2007) have illustrated the need to partially leave aside the underlying principles or understandings of CAM forms in biomedical research if they are to be accepted within this sphere. Also the CAM practices they have dealt with to some extent seem to become a toolbox from which different aspects can be taken depending on the particular context – exactly as it appears to be the case in the yoga research. In line with what Kim described with respect to Korean medicine, also the yoga researchers somewhat seemed to adopt a 'double standard' – creating particular versions of yoga that fit a certain context, and explaining and implementing it differently depending on whom they want to address.

However, an interesting difference between the case of yoga and similar ones seems to lie in the value that is ascribed to more or less authentic forms of a CAM practice. Anna Ning (2018) has with respect to the case of TCM and the multiple forms of knowledge and evidence that are implicated in its encounter with biomedicine, identified hierarchies between more or less 'authentic' forms of knowledge – yet, this seems to be different in the medical yoga research. In this case, there is rather an inherent ambivalence between valuing yoga *as a whole*, and hence also valuing its tradition, and valuing versions of it that are further removed from this and hence may be seen as less 'authentic'. As medical interventions, all these forms of knowledge and versions of yoga seem to have some right and value for different reasons. Thus, there appears to be as such no unequivocal hierarchy between these different versions of yoga, but it is only established through the *regime of biomedical knowledge* which demands to prioritise some versions over others.

Talking about different 'versions of yoga' already points to another important difference that I see between my own inquiry and other studies of CAM research and practice, such as those of Ning (2018), who is mostly concerned with the epistemic. As I have illustrated before, yoga is in the medical research not only explained differently, but it becomes different things in different contexts. In the case that I have investigated, there is thus not only epistemic disunity, i.e. different understandings of yoga, but also ontological disunity, or rather, multiplicity. This is very much in line with Annemarie Mol's considerations about the multiplicity of medicine which I have introduced at the outset of this thesis. Yet, interestingly, while in her book *The body multiple*, Mol (2003) is concerned with how a disease is enacted differently in different situations, it is here a therapeutic intervention that comes into being and changes through its enactment in practice. This illustrates that, as Judith Farquhar (2012, p. 168) put it, all the objects of medicine present themselves in a variety of manifestations, "being translated and transformed in and out of the local".

8.2 Negotiating the encounter of yoga and biomedicine on the methodological level

The second sub-question that I intended to answer in my research was concerned with how the researchers handle the encounter of yoga and biomedicine with respect to methods, i.e. how they practically approach the investigation of yoga in an RCT, and what their experiences and perspectives

on this are. Quite in line with what I had expected, the methodological considerations of the researchers were centrally dominated by the *regime of EBM*, its relevances and orderings. This means that all of them referred to the RCT as the gold-standard method by which medical interventions should be investigated, and they highlighted the necessity to conform to this standard if one wants to be recognised in the field of medical research. As I have equally outlined, the researchers on the one hand criticised this regime and the strict methodological hierarchies it brings along which pose difficulties for the investigation of yoga. Yet, on the other hand, they expressed valuations that went along with it, thus showing signs of critical distancing as well as of appreciation and internalisation.

In any case, whether being critical of it or not, the researchers described the need to adapt to the valuations suggested by the *EBM regime*, which means to investigate yoga in an RCT framework, despite the problems that brings along. Hence, while how they can negotiate the encounter between yoga and biomedicine on the level of knowledge is strongly framed by the *regime of biomedical knowledge*, negotiating this encounter on the level of methods is, in a comparable manner, structured by the *EBM regime*. In many regards, the researchers described to deal with this quite pragmatically, trying to 'play according to the rules' suggested by the EBM framework. This means making the RCT methodology and yoga fit as good as possible and to find solutions to the problems this entails, such as constructing placebo interventions to blind participants to the yoga intervention. Yet, as the participants emphasised, it is in many ways simply not possible for the yoga research to live up to all the standards of the 'classical' RCT, thus they also tried to find suitable alternatives to this approach, such as simply comparing yoga to different interventions instead of a placebo.

While this illustrates that researchers in many ways comply with the rules set by the EBM framework, they also described some practices that allow them to do justice to other valuations than those suggested by the *EBM regime*. For example, they combine qualitative and quantitative methods in their studies, thus to some extent bringing in values related to *methodological diversity*, without needing to break completely with the dominant valuations suggested by the *EBM regime*. Such practices of *tinkering with methodology* allow the researchers to focus on more subjective and qualitative outcomes in addition to the numerical ones demanded by the RCT, thus creating some leeway for evaluative principles related to *valuing a holistic approach to medicine*. Overall, the researchers thereby on the one hand do important work in trying to adapt to the valuations related to the *EBM regime* which is required for acceptance in the domain of medical research, yet on the other hand they also find some ways for bringing in different sets of worth.

Again, when considering this in relation to the literature, much of what other scholars have described before is reflected in my findings. As I have illustrated in the state of the art, especially the dominance of EBM and the need to conform to it has often been discussed before. To some extent, my investigations confirm this dominance, highlighting the importance of methodology, and especially of the RCT, in securing biomedical boundaries. As the researchers repeatedly mentioned, if you want to be accepted in medicine, you need to abide by the rules, and the rules are called RCTs. Hence, similar

to what Collen Derkatch (2016, p.69) has described, also in the yoga research the RCT seems to be a "surrogate metric of reasonableness". However, what seems to have been discussed to a lesser extent in the existing literature are partially ambivalent stances of researchers towards these methodological hierarchies. Indeed, far from feeling only constrained by it, the yoga researchers also pointed out the value of the RCT and its benefits over other methodologies, as least for some kinds of questions. Whether this points to a 'true' value or benefit of the RCT methodology, or rather to an internalisation of the evaluative principles suggested by the *EBM regime* remains open at this point. Yet, it is important to consider the ambivalent character that the RCT holds here – being a necessary passage point and hence to some extent constraining, but simultaneously being appreciated in some regards. In relation to this, my findings also highlight the agency of researchers in relation to the overall dominance of EBM. While this framework suggests certain rules, I have illustrated that the researchers are by no means only passively obeying to these rules, but that they do important work in creatively tinkering with methodology and partially adapting it to their particular aims.

However, at the same time my findings also illustrate the performative character of the RCT methodology, crucially shaping how medical research is and can be done (Timmermans & Berg, 2003). In the particular case of the yoga research, it defines what yoga can be in the first place, privileging some realities of yoga which fit better with this framework over others. For example, yoga can in this context rather be a confined and clearly circumscribed intervention, instead of a long-term, encompassing lifestyle practice. Similarly, aspects of yoga that are less easily measurable through standardised numerical methods are harder to investigate here and thus equally encouraged to be 'left out'. This illustrates that the investigation of yoga in RCTs essentially shapes how yoga as a medical intervention can look like and is therefore also likely to have consequences for how yoga is employed in medicine later on.

From a wider perspective, my findings thus illustrate that, as also remarked by Helgesson, Lee, & Lindén (2016), setting up a research design is a process that entails various different valuations. In the case of yoga research, these are valuations about which reality of yoga should become privileged, what kinds of outcomes are important to measure and by what means – for example, whether it is important to consider changes in physiological parameters or rather the subjective experience of the patients through qualitative methods. As I have described in the empirical chapter, these valuations are influenced by a diverse background in which many different regimes of valuation are implicated, which suggest partially contradicting evaluative principles and structure the researchers work to different degrees. In the following, I turn back to these regimes of valuation which crucially shape how the researchers (can) negotiate the encounter of yoga and medicine, and thereby to the third sub-question that I intended to answer in my thesis.

8.3 Regimes of valuation

In the empirical chapter, I have described five regimes of valuation that influence the work of the researchers I interviewed. I denoted these regimes that I reconstructed from my empirical material as *good scientific practice*, *medical ethics/benefiting patients*, *personal academic success*, *EBM*, and *biomedical knowledge*. Moreover, I also identified a *counter-discourse to the regime of biomedical knowledge*, in which the researchers distanced themselves from the dominant valuations of this regime but also expressed the appreciation of a *holistic approach to medicine*. In addition, also the theme of *valuing yoga* due to various reasons was quite present in the interviews, but I could, similar as with respect to the *counter-discourse to the regime of biomedical knowledge*, not link these valuations back to one clearly circumscribed regime of valuation. Overall, there was thus a great diversity of evaluative principles present in the researchers' accounts, yet they structured their work to different degrees. Especially the *regimes of EBM* and *biomedical knowledge* seemed to have a quite dominant role, often overlaying other considerations. In the following, I further discuss the character of the different regimes that I identified, in an attempt to explain the dominance of the *regimes of EBM* and *biomedical knowledge*.

8.3.1 Explaining the dominance of the regimes of EBM and biomedical knowledge

On the basis of my interviews, it seems that the evaluative principles suggested by the *regimes of EBM* and *biomedical knowledge* have an immense normative power and a non-compliance would be difficult to maintain for the researchers, even if they might disagree with the evaluative principles suggested by these regimes. As I have described before, the *EBM regime*, implicating a strong privileging of statistical and quantitative forms of evidence and methodology over qualitative ones, is institutionalised in an omnipresent discourse in contemporary medicine and medical research, and there are moreover entire institutions specifically devoted to the promotion of EBM, such as the *Cochrane Collaboration*. What is further important to note is that, while the *EBM regime* as such is specific to medicine and medical research, the emphasis on quantification, statistical thinking, and accountability it brings along, is not only related to medicine but may even be described as a dominant way of thought in contemporary societies (Porter, 1995). This could be seen as an important reinforcing factor to this regime – giving it more self-evidence and inevitability because the values related to it are equally present in many different domains.

The manifestations of this regime then became very obvious throughout the interviews. The researchers repeatedly emphasised that studies with a different design than that of the RCT are more difficult to publish and are often somewhat disregarded in the medical system. Hence, non-compliance with the *EBM regime* is of course possible in so far that nobody will prohibit or penalize a study that has a non-RCT design. Yet, as the researchers noted, for having any impact in the current medical system it is necessary to conduct RCTs, and it may also be more difficult to attain (public) funding for a rather

qualitative study. In such ways, the evaluative principles related to the *EBM regime* are indirectly enforced, and acting otherwise is in many regards disadvantageous and difficult for the researchers.

Especially the circumstance that when conducting studies with a non-RCT design, it is difficult to have an impact in the medical system seems to confirm that RCTs and EBM's "discourse on quantification" (Derkatch, 2016, p. 31) more broadly function as a sort of "protective work" in contemporary medicine. The researchers' emphasis on the necessary compliance with the *EBM regime* for acceptance in mainstream medicine highlights that EBM and its evidence hierarchy are not only of epistemic but also of political character, enacting medical boundaries and functioning as a sort of gate-keeper. Besides this function of EBM as a form of boundary work in response to what Porter (1995, preface) has described as "internal disciplinary weaknesses" in medicine, one also finds a second function of EBM and statistical thinking in my empirical material, related to outside regulatory demands. Different researchers, for example, noted the importance of generating evidence based on RCTs for the development of clinical practice guidelines which play a crucial role in the regulation and accountability of contemporary healthcare. As they emphasised, for such guidelines, evidence of any different kind is not of much use, since it will not be taken into consideration. This illustrates the dual function of the *EBM regime* as both a rather externally driven tool to guarantee accountability and to justify medical practice in light of an increasingly output- and efficiency-oriented healthcare sector, and as a sort of more internally driven boundary work, defining what counts as scientifically acceptable medical practice.

Besides these considerations with respect to its function, another aspect related to the *EBM regime* that seems relevant to discuss further is that the researchers often remarkably differed with respect to how critical they were of this regime of valuation. While all of them noted its strong impact, especially two more experienced researchers seemed to be mostly fine with this dominance, expressing that they were not too much constrained by it. In their accounts, evaluative principles that aligned with the *EBM regime* were more present than in those of the other researchers, reflected in, for example, denying that the RCT poses too many problems for their research, or highlighting the wish to make the yoga research more standardised and reproducible. They also noted that they did not find it too problematic to conduct also different kinds of studies – though at the same time stating that these might need to be done without much funding, or might not be publishable in very highly ranked journals. In contrast to that, while also the 'younger' and less experienced researchers noted some benefits of the RCT methodology and voiced other valuations in line with those of the *EBM regime*, they seemed to be generally more critical of this regime and to see it as a constraint. This divergence in the researchers' position towards the *EBM regime* seems quite interesting and not entirely explainable on the basis of my data. One hypothesis could be that the researchers become more and more socialised into this regime of valuation in the course of their career, and internalise the evaluative principles that go along with it. Another explanation that seems to hold especially with respect to the aspect of seeing it as less problematic to conduct also different kinds of studies within the *EBM regime*, might be that at a certain

point in the career, one can simply better afford to conduct studies which are not so highly regarded in the mainstream medical community – thus making the *EBM regime* appear as a less constraining force. Besides this influence of seniority, also other personal factors might explain why researchers are differently influenced by the values related to the *EBM regime* – something that I cannot conclude on the basis of my data and my rather small sample, but that would be interesting to consider in future investigations.

While the *EBM regime* was not perceived as equally constraining by all participants, that of *biomedical knowledge* was seen somewhat critical by all of them. As I have described before, the *regime of biomedical knowledge* as I reconstructed it from my data demands yoga to be explained in medical terms, yet more broadly it also goes along with a devaluation of CAM research and practices in the medical system and research landscape. This entails prejudices against research in this field as well as a lack of official support in terms of funding. Hence, while its scope is limited to the domain of medicine, its institutionalisation and normative impact are quite immense. Since the dominance of biomedical knowledge and the scepticism towards different forms of knowledge are inscribed in and enacted through the German research funding landscape, it inevitably affects the researchers' work. Other evaluative principles linked to the *regime of biomedical knowledge* such as the demand to explain yoga in biomedical terms and to rather leave out its spiritual and philosophical components may be less materially enforced, yet also here, a non-compliance of the researchers seems very difficult to maintain. Similar to the case of non-compliance with the norms set be the *EBM regime*, it will equally not be penalized if the researchers would promote a very spiritual and philosophical version of yoga and oppose against explaining it in biomedical terms. Yet, if they would do so, an acceptance of their research within the mainstream medical community would hardly be possible, which to some extent necessitates a compliance with the evaluative principles of the *regime of biomedical knowledge*, and explains the strong structuring influence of this regime.

An obvious question that arises from this is why this regime is so powerful and has such an immense normative impact. When aiming to explain this, it seems – similar as with respect to the *EBM regime* – important to consider the aspect of securing biomedical boundaries. While EBM may be seen as a form of boundary work that defines the methods that decide whether something can enter the biomedical sphere or not in a first instance, the *regime of biomedical knowledge* goes beyond this – as I have noted before, good evidence is often not enough, but an explanation in biomedical terms is required for a practice to be accepted here. Hence, this knowledge as such seems to have an even more dominant character than the methodologies that are legitimate to acquire it. As a consequence, anything that does not seem to fit with these understandings, that is incommensurable with a biomedical worldview and may challenge its epistemologies and ontologies, is treated with caution and scepticism. At this point, it is interesting to think again of what Yael Keshet (2010) described, arguing that research in the field of CAM more explicitly creates 'hybrids' between binaries that biomedicine tries to keep neatly separated. Though I would not like to entirely frame the *regime of biomedical knowledge* and its dominance in

these terms, I think that it is valuable and interesting to consider this line of thought: Yoga (in some versions) addresses "the different levels of the human being" and merges spiritual with physiological and psychological aspects. Thereby, it may be seen as bringing some disorder to the epistemologies and ontologies of biomedicine, where many of these aspects have no place or are at least rather kept apart. The *regime of biomedical knowledge* with its evaluative principles and their rather strong normative impact then seems to function as a form of boundary work that secures biomedicine from such practices and understandings that may mess with its orderings.

In relation to this, it is again interesting to consider the researchers' relation to this regime of valuation. When regarding its strong normative impact and the evident problems and constraints it poses to the researchers' work – often devaluing it to some extent – it becomes understandable that they were rather critical of the *regime of biomedical knowledge*. However, as I have highlighted in the empirical chapter, none of them was generally opposed to mainstream medicine or to an explanation of yoga in biomedical terms. Hence, they were not critical of biomedical knowledge as such, but of the strong enforcement of its boundaries through many of the evaluative principles suggested by the *regime of biomedical knowledge*. As I have mentioned before, some of the researchers explicitly demanded an opening up of biomedical knowledge to different understandings, and they criticised the strict separation between the spheres of CAM and biomedicine. Hence, if the *regime of biomedical knowledge* is regarded as a form of boundary work aiming to secure the sphere of biomedicine, the researchers may be seen as acting contrarily to that. Being informed by different kinds of values related to, for example, a *holistic approach to medicine,* and the related appreciation of yoga *as a whole,* they aim to open up exactly these boundaries, which was to some extent visible in the *counter-discourse to the regime of biomedical knowledge*. While this seems rather difficult to achieve, it is again important to acknowledge the work they are doing here, which was also by themselves sometimes portrayed as a small step towards a potential broader change of medicine.

Having described the strong dominance of the *regimes of EBM* and *biomedical knowledge,* it seems interesting to consider why the other regimes that were equally present in the researchers' accounts seemed to structure their work to a smaller extent. With respect to the *counter-discourse to the regime of biomedical knowledge,* and the evaluative principles related to *valuing yoga,* which I could not even identify as clearly circumscribed regimes of valuation, this seems rather easy to explain – they are more fragmented and lacking institutionalisation and normative power, hence being rather easily subordinated to more dominant considerations. While the *regimes of good scientific practice* and *medical ethics/benefiting patients* are more coherent and institutionalised, I suggest that some evaluative principles related to these regimes are more ambiguous, thus making it easier not to comply with them. To begin with, the *regime of good scientific practice* may with respect to its scope be described as the broadest of the five regimes of valuation I identified, yet it seemed at the same time to have the smallest influence on the researchers. While this regime is to a certain extent institutionalised, and every university or research institution probably has guidelines for good scientific practice, many evaluative

principles related to it rather seem to take the form of a general ethos with which researchers should comply. In this respect, some principles related to the *regime of good scientific practice* also allow for some interpretative flexibility: While some practices – such as plagiarism – may clearly be classified as bad scientific practice, there often seems to be some more leeway. This was especially visible with respect to the aspect of *being a disinterested researcher*, which was mentioned to be very important by all of the participants. Yet, some of them employed practices that others already dismissed as containing a certain bias, such as the use of a waitlist control group in which yoga is more likely to show good results. Hence, it seems that some of the principles suggested by the *regime of good scientific practice* contain a certain degree of interpretative flexibility, in contrast to the clear rules suggested by, for example, the *EBM regime*. Regarding such more ambiguous principles, non-compliance seems easier to maintain since there may be no direct negative consequences, in contrast to a non-compliance with evaluative principles suggested by the *regimes of EBM* and *biomedical knowledge.*

In a similar manner, also the *regime of medical ethics/benefiting patients* often seems to allow for some more leeway, potentially explaining why it was equally often dominated by the *regimes of EBM* and *biomedical knowledge*. In a broader sense, the *regime of medical ethics/benefiting patients* as I reconstructed it from my data demands to always act in the best interest of the patient. This can, for example, mean to treat patients ethically in clinical trials, but also to benefit patients in a wider sense through promoting a therapy that one considers as particularly beneficial, or to acknowledge the work that patients have put into a trial through publishing its results. Such considerations seemed to be of importance to all of the researchers and played a central role in their valuations, yet still, they were often dominated by those related to the *regimes of EBM* and *biomedical knowledge*. For example, even though the researchers may think that also the spiritual and philosophical components of yoga can benefit patients, they may rather leave these apart in order to make yoga acceptable in biomedicine at all. Again, while a non-compliance with many of the principles related to the *regime of medical ethics/benefiting patients* does not have any direct negative consequences for the researchers, acting in line with the *regimes of EBM* and *biomedical knowledge* seems to be essential to the acceptance of the researchers' work and to their aim of giving yoga a better standing in the biomedical sphere. This may, at least to some extent, explain why the researchers often need to place back considerations related to benefiting patients – which from a more idealistic perspective should be essential to medical research and practice – behind those related to EBM and biomedical knowledge.

8.3.2 The surprising unimportance of personal academic success

While the dominance of the *regimes of EBM* and *biomedical knowledge* was to a certain extent predictable based on what previous research has described, a very surprising and unexpected finding of my research was the relative unimportance of evaluative principles related to the *regime of personal academic success*. As I have described in the empirical chapter, considerations about publishing to promote one's academic career were present in the interviews, yet only to a very small extent. Other

expressions of such a regime of valuation, such as the importance of performing well in evaluations along research metrics, were completely absent in the interviews. Moreover, even in considerations with respect to publication, which may be seen a hallmark of academic success, the researchers primarily seemed to be influenced by the aim of promoting yoga as a therapy from which patients can benefit, rather than by a need to churn out as many publications as possible.

These observations are in quite a stark contrast to what other scholars have described. As outlined in the state of the art, many researchers have highlighted that in academia more broadly, and especially the life sciences, there is a strong dominance of values related to individual productivity and international competitiveness, where research metrics strongly shape academic enquiries and become obligatory passage points in ascribing worth to academic activities (e.g. Burrows, 2012; Fochler et al., 2016; Müller & de Rijcke, 2017). Based upon this, one could have expected that the yoga researchers are, at least to some extent, influenced by similar considerations, and that performance along research metrics is a relevant reference point for them when taking various decisions in their work. Certainly, the relative absence of such considerations from my interview data cannot conclusively indicate the non-importance of such issue for the researchers, especially since these aspects were not a major topic of my inquiry and hence did not have a central place in the interviews by design. Thus, it is important to consider my own role and the way that I approached my inquiry when explaining the absence of this topic from my data. However, at least the issue of publication and the researchers' motivations for publishing were explicitly addressed by me, and also in relation to this explicit question the researchers hardly mentioned considerations about individual productivity and the need to perform well in relation to certain research metrics. This may indicate that, also apart from my own influence, these issues are not of central relevance to the researchers.

When trying to explain the relative 'non-dominance' of the *regime of personal academic success*, it is important to consider the researchers' situation on the borders of CAM and biomedical research. This field of inquiry is certainly less popular than research in the 'hard' biomedical sciences, and hence also much less competitive and fast-paced. Therefore, productivity and competition may be less enforced here from the outside. Besides this, people who decide to work in the field of CAM and yoga research may also internally be less influenced by considerations about succeeding in the international competition. For most people working in this area it might be clear from the outset that yoga is not a very popular field of research where one will make a great international career. Researchers deciding to work in this field might rather be influenced by other values than those relating to personal academic success, for example by considerations related to benefiting patients and by the conviction of a certain kind of therapy which they want to promote. Thus, the relative absence of the *regime of personal academic success* from my interview data may be related to both structural and systemic as well as to rather personal and individual factors.

8.4 Orderings of worth in medical yoga research – between heterachy and hierarchy

What should have become clear in my empirical chapter as well as in the discussion of my findings so far is that medical yoga research is influenced by a variety of different value(s) – including considerations about good scientific practice, benefiting patients, promoting yoga *as a whole* or *as a toolbox*, wanting and needing to comply with certain methods and explanatory approaches to be accepted in biomedicine – all these aspects influence the researchers to different degrees and the tensions that arise between them need to be negotiated in one way or the other. In considering from a more abstract perspective how the various evaluative principles that are implicated here become ordered, I want to refer back to David Stark's (2009) notions of hierarchical and heterarchical orderings of worth. Stark suggests that while there are constellations with a clear dominance of some evaluative principles, in other situations different evaluative principles are ordered more horizontally and the tensions that exist between these become organised in some way, allowing them to exist next to each other.

In the medical yoga research, there seems to be an interesting complexity of both hierarchical and heterarchical ordering of worth. On the one hand, there is a clear dominance of the *regimes of EBM* and *biomedical knowledge*, and the evaluative principles that they bring along are often superordinate to different ones. While this may suggest a hierarchy of evaluative principles, I argue the that ordering of values in the medical yoga research is more complex than this. Even though other evaluative principles frequently have to be subordinated to the ones suggested by the two dominant regimes, such other principles still play an important role for the researchers and guide their practices in interesting ways. For example, the aim to benefit patients and the appreciation of a holistic approach to medicine and of methodological diversity motivate the researchers to creatively handle methodology and to combine quantitative with qualitative aspects in their studies. This allows for new insights which would not have been possible had they entirely subjected to the evaluative principles suggested by the *EBM regime* and 'only' conducted RCTs. Moreover, because they value yoga both *as a whole* and *as a toolbox* and think that it can and should benefit patients in both forms, they adapt their explanatory pattern to a particular context and audience. Hence, they do only partially subject to the demands of the *regime of biomedical knowledge* and do – at least where it is possible to do so – deviate from the norms that it suggests. While these are only two illustrations, I suggest that in the practices of tinkering with yoga theoretically and practically, and in tinkering with methodology, multiple examples of somewhat creative arrangements of different kinds of value(s) can be found, which allow the researchers to bring in different relevances despite the dominance of the *regimes of EBM* and *biomedical knowledge*. Yet, also in other respects the researchers employ strategies that allow them to handle tensions between different regimes of valuation and hence to maintain rather heterarchical constellations of worth. Another example would be the practice of discussing the limitations of one's study adequately if one has employed a waitlist control group where yoga is more likely to perform well in the comparison. This somewhat mediates the tensions between the *regime of good scientific practice* and *valuing yoga* –

thereby organising the dissonance and allowing these different kinds of evaluative principles to co-exist without one entirely dominating over the other.

Overall, the medical yoga research thus shows facets of both a heterarchical as well as of a hierarchical ordering of values. This observation is somewhat in contrast to previous investigations, where researchers have rather identified orderings of worth that more unequivocally fall into one of these categories (e.g. Fochler et al., 2016; Stark, 2009). Hence it seems that, in order to fully describe my findings, it is necessary to enlarge the currently existing terminology relating to different orderings of worth. In order to capture more complex constellations such as the one that seems to be present in the medical yoga research, it may be more helpful to think of heterarchical and hierarchical orderings of worth as the ends of a continuum rather than as two mutually exclusive categories. The case I investigated shows that constellations of worth cannot always be clearly captured with one of these terms, but that they may equally be located somewhere in the middle between the two poles, uniting facets of both of them.

Being situated somewhere in between a heterarchical and a hierarchical constellation of worth, the case of medical yoga research also shows some of the characteristics that other scholars have ascribed to both of these ways in which values can become ordered. On the one hand, the dominance of the *regimes of EBM* and *biomedical knowledge* constrains the researchers' actions in various respects and thus somewhat narrows the evaluative principles they can draw upon – something that, for example, Fochler et al. (2016) have already earlier described as a consequence of a hierarchical ordering of values. On the other hand, because the case of medical yoga research also shows features of a heterarchical constellation of worth, new possibilities are created that would not be existent if there was a strict hierarchical ordering of values. This reflects that, as David Stark has put it, heterarchical constellations of worth foster creative innovation and create "wealth by inviting more than one way of evaluating worth" (Stark, 2009, p. 27). In the case I investigated, the wider set of evaluative principles that the researchers draw upon prompts them to assemble methods, yoga, and theoretical explanations in creative ways that allow for new insights and for a new practice to enter the medical sphere to a certain extent.

Beyond this, another characteristic that Stark ascribes to heterarchical constellations of worth seems to be equally reflected in the medical yoga research, namely the possibility to open up spaces for reflection on institutionalised conventions. If we imagine a situation in which the yoga researchers were only influenced by the *regimes of EBM* and *biomedical knowledge*, there would hardly be space for action and for critical distancing towards there regimes. However, because they draw on a much broader set of evaluative principles, because they are also influenced by considerations about what is best for patients in their particular situation, and because they value a holistic approach to medicine and a diversity of methods, they reflect on the norms and conventions suggested by these dominant regimes. Thus, the heterarchical facet of the constellations of worth that are present in the researchers' work fosters many creative practices as well as a critical distancing towards dominant regimes of valuation which constrain their work.

Having said this, it seems in a last step also important to think more explicitly about how these hierarchical and heterarchical facets of orderings of worth in the medical yoga research relate to the multiplicity that is implicated here. In other words, how is ontology related to valuation, to different constellations of worth? As I suggest, the heterarchy of values that is present in the medical yoga research essentially fosters the multiplicity of yoga. Because the researchers are influenced by a variety of considerations relating to benefiting patients in different ways, giving yoga a better standing in the healthcare system, appreciating yoga as a holistic practice, etc., they enact or create various different versions of yoga, each of these being valuable in different respects. At the same time, the hierarchical facet that arises from the dominance of the *regimes of EBM* and *biomedical knowledge* to some extent limits this multiplicity, suggesting the prioritisation of some versions of yoga over others. In a scenario where the researchers' work would entirely be dominated by these regimes of valuation, certain versions of yoga would have no place anymore and its multiplicity would be reduced. Hence, through the variety of valuations that the researchers employ, they promote and sustain the multiplicity of yoga, which highlights the performative character of valuation practices and their role in shaping realities.

Yet, importantly, it seems that this relation is not only unilateral, but that multiplicity and a heterarchy of worth to some extent also co-produce each other. Indeed, already before the different valuations I have described become implicated, yoga is to some extent multiple, being a different thing when one goes to a fitness centre, to a yoga studio, or to an ashram, or whether looking at India or at the West. It is thus also this multiplicity that is there in the first place that entails many different kinds of valuations, contributing to a heterarchy of worth where different forms of yoga are valued for different reasons. As I have described before, this heterarchy of valuations then again fosters the multiplicity of yoga – showing the mutual entanglement of valuations and the creation of different realities.

8.5 Where to go from here – fostering multiplicity and diversity in medicine

In the process of writing this thesis, having already drawn many smaller and bigger conclusion, I came to ask myself what I actually take home from all this in a broader sense. What to do with everything I have described here, what can and does it mean for medical research and especially for the yoga research? As I have stated at the outset of this thesis, an important aim in investigating valuations in medical yoga research was to shed more light on some of the black-boxed normativities that structure medical research more broadly, thereby potentially opening up a space for discussion. Having illustrated the valuations and normativities that I identified in the yoga research, I now want to consider some implications of what I have described here.

To begin with, I suggest that my thesis has once more shown the importance of acknowledging medicine's multiplicity (Mol, 2003), and of allowing this multiplicity to be there. In the case of the yoga research, this means, first, to acknowledge that yoga is a multiplicity, that it is a different thing in different trials and contexts. In a next step, I suggest that it is crucial to ask about the consequences of enacting a particular version of yoga and not another one, about the "ontological politics" (Mol, 1999)

this entails: What are the implications of yoga being employed in a clinical study and accepted in medicine as 'only' a physical practice? Is this a 'good' or a 'bad', does it become curtailed or valorised here? In which version can and should yoga benefit medicine the most? As I have outlined in my empirical chapter, the researchers I interviewed had ambivalent positions with respect to these questions, often highlighting the 'goods' and the 'bads' of yoga coming both *as a whole* and *as a toolbox*, and the double-edged character of medical research in valorising and changing yoga. In line with the researchers, I equally do not want to universally judge about which form of yoga could benefit medicine the most. Instead of dismissing some versions of yoga as being inauthentic or incomplete on the one hand, or as being not reconcilable with biomedical understandings and methods on the other hand, I suggest that it is important to maintain the multiplicity of different versions of yoga, letting more or less comprehensive and authentic versions exist alongside each other and benefit medicine in different ways and contexts.

However, while I consider different realities of yoga as being valuable for different reasons, I nevertheless argue that it is important to ask why a certain reality of yoga is prioritised in a particular situation, and what valuations inform this. Is yoga in a specific clinical trial employed as a primarily physical practice because it is as such better compatible with biomedical knowledge, or because this is what is considered as best for patients? Is one of those possibilities 'better' than the other? While I do not think that one particular version of yoga is better than another one as such, I advocate a more normative position with respect to the reasons why a certain version of yoga is prioritised. From a rather idealistic perspective, the ultimate goal of medicine and medical research should be to act in the best interest of the patient – hence, from this point of view, considerations informed by the aim of benefiting patients and whether a more or less comprehensive or authentic form of yoga is best for them in a particular situation should be prioritised in the research. Certainly, such a scenario is rather unrealistic, since, as I have shown, medical research is situated within a multitude of regimes of valuation which all exist for certain reasons and which thus have a somewhat justified influence on the practices of researchers. However, I suggest that when decisions and valuations in research become too much dominated by certain methodological and epistemological frameworks and rules – as indicated by the strong presence of the *regimes of EBM* and *biomedical knowledge* – rather than by the aim of benefiting medicine and patients, this may be seen in a rather critical light. As I have illustrated, a strong hierarchy of methodological and epistemological approaches constrains medical research to some extent, dominating and potentially eliminating other evaluative principles which are of equal importance to medicine, and limiting the multiplicity in which an intervention can benefit patients. Meanwhile, more heterarchical constellations of worth in which different evaluative principles, and thus also various different ideas of what is 'best' in a particular situation coexist, can allow for creativity and innovative thought and practices.

In this light, I suggest that it is crucial to maintain and support a heterarchy of worth in medical research and the diversity of 'best' methodological and epistemological approaches that goes along with it. This does not mean that I advocate some sort of relativism, but rather that decisions about what is

‘best’ may be taken in a more situated and context-dependent, rather than universal manner. In this way, researchers may attain more freedom to experiment with different kinds of methods, and medicine may be able to profit from a wider range of insights and forms of evidence. Moreover, linking back to the postcolonial thoughts I have mentioned at the outset of this thesis and the importance of considering the value of various different knowledges, medicine may be able to benefit from paying more attention to practices and approaches that might not entirely fit with its current principles. Overall, I suggest that through enlarging its evaluative repertoire, thereby giving more room to a multiplicity of different versions of yoga and, more broadly, to a diversity of methodological and theoretical approaches, medicine may better do justice to the messy and complex realities we live in.

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Appendix

A. List of abbreviations and Sanskrit terms

Asanas – The physical postures that are practised in yoga

CAM – Complementary and alternative medicine

Chakras – Focal points in the human body where the subtle energy conduits (*nadis*, see below) come together

EBM – Evidence-based medicine

MBSR – Mindfulness based stress reduction

Nadis – Subtle energy conduits which are a part of the yogic conception of the human body

Pranayama – The breathing exercises that can be a part of yoga

RCT – Randomised controlled trial

STS – Science and Technology Studies

TCM – Traditional Chinese medicine

B. Original quotes

1. „[Es ist] vordergründig erstmal eine gymnastische Übung, die kombiniert wird durch einen meditativen bewussten Anteil, und die dann in einem erweiterten Verständnis auch den Lebensstil verändert und beeinflusst, und eigentlich ist, seine eigene Perspektive auf das was Leben ausmacht verändern könnte“ (interview 3)

2. „Wenn es einfach eine sportliche gymnastische Intervention ist spricht überhaupt nichts dagegen, dass auch ein Hardcore Schulmediziner das als supportive Therapie […], wenn man halt versucht andere Komponenten mit hineinzunehmen, nennen wir es mal die Spiritualität, dann kann es natürlich für bestimmte Bereiche der Schulmedizin schon etwas kompliziert oder problematisch“ (interview 3)

3. „Yoga ist extrem vielfältig und bietet extrem viele Möglichkeiten, und viele Studien gerade im Westen […], die machen dann nur bestimme Haltungen, aber Yoga kann auch zB nur Meditation sein, dass man gar keine Yogahaltungen macht, es kann auch nur Atmung sein und es kann auch durchaus, wenn man‘s ganz ganz streng wird, kann es auch nur Dienst am Nächsten oder Chanting oder ehm Krishna Verehrung sein - das kann alles theoretisch Yoga sein, und ehm meist ist es so wenn man Yoga ernst nimmt in der Erforschung dann, hat man irgendwie son Mittelding, das man zumindest Meditation und Atmung berücksichtig, das kann man dans aber auch wiederum anpassen an die Erkrankung, dass ich wenn ich mit Asthma Patienten arbeite mit Sicherheit mehr Atmung reinbringe als wenn ich mit Rückenschmerzpatienten arbeite, da steht dann vlt eher ein bisschen Arbeit an der Haltung im Vordergrund, und da bietet Yoga einfach extrem viel, was man auch in Studien berücksichtigen kann.“ (interview 2)

4. „Es dadurch einfach ein sehr viel weiteres Feld, was auch sehr viel mehr Missverständnisse zulässt. Halt eehm je nachdem wer jetzt über Yoga spricht, ob das Physiotherapeuten oder eehm eh Yogagurus sind meinen die wahrscheinlich unterschiedliche Dinge. Wenn ich über nen Blutdrucksenker spreche meinen die meisten das gleiche.“ (interview 2)

5. “Das heißt der Forscher hat das Design strategisch klug so gewählt, dass auf jeden Fall was Positives herauskommen muss - das ist eigentlich unseriös - das heißt die Erwartungsoffenheit ist dann gar nicht mehr“ (interview 3)

6. „Es ist meine Pflicht als Wissenschaftler neutral da raufzugucken, das heißt wenn ich ne Studie ausführe, dann muss ich einfach damit rechnen dass vielleicht das keine Wirksamkeit zeigt, und

dann hab ich auch die Pflicht dass so dazustellen, ja und da finde ich ehm ist es sehr schwierig ja gleichzeitig nen tiefes Wissen zu haben über eehm [yoga]“ (interview 4)

7. „Wenn man was publizieren will - negative Daten nimmt nicht so gerne irgendein Magazin, also wenn man ne Negativstudie hat, die Wahrscheinlichkeit dass die abgelehnt von nem Magazin wird ist sehr hoch, und das ist natürlich auch ein Entscheidungsfaktor“ (interview 1)

8. „Die allermeisten Menschen die mit Yoga anfangen sagen zumindest sie tun das weil sie den Eindruck haben es tut Ihnen gut, fördert die Lebensqualität, aber kann auch wirklich Krankheiten behandeln, und wenn etwas in dem, in der Hinsicht genutzt wird finde ich es halt auch spannend und auch in gewisser Weise ethisch verpflichtend zu gucken ob das auch stimmt. Ob das wirklich auch hilft und was auch zB Gefahren sein […] da finde ich muss man schon auch wissen ob, ob das was bringt, ob das schaden kann“ (interview 2)

9. „Ich find es ist schon ne ethische Verpflichtung als Wissenschaftler auf Sachen zu schauen wo Menschen ne Wirkung erwarten […] fürs Wissenschaftssystem, das man sich dem nicht verschließt, wie es ja die deutsche Forschungslandschaft und Forschungsförderungslandschaft immer noch sehr gerne tut“ (interview 2)

10. „Es soll auch durchaus dem Konsumenten, Patienten wie man immer ihn nennen möchte, dienen, also dass auch schon die Idee ist, dass halt da ne größere Bereitschaft ist das anzubieten in Kliniken, eventuell Übernahme durch die Krankenkassen“ (interview 2)

11. „Wenn ich das in einem Feld, Wald und Wiesen Journal veröffentliche was niemand kennt wird niemand den Artikel lesen, dann hätte ich die ganze Arbeit auch gar nicht machen brauchen, was dann ne Verschwendung ist von A Geldern und B natürlich auch unseriös gegenüber den Patienten die mitgemacht haben, die Ihre Zeit geopfert haben, Kraft und Leidenschaft geopfert haben – wenn‘s dann keiner merkt, warum haben sie das dann gemacht?“ (interview 3)

12. „Da haben wir geschaut wie kommen wir den Patienten entgegen. Wenn das in diesem Fall Frauen währen der Chemotherapie waren sollten sie möglichst wenig belastet werden, auch wenig Anstrengung haben, dementsprechend haben wir versucht eine milde Form des Yoga zu finden.“ (interview 3)

13. „Klar will ich auch irgendwie mit der Habil vorankommen, also ich hab natürlich auch Interesse da Publikationen zu generieren.“ (interview 5)

14. „Natürlich schau ich schon auch von Anfang an, ob man das gut publizieren kann […] und dann muss schon neben nem Gewinn für die Forschung und für die Patienten auch der persönliche Gewinn für die Abteilung für mich mit ner guten Publikation stehen.“ (interview 2)

15. „Das sind Mediziner und teilweise hardcore Mediziner und vielleicht auch Genetiker oder so, die haben davon keine Ahnung, die wissen nicht wie wichtig und welcher Schatz dahinter steckt, das interessiert die nicht. Da sind keine Zahlen drin und dann ist es schon für die per se uninteressant.“ (interview 1)

16. „Wenn ich aber ne Forschung mache von der ich möchte, dass die über das Yogafeld und über die Komplementärmedizin hinaus anerkannt wird bleibt mir gar nichts anderes übrig als RCTs zu machen, weil wenn ich bei ner Leitlinienentwicklung sage wir haben ne großartige Beobachtungstudie die irgendwie ne Wirksamkeit belegt, dann bin ich damit sofort raus, das heißt wenn ich wirklich möchte dass ich nen Impact im jetzigen Gesundheitssystem habe muss ich mich auch einfach den Regeln anpassen die herrschen.“ (interview 2)

17. „Und das finde ich in dem Punkt in Anführungsstrichen nicht fair, weil es geht halt nicht - was will ich verblinden, das funktioniert nicht. Also da wird im Grunde genommen ne bestimme Therapie in einen Rahmen gepresst die dafür nicht da ist.“ (interview 1)

18. „Die Studien sind ziemlich schlecht, und ich würd sagen unsere Forschungsgruppe hebt sich schon dadurch ab, dass wir methodologisch versuchen sehr sauber zu arbeiten.“ (interview 1)

19. „Wenn wir uns irgendwie hervortun wollen, müssen wir jetzt erstmal mit dem Strom mitschwimmen. Also ich kann ja nicht hingehen und sagen – mein Brezel ist toll, also die Form des Brezels ist toll, […] aber ich mach jetzt was ganz kreatives und mach ne Herzform, finden aber alle erstmal doof, und ich verkauf jetzt nur noch meine Herzform […] und mir kaufts aber keiner ab, das heißt ich muss vielleicht dann daneben nochmal den anderen Brezel legen und sagen - aber wir haben auch ne andere Form die ist auch ganz toll, probieren sie doch mal… das mal so als bildliches Beispiel.“ (interview 1)

20. „Selbst wenn man ne vernünftige Studie anbietet und zeigt das hat ne Wirkung, bei den richtigen Skeptikern kommt dann - ist mir ja egal, wie wirkt es dann, da kommen dann wieder der nächste Schritt wo man sich dann wieder rechtfertigen muss. […] Also es hat schon ne gewisse Rechtfertigungsfunktion dann halt auch in medizinischen Bildern zu argumentieren.“ (interview 1)

21. „Im Yoga ist halt dieser Angriffspunkt nicht da weil Yoga nachgewiesen physiologische Wirkungen hat, und wenn Yoga das nicht hätte hätten wir sehr sehr sehr viel größere Widerstände, selbst mit ner positiven Evidenz aus klinischen Studien.“ (interview 2)

22. „Ich glaub schon dass wir im Bereich der komplementärmedizinischen Forschung sowieso immer doppelt so gut sein müssen wir der Rest, weil wir immer dieses Vorschussmisstrauen haben, das ist ehm Qacksalberei was wir machen […], und da müssen wir immer erstmal gegen ankämpfen, und das ist immer wenn dann auch Wissenschaftler von außen dazukommen, ist immer so - jetzt sag ich euch erstmal wie Forschung geht, weil das wisst ihr ja nicht – also das ist ganz spannend finde ich […] dass da dieses Vorurteil ist wenn Leute die ein Drittel so viel veröffentlicht haben wie ich, in schlechteren Zeitschriften, mir erstmal erzählen wollen wie Forschung geht, weil bei mir Komplementärmedizin draufsteht.“ (interview 2)

23. „Wir sehen halt nur was abgelehnt wurde, und wir sehen aber auch was angenommen wird von anderen und wie leicht es Andere vielleicht haben im Gegensatz zu uns, und da muss man halt seine Schlüsse draus ziehen… also wenn man sieht eehm, andere bewerben, machen und kriegen jedes Jahr eine BMBF oder DFG Förderung oder zwei und wir versuchen es 10 Jahre lang und kriegen keine einzige, dann muss man halt die Schlussfolgerung ziehen.“ (interview 1)

24. „Wir wissen mittlerweile dass auch ne spirituelle Komponente nen sehr sehr guten Gesundheitsfaktor darstellen kann […] Spiritualität oder auch der Glauben - muss auch nicht immer ne spirituelle Komponente haben, also ein Glauben an etwas, ist einfach ein sehr sehr starker gesundheitsrelevanter Faktor.“ (interview 5)

25. „Ja Bewegung ist einfach gut für den Köper […] es ist aber genauso wichtig eben auch den Geist zur Ruhe zu bringen, ja, und genauso wichtig eben, mit der Atmung lässt sich unglaublich stark das Nervensystem beeinflussen, ja, das heißt ich denke es muss alles mit drin sein und ich denke am schönsten ist es eben wenn da noch dieser Aspekt der Philosophie des Yogas mit reinkommt, das bedeutet wie sehe ich eigentlich die Welt […] ich denk, ja, die Aspekte der Philosophie, Meditation der Atmung und eben der Asana - das ist das was eben wirklich dieses breite Wirkspektrum von Yoga auch ausmacht.“ (interview 4)

26. „Yoga hat eigentlich einen ziemlich integrativen ganzheitlichen Anspruch, ich hab darin nicht nur meine Verhaltensweisen die geändert werden, ich hab ne sportliche Komponente, mein Lebensstil wird verändert, ich hab ne reflexive Komponente mit dadrin, das heißt die verschiedenen Ebenen des Menschseins - die Physis, die Emotionalität, und auch die geistliche,

geistige Komponente die werden alle mit angesprochen, das finde ich natürlich sehr spannend, und es gibt gar nicht so viele Interventionen die genau das machen.“ (interview 3)

27. „Es ist eigentlich fast das einzige Verfahren das fast alle Empfehlungen erfüllen kann die generell für einen gesundheitsförderlichen Lebensstil gegeben werden - also das gesagt wird man muss körperlich aktiv sein, das Stressmanagement muss berücksichtigt werden, Ernährung sollte dabei sein - es gibt amerikanische Studien die zeigen, dass ne gesunde Spiritualität extrem lebensfördernd ist […] da bietet Yoga ne Blaupause um wirklich eigentlich eine ideale Lebensstilmodifikation für sehr viele Erkrankungen zu bieten.“ (interview 2)

28. „In der Vielschichtigkeit der Veränderungsmöglichkeiten des Yoga hab ich so viele der Wirkprozesse die gleichzeitig laufen, da eindeutig erklären zu können wie Yoga nun wirklich funktioniert wäre nur sehr schwer möglich.“ (interview 3)

29. „Das kann Einige abschrecken finde ich, also gerade diese Philosophie, das Chanten, ich glaube da muss man für bereit sein, und ich glaube wenn jemand ne Aversion hat, dann kann das echt ne abschreckende Wirkung haben […]. Wenn wir das hier irgendwie anbieten würden, vor allem im […] was ja auch sehr sekulär geprägt ist, da würde kaum noch jemand kommen, die würden sagen - hier, machen wir nicht, […] in Deutschland ist man direkt in der Eso-Schiene und da muss man bisschen vorsichtig sein.“ (interview 1)

30. „Und wir versuchen dann aus allen Komponenten des Yoga - Bewegung, also Asanas, Atemtechnik und Entspannung was anzubieten wo wir meinen das hilft den Erkrankten in ihrer Verfassung.“ (interview 1)

31. „Dann man das aber auch wiederum anpassen an die Erkrankung, dass ich wenn ich mit Asthma Patienten arbeite mit Sicherheit mehr Atmung reinbringe als wenn ich mit Rückenschmerzpatienten arbeite, da steht dann vielleicht eher ein bisschen Arbeit an der Haltung im Vordergrund.“ (interview 2)

32. „Wenn man den Medizinern erklärt, ich dehne und strecke mich im Yoga in den Asanas, ich mach Faszienarbeit dann - super - dann verstehen sie es plötzlich, dass aber dann noch‘n anderer Aspekt dazukommt, der meiner Meinung nach auch sehr wichtig ist, wenn ich zum Beispiel Probleme mit dem Rücken habe und ich geh in die Dehnung, ist halt auch dieses – in sich reinatmen, in sich reinfühlen und vielleicht auch einfach mal akzeptieren dass da ein Schmerz jetzt ist – das verstehen sie wiederrum nicht.“ (interview 1)

33. „Um jetzt ne Wirkung von Yoga auf Schmerzen oder auf metabolische Parameter zu erklären brauch ich keine philosophischen Aspekte die der Schulmedizin wiedersprechen. […] und darum ist da finde ich wenn man Yoga entsprechend vertritt relativ wenig Reibungspunkte was was eigentlich das zugrundeliegende angeht, Man kann sehr viel wirklich physiologisch erklären, und wenn ich Yoga nicht medizinisch einsetze muss ichs vielleicht auch nicht physiologisch erklären.“ (interview 2)

34. „Im Yoga gibt‘s tatsächlich auch was das ging auch in Richtung Sham aber letztendlich war das im Endeffekt ne Yogaintervention die nur nicht so hieß, das heißt es gibt noch keinen Ansatz wo man sagt wir haben ein Placebo, dass die Patienten glauben dass das was ist was wirkt was aber nicht wirklich wirkt. Und das glaub ich aber nicht, dass wir das jemals haben werden, das muss ich ganz ehrlich sagen.“ (interview 2)

35. „Wir haben wir ne Studie gemacht zu chronischen Nackenschmerzen, wo wir zeigen konnten Yoga verringert chronische Nackenschmerzen, verringert die funktionellen Einschränkungen, aber haben noch ne qualitative Begleitstudie gemacht, die dann auf die Idee gebracht hat, dass Yoga das wahrscheinlich gar nicht so sehr tut weil ich jeden Tag 10 min Yogahaltungen mache, sondern weil sich die Körperwahrnehmung verändert, und es dann die Patienten gesagt haben, wenn ich irgendwo im Alltag bin bemerk ich dass meine Körperhaltung ungesund ist, und da wären wir durch den RCT nie drauf gekommen, weil wir diese Fragestellung nicht haben.“ (interview 2)

36. „Es ist genauso gut möglich pre-post einarmige Studien, man kann genauso gut qualitative Interviews führen, da spricht erstmal nichts gegen eine Methode. Ich würd eher andersrum die Frage stellen – was will ich eigentlich wissen und mit welcher Methode will ich das beantworten […]. Wenn ich einfach auf Effektivität jetzt messen möchte und definierte Zielparameter habe, die ich auch schon vorher gut kenne […] dann kann ich sowas natürlich wesentlich besser steuern und auch designen, aber wenn ich halt neue Fragestellungen habe, […] da komm ich am Besten natürlich mit qualitativen Interviews weiter, es sei denn ich hab so viele Vorurteile, oder nennen wir‘s mal Vorerfahrungen, dass ich schon Fragebögen konstruieren kann die genau diese Dimension drin haben. […] Die Methodenvielfalt sollte man immer auch nutzen für kluge Fragestellungen.“ (interview 3)

37. “Wenn man sich Sackett selber anguckt ist da keine Wertung drin, und so sollte es ja auch sein, es kommt drauf an was man wissen will.“ (interview 1)

38. „Gut finde ich auf jeden Fall mixed methods designs wo man halt nicht nur diese Fragebögen Erhebung macht, das subjektive was auch total wichtig ist, auch die anderen Aspekte mit zu berücksichtigen, die qualitative Seite, das find ich super wichtig.“ (interview 5)

39. „Wir haben jetzt gerade ne Yogastudie im […] veröffentlicht zu arterieller Hypertonie, und da war natürlich der Hauptoutcome der Blutdruck, und da haben wir dann zusätzlich noch weitere Parameter wie Lebensqualität abgefragt.“ (interview 2)

40. „Also bei der Studie die wir gerade planen, Yoga gegenüber MBSR haben wir einfach den Patienten im Vorfeld nur gesagt, sie nehmen an einem Entspannungskurs teil und, Entspannungskurs A hat nen höheren Anteil an Bewegung, Entspannungskurs B hat nen höheren Anteil an Entspannung.“ (interview 1)

41. „Mir ist es einfach wichtig dass eben diese Anwendungen wie Yoga und Ayurveda und ähnliches, dass die nicht mehr in dem Sinne als unwissenschaftlich gelten, oder als etwas womit Leute Esoterik verbinden oder ähnliches, sondern ich wünsch mir, und dazu hoff ich natürlich damit einfach nen Beitrag zu leisten, dass diese Methoden irgendwann genauso selbstverständlich sind wie jegliche andere Pillen.“ (interview 4)

42. „Ich glaub so langsam verändert sich das auch Bewusstsein, und da tragen auch die Studien zu bei, diese größeren Studien die auch einfach nach ganz klar hart definierten Kriterien alles sauber gemacht haben, das trägt auf jeden Fall dazu bei dass Yoga mehr anerkannt wird.“ (interview 5)

43. „Ja ist die Frage was halt wichtig ist für wen – für manche ist es natürlich sehr wichtig das genau erklären zu können, vor allem natürlich die auch so am biomedizinsichen Weltbild interessiert sind, da ist es natürlich wichtig [...] also ja, ehrlich gesagt so für mich persönlich, ich muss da nicht genau wissen was da abgeht an irgendwelchen immunologischen.“ (interview 5)

44. „Yoga hat so ne alte Tradition und so viele bewährte Strukturen - würden sich tatsächlich die Lehren verändern nur weil jemand eine Studie gemacht hat und ein Studienergebnis dieses und jenes gezeigt hat - vermutlich nicht.“ (interview 3)

45. „Was ist jetzt die Medizin - wenn man sich vielschichtig anschaut, in bestimmen Teilen hat das Yoga sicherlich schon das Denken beeinflusst.” (interview 3)

46. „Die wird ja durch alles bereichert wo man Methoden anbieten kann, also wenn ich ne Wirksamkeit einer Methode zeige, dann eröffne ich dann ja Wahlmöglichkeiten sowohl für Therapeuten als auch für Patienten.“ (interview 2)

47. „Physiologie, Anatomie ist für mich in dem Sinne nicht die Schulmedizin sondern das sind ja mehr die Grundlagen auf denen die Schulmedizin aufbaut, und die kann man durchaus auch ein stückweit bereichern, das ist allerdings ein deutlich schwierigerer Weg.“ (interview 2)

C. Example interview guideline

Generelle Einführung:

- Überblick über Interview
- Können Sie mir zunächst erzählen wie es dazu kam, dass Sie zu Yoga forschen?
    - Wieso sind Sie an Yoga interessiert? Was war Ihr erster Kontakt mit dem Thema?
- Wieso halten Sie es für wichtig, Yoga aus einer medizinischen Perspektive zu erforschen? Was ist das Ziel Ihrer Forschung (auch ganz konkret – Interventionen oder generelle ‚Bestätigung' von Yoga)? Was ist Ihre Motivation dahinter, diese Art von Forschung zu machen? Wer kann Ihrer Meinung nach von der Forschung profitieren?

Methodologische Aspekte der Forschung:

- Um zunächst auf die methodologischen Aspekte Ihrer Arbeit zu sprechen zu kommen – Sie haben ja bereits selber zwei RCTs zu Yoga durchgeführt – wieso haben Sie und Ihre Kolleg*innen sich für diese Methodologie entschieden?
    - Was sehen Sie als die Vorteile der RCT Methodologie gegenüber anderen Studiendesigns?
    - Könnten andere Methoden andere Einsichten in die Wirksamkeit oder Wirkweise von Yoga geben, die das RCT nicht geben kann? Können Sie dies genauer erklären? Wenn ja, wieso haben Sie sich dennoch für das RCT Design entschieden?
    - Was für methodologische Schwierigkeiten begegnen Ihnen beim Durchführen von RCTs über Yoga? Was halten Sie für die größten Limitationen von RCTs über Yoga?
    - Lässt sich Yoga Ihrer Meinung nach in diesem Rahmen zufriedenstellend beforschen?
- Ich habe jetzt einige spezifischere Fragen zu den vielen Entscheidungen im Design des Studienprotokolls:
- Wie entscheiden Sie über eine bestimmte Zusammensetzung des Samples?
- Was für Faktoren bedenken Sie bei der Wahl einer Kontrollgruppe für Ihre Studien?
    - Inwiefern denken Sie, dass unspezifische Effekte der Intervention bei Yoga eine Rolle spielen? Was unterscheidet Yoga trotzdem von ähnlichen Interventionen?
- Wie entscheiden Sie, welche Outcomes gemessen werden sollen? (Wieso messen Sie eher keine klinischen/physiologischen sondern eher psychologische Parameter?)
- Wie haben Sie sich für einen bestimmen Yoga-stil entschieden? Was bedeutet ‚traditionelles Hatha Yoga' für Sie? Wieso haben Sie sich hierfür entschieden? Wieso haben Sie sich für die Yoga Vidya Serie entschieden?
- Sie schreiben, dass die Yogastunden von 'zertifizierten Yoga Lehrern' unterrichtet werden – in einer Studie verweisen sie explizit auf die Yoga Alliance. Was ist das für eine Zertifizierung und wieso halten Sie diese für gut?

- Wie haben Sie sich für die Länge, Häufigkeit, und insgesamte Zahl der Yoga Sitzungen entschieden?
    - Inwiefern war diese Entscheidung auch von äußeren Einschränkungen beeinflusst? Wenn Sie keine Einschränkungen in Puncto Zeit und Ressourcen gehabt hätten – hätten Sie die Studie dann anders designt?
- Welche ‚Elemente' des Yoga halten Sie für wichtig, in eine klinische Studie miteinzubeziehen (Wieso haben sie in einer Studie auch Yoga-Theorie/Philosophie miteingezogen?)
- Noch einmal auf das Studiendesign als Ganzes bezogen - welche Faktoren beeinflussen Ihre Entscheidungen in der Entwicklung des Studienprotokolls?
    - Welche institutionellen Faktoren beeinflussen dies? Gibt es institutionelle ethische oder praktische Richtlinien, die das Studiendesign beeinflussen? Ist die Zuteilung von Ressourcen für die Forschung abhängig davon, wie die Studie designt ist?
    - Welchen Einfluss hat das Thema Publikation darauf, wie sie die Studie designen? Lassen sich manche Arten von Studien besser publizieren als andere? Macht es einen Unterschied dafür wie Sie die Studie designen, wo Sie publizieren möchten?
    - Wen möchten Sie mit Ihrer Forschung erreichen? Welche Rolle spielt für Sie das Thema Anerkennung in der medizinischen Community?
    - Welche Rolle spielt Anerkennung von Yoga im breiteres Gesundheitssystem?
    - Wie sehen Sie Ihre Herangehensweise im Vergleich zu der von anderen Forschungsgruppen, die international in dem Bereich tätig sind?

Die Begegnung von Yoga und Biomedizin auf der Wissensebene:

- Was ist Yoga für Sie?
- Wissen Sie viel über den Hintergrund/die Geschichte von Yoga? Woher stammt dieses Wissen? Haben Sie persönliche Erfahrungen mit Yoga gemacht?
- Wie wählen Sie eine passende Darstellungsform von Yoga in Ihren Publikationen?
- Wie sehen Sie Yoga im Vergleich zu „Westlicher Medizin"? Gibt es hier grundlegende Unterschiede? Inwiefern sehen Sie Yoga und Westliche Medizin als vereinbar an? Stellt dies manchmal ein Problem oder eine Schwierigkeit dar in Ihrer Arbeit? Wenn ja - Wie gehen Sie mit diesen Problemen um?
- Inwiefern halten Sie es für wichtig, das Wissen auf dem Yoga basiert zu bewahren?
- Wieso ist es wichtig, Yoga in klinischen Studien auszuwerten?
- Halten Sie es für wichtig, dass man die Wirkmechanismen von Yoga medizinisch erklären kann?
- Inwiefern kann medizinisches Wissen bereichert werden durch Wissen über Yoga?
- Wie können schulmedizinisches Wissen und Anschauungsweisen durch Studien über Yoga verändert werden?

- Wie könnte sich Yoga durch medizinische Forschung verändern?
- Was kann Yoga durch die medizinische Beforschung gewinnen?

Zum Abschluss:

- Können Sie mir zum Abschluss eine übergeordnete Einschätzung der medizinischen Yoga-Forschung geben? Wo sehen Sie das Potential dieser Forschung?
- Gibt es etwas über das wir noch nicht gesprochen haben, das Ihnen zum Abschluss noch wichtig ist?

D. English Abstract

In recent years, medical research on yoga is increasing rapidly. Here, yoga, which is originally not a medical intervention but a philosophical and spiritual practice, and nowadays a popular form of sports and relaxation, is brought together with modern biomedicine, its knowledge and methods. In my thesis, I was particularly interested in the conduction of randomised controlled trials (RCTs) on yoga, since this method features as the 'gold-standard' in current evidence-based medicine (EBM), but also seems to bring along particular problems for the investigation of yoga. I was explicitly interested in investigating the presumed tensions that seem to arise when aiming to investigate yoga in RCTs and explaining it in biomedical terms, and how these are negotiated by researchers. A fundamental assumption of my thesis was that all acts of research and especially processes of setting up a research design involve different acts of valuation. In biomedical research on yoga, various different kinds of values seem to be entangled, relating, for example, to valuing a traditional knowledge or practice in itself, valuing a 'holistic' approach to medicine, wanting to benefit patients through establishing a new form of therapy, wanting to be accepted in the mainstream medical system, etc. In my research, I aimed to identify the situated valuations that researchers perform in negotiating the encounter between yoga and biomedicine methodologically as well as theoretically. Beyond this, I was also interested in reconstructing how these concrete valuations are related to broader institutional, structural, and discursive regimes of valuation that exert a certain normative power on the researchers. Theoretically, my thesis thus brings together the investigation of research in the fields of biomedicine and complementary and alternative medicine (CAM) from the perspective of Science and Technology Studies with an approach inspired by the field of valuation studies. Methodologically, I approached my research questions through qualitative interviews with five researchers conducting RCTs on yoga, which were informed by an exploratory document analysis.

In my thesis, I show that yoga manifests in medical research as a multiplicity, taking different forms in different trials, as well as with respect to different local and discursive contexts. I reconstruct five regimes of valuation influencing the researchers' work, related to *good scientific practice*, *medical ethics/benefiting patients*, *personal academic success*, *EBM*, and *biomedical knowledge*, where especially the two latter regimes seem to strongly structure the researchers' work practices and decisions. Within this contextual framework, different versions of yoga are linked to ambivalent and partially contradicting valuations, with both more and less comprehensive versions of yoga being appreciated for different reasons. Moreover, I identify practices of tinkering with yoga, both on a practical and on a theoretical level, where yoga itself as well as its explanations are adapted to different contexts. Furthermore, the researchers' valuations of methods turned out to be equally ambivalent, appreciating the RCT for various reasons, but also valuing methodological diversity. Hence, they tinker with methodology in different ways, thereby partially reconciling such ambivalent valuations. Last, also the outcomes of the researchers' work seem to be of a double-edged nature. While the yoga research was by the participants unequivocally perceived as a positive contribution to medicine, its consequences

for yoga were seen as both a promise and a peril – valorising it through raising its acceptance in the medical system, but potentially also threatening yoga through altering it and detaching it from its roots.

Overall, my research shows that the medical yoga research is strongly structured by the methodological framework of EBM, as well as by the understandings of biomedical knowledge. Yet, it simultaneously highlights the multiplicity of values that exists in medical research, and the innovative potential that is inherent to heterarchical constellations of worth, were different valuations exist alongside each other. My thesis thus to some extent problematizes crude hierarchical orderings of worth, of methods, and of knowledge in medical research, and emphasises the benefits that seem to arise from giving room to more complex valuations.

D. German Abstract

Im Verlauf der letzten Jahre hat medizinische Yoga-Forschung mehr und mehr an Bedeutung gewonnen. In klinischen Studien wird Yoga, welches ursprünglich keine medizinische Intervention, sondern eine philosophische und spirituelle Praxis, und heutzutage ein zunehmend populärer Sport ist, mit biomedizinischem Wissen und Methoden zusammengebracht. In meiner Arbeit beschäftige ich mich im Speziellen mit randomisierten kontrollierten Studien (RCTs) zu Yoga, da diese Methodologie als der Gold-Standard in heutiger evidenzbasierter Medizin (EBM) gilt, aber gleichzeitig einige Probleme für die Erforschung von Yoga mit sich bringt. Mein Ziel war es, diese Spannungen zu untersuchen, und wie diese von Forscher*innen verhandelt werden. Eine grundlegende Annahme meiner Arbeit war zudem, dass wissenschaftliche Praxis und insbesondere das Erstellen eines Studiendesigns eine Reihe von Wertungen enthält. In medizinischer Yoga-Forschung scheinen eine Vielzahl von Werten miteinander verwoben zu sein, angefangen von der Wertschätzung eines traditionellen Wissens, bzw. einer Praktik als solcher, über die Wertschätzung eines ganzheitlichen Ansatzes in der Medizin, hin zu dem Wunsch, Patienten durch die Etablierung einer neuen Therapieform zu helfen, sowie im (schul-)medizinischen System anerkannt zu werden. Mein Ziel war es, die situierten Wertungen zu untersuchen, die Forscher*innen vornehmen, wenn sie die Begegnung zwischen Yoga und Biomedizin methodologisch sowie theoretisch verhandeln. Darüber hinaus war mein Ziel, zu rekonstruieren wie diese konkreten Wertungen von breiteren institutionellen, strukturellen und diskursiven Werteregimen, die eine gewisse normative Macht auf die Wissenschaftler*innen ausüben, beeinflusst werden. In theoretischer Hinsicht bringt meine Arbeit somit die Beschäftigung mit Forschung im bio- und komplementärmedizinischen Bereich aus der Perspektive der *Science and Technology Studies* mit einem *Valuation Studies* inspirierten Ansatz zusammen. Methodisch beantworte ich meine Fragestellungen mittels qualitativer Interviews mit Forscher*innen die RCTs zu Yoga durchführen, welche auf einer explorativen Dokumentenanalyse aufbauen.

In meiner Arbeit zeige ich, dass Yoga in der medizinischen Forschung in einer Vielheit auftritt, und sowohl in verschiedenen Studien, als auch in verschiedenen lokalen und diskursiven Kontexten verschiedene Realitäten annimmt. Ich rekonstruiere des Weiteren fünf Werteregime die die Forscher*innen beeinflussen. Diese beziehen sich auf gute wissenschaftliche Praxis, das Handeln zugunsten von Patient*innen, persönlichen akademischen Erfolg, EBM, und biomedizinisches Wissen, wobei insbesondere die letztgenannten einen starken Einfluss auf die Forscher*innen, ihre Praktiken und Entscheidungen zu haben scheinen. In diesem Kontext sind verschiedene Versionen von Yoga mit ambivalenten und teilweise widersprüchlichen Wertungen verknüpft, und mehr oder weniger umfassende Formen von Yoga werden aus unterschiedlichen Gründen wertgeschätzt. Darüber hinaus identifiziere ich Praktiken des theoretischen und praktischen ‘tinkerns’ mit Yoga, wobei sowohl Yoga selbst als auch entsprechende Erklärungsmuster an verschiedene Kontexte angepasst werden. Ebenso beschreibe ich auch die methodischen Wertungen der Forscher*innen als ambivalent, einerseits den Wert des RCTs hervorhebend, andererseits eine methodische Vielfalt wertschätzend. Dies resultiert in

verschiedenen Adaptionen von Methodologie, die es erlauben solch unterschiedliche Wertungen teilweise zu vereinen. Zuletzt scheinen auch die Auswirkungen der Yoga-Forschung von ambivalenter Natur zu sein. Während die Forschung von den befragten Wissenschaftler*innen einstimmig als ein positiver Beitrag zur Medizin gesehen wurde, erschienen die Auswirkungen auf Yoga sowohl als Potential als auch als Gefahr – einerseits als Aufwertung von Yoga durch erhöhte Anerkennung im medizinischen System, andererseits als nachteilige Veränderung von Yoga, einhergehend mit einer Art „Verkürzung".

Meine Arbeit zeigt somit, dass medizinische Yoga-Forschung stark von den methodologischen Hierarchien der EBM, sowie von der Notwendigkeit, den Anforderungen biomedizinischen Wissens zu genügen, dominiert wird. Gleichzeitig stellt sie jedoch die Vielfältigkeit von Werten in der medizinischen Forschung heraus, sowie das innovative Potential das heterarchischen Wertekonstellationen in denen verschiedene Wertungen nebeneinander existieren können. Damit problematisiert meine Arbeit zu einem gewissen Grad simple hierarchische Anordnungen von Werten, Methoden und Wissen in medizinischer Forschung, und sie unterstreicht die Vorteile die entstehen können wenn komplexeren Wertungen mehr Raum gegeben wird.