Visual Expressions of Embodied Risk

Body Maps as a Means of Reflecting and Understanding the Meaning of Health Risk in Research and Teaching

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Abstract With increasing opportunities of early detection of risk in biomedicine, the communication of statistical likelihood of disease has gained importance. Risk communication is committed to the support of risk literacy, assumed to be a prerequisite for making informed decisions to minimise one's risk. Graphical representations play a crucial role in this context; among others, stylised human silhouettes are employed to visualise likelihoods, for example to indicate the number of persons out of one hundred who will or will not get the disease. While this may support risk literacy in terms of more easily 'grasping' abstract statistics, still a risk likelihood is difficult to comprehend in terms of its meaning for one's individual life. So what if this principle is inverted and the stylised human silhouette is used instead to visualise the individual and collective meaning attributed to a certain – actual or envisioned – disease risk? In the context of a study on health literacy among persons with an increased disease risk, we employed body maps in research and in teaching. In the research project, we conducted narrative interviews with 20 persons who had been informed about having an increased risk for familial breast and ovarian cancer or psychosis. Towards the end of each interview, we invited our informants to do a body mapping exercise, using a stylised human silhouette on a sheet of paper and asking them to sketch their risk. In teaching, we invited medical students attending an ethics seminar to do a body mapping exercise in small groups based on a case example, using a stylised human silhouette on a flip chart sheet.

Keywords body maps – health risk – risk understanding – research methodology – teaching

Introduction

In this contribution, we analyse the potential of Body Maps (BMs) as a visual methodology and creative technique to explore embodied representations of disease risk in the context of research and education. BMs are representations of the human body containing a person's narrative and telling a story about a certain aspect of their life (van Rantwijk 2021). In a medical context, they are well-known for the documentation of symptoms such as pain. Their historical origin as an arts-based method is described as being in South Africa as a therapeutic intervention for women living with HIV/AIDS (Gastaldo *et al.* 2012). Later, next to variations in their therapeutic use, BMs were also adapted as an arts-based activity for education and as a (participatory) research data collection tool (Lys *et al.* 2018: 1185-1186). In the field of health research they find application to elicit subjective perceptions of one's health and identify health-related issues (Gastaldo *et al.* 2012: 11). BMs have been employed in different areas, for example to explore healthcare experiences of men and women with a diagnosis of fibromyalgia (Skop 2016: 29–43); subjective experience of bodily activity such as yoga (van Rantwijk 2021); sexual health (Lys *et al.* 2012: 1186); HIV/AIDS; eating disorders; chronic pain; occupational health (Gastaldo *et al.* 2012); and human-computer interaction (van Rantwijk 2021).

Epistemological and methodological background

The rationale for the use of images of the human body to tell a story is manifold and rests on the appreciation of arts as a source of reflection concerning a person's inner and outer worlds that can do more justice to the depth and complexity of embodied experiences than words alone (Skop 2016: 29–43). Epistemologically, this can be argued from both a phenomenological (Klein & Milner 2019) and a constructivist (Skop 2016) perspective. By means of visual methodologies, people have the opportunity to explore and draw their awareness to phenomena in unusual ways and can thereby make meaning of experiences that may not be accessible for or difficult to share in the form of a verbal account (Lys *et al.* 2012: 1186). BMs also have integrative effects, assessing the intersection of global and local contexts, connecting times and spaces (Gastaldo *et al.* 2012) as well as mind, body, and social context (Skop 2016: 29–43). Next to the methodological strength for collecting rich data in research, the intervention character of body mapping is emphasised in terms of its potential for introspection, reflection, processing experiences, self-expression and liberation through storytelling, creating narratives and validating the legitimacy of one's experiences, and even altering body perception (Skop 2016: 29–43; Lys *et al.* 2018: 1185-1198; van Rantwijk 2021). Body mapping also has interactive, collaborative features – between researchers and participants, and in group settings also between participants. Here, the effect of societal storytelling and empowerment by transforming individual into collective experiences is described as key (Skop 2016: 29-43). The collective sharing of narratives may entail a cathartic, validating, and healing effect; and also help to co-create meaning and power of definition opposing dominant medical discourses concerning health and body.

This is of particular relevance in the context of evidence-based medicine (EBM) as the dominant framework for scientific knowledge generation in 'Western' medicine (Jünger 2024). While EBM privileges certain forms of evidence (generalizable and 'objective') and certain codes of articulating and presenting knowledge (in a standardised, impersonal way) (Carel & Kidd 2014: 530), patients "live in a messy, idiosyncratic, and unpredictable world" (Greenhalgh *et al.* 2015: 1). EBM's strict specifications as to what counts as knowledge hence does not encompass a diversity of understandings and meanings of health (Greenhalgh *et al.* 2015: 2; Jünger 2024). This is, amongst others, due to the low status of experience, anecdote, as well as tacit (personally embodied and socially shared) knowledge in the hierarchy of evidence (Greenhalgh *et al.* 2015: 2). In consequence, patients' views and stories are not considered as legitimate source of knowledge or evidence in medical communication and knowledge production, which implies a reduction of complexity (Greenhalgh *et al.* 2015; Jünger 2024). This deprivation of the opportunity to contribute to knowledge and meaning has been described as epistemic injustice (Carel & Kidd 2014).

Alternative ways of knowledge generation and communication have been proposed to account for idiosyncrasy and open up a space for more epistemic justice (Carel & Kidd 2014; Greenhalgh *et al.* 2015; Jünger 2024). An integrative epistemic opening of the restricted EBM paradigm has been suggested to allow for a greater diversity of health-relevant perspectives and methodological approaches (Jünger 2024). This includes creative narrative and arts-based techniques and phenomenological evidence on lived experiences of illness and healthcare (Carel & Kidd 2014; Greenhalgh *et al.* 2015). Carel & Kidd argue that phenomenology can help to "identify and articulate the tacit structures that underpin one's experience and engagement in the world" (2014: 537). In this regard, BMs can be considered as valuing the richness of individual accounts, "moving away from a narrow understanding of illness as a biological process, towards a thick account of illness as a new way of being in the world." (Carel & Kidd 2014: 538).

In a similar way, they can constitute a salient didactic tool in the context of medical education in order to sensitise for the affective and ambiguous experience of health and illness; and to create a counterweight to collective modes of dealing with medical uncertainty such as intellectualisation and operationalising health-related problems in probabilistic, scientific terms (Fox 2000).

In line with the findings of a systematic review on body mapping (De Jager *et al.* 2016), only a

minority of articles address the use of body mapping for teaching purposes. Nevertheless, insights from existing research on medical curricula over the world provide starting points for the assumption that BMs can be a fruitful teaching tool for several purposes. Some authors (e.g. Doukas *et al.* 2012: 334–341, Roberts 2021: 1075) argue for the immense importance of arts and humanities in medical education as enabling factors for the development of medical professionalism, inspiring creativity and critical thinking. Furthermore, skills of eliciting and interpreting patients' stories are crucial for the preparation of medical professionals (Doukas *et al.* 2012: 334–341). BMs can contribute to the development of new teaching approaches in medical education that enable the flowering of empathy and resilience (Laughey *et al.* 2021: 1941–1950) on the one hand and training students' skills in interpreting the social and cultural dimensions of the health-illness process (Quintero 2014) on the other hand. Body mapping can be applied in the field of youth education to encourage learning in topics associated with stigma and shame (Chenhall *et al.* 2013: 123-132) and also to encourage students to increase their self-awareness on the link between body and mind (Empowering Education 2016: 4). Equivalently, body mapping can be used to increase teachers' self-awareness on of how their "personal lived experiences" influence their perceptions about teaching (Griffin 2011: 169–192).

Body-map storytelling in the context of disease risk

The challenges of translating individual illness experiences into medical terms and vice versa are well documented in anthropological and social sciences research (Kleinman 1978, Napier *et al.* 2014). With increasing opportunities of the early detection of risk in biomedicine, the communication and translation of statistical likelihood and risk of disease has gained more and more importance (Fox 2000, Jenkins *et al.* 2005).

Technical progress in biomedicine allows for an increasingly fine-grained 'unveiling' of the body's inner space (Foucault 1973: 166). While Foucault had introduced this notion in relation to the opening up of the human body and the analysis of tissues in pathology, during the last decades more and more refined techniques of shining through (x-ray, imaging techniques), fragmenting (genome sequencing), and calculating (algorithms, Big Data) the body have been developed (Jünger 2024). These are characterised by a higher and higher degree of abstraction, entailing the idea of operationalisability and quantifiability of human existence. Foucault hast coined the term 'medical (or clinical) gaze' for this decryption of health-related phenomena and the associated promise of the increasing control of chance (Foucault 1973).

In the context of EBM, risk is conceptualised as measurable uncertainty, entailing operationalisations of (ab)normality, and implying an action-oriented paradigm of prevention (Hoydis 2021: 93). This measurability of risk is closely tied to notions of controllability and rationality (Hoydis 2021: 93; Luhmann 1990: 136). The 'factual' health risks expressed as statistics promise control over unknown events, and require a person's 'rational' appreciation. There are two central problems related to this. First, logically, the reductionistic parameters constituting a risk profile do not represent the whole person and probabilities cannot be applied to individual decisions (Luhmann 1990: 143; Fox 2000: 8), resulting in an intellectual gap or what Samerski called 'epistemic confusion' (Samerski 2010). Second, the ubiquitous nature of risk has implications for definitions of 'normal' human functioning and a 'normally' functioning human being (Jünger 2024: 156). This entails the construction of a problematic body that needs to be monitored and tamed, and the loss of confidence in the resistance and self-healing powers of human beings. Health and disease are always less considered as tangible experiences, but a something that needs to be actively controlled or prevented.

Graphical representations play a crucial role in this context; among others, stylised human silhouettes are employed to visualise likelihoods, for example to indicate the number of persons out of one hundred who will or will not get the disease. But what if this principle is inverted and a stylised human silhouette is used instead to visualise the individual and collective meaning attributed to a certain – actual or envisioned – disease risk?

Arts-based methodology may serve as an approach to this question; the value of creative

techniques and visual methodology in health research and -communication has gained appreciation during the past years, particularly in the context of community-based participatory research (Phillips, Christinsen-Strynø & Frølunde 2022: 391–411). Furthermore, in the context of risk education, body mapping can contribute to dealing with the manifold concepts and understandings of risk, hereby overcoming the missing clear conception of a risk curriculum (Eichler & Vogel 2015: 168–183).

BMs can be considered a useful resource with regard to the abovementioned epistemic conflicts; they may have the potential for empowerment in a risk discourse dominated by depersonalised, standardised, and generalised knowledge. BMs may be a storytelling technique, allowing to unfold a personal 'health risk narrative' (Hoydis 2021: 94), and to construct an individual meaning of risk as a way to deal with uncertainty and randomness. Last but not least, BMs may serve as a source for a salutogenic, benevolent introspection – as contrasting the medical gaze that views the body in pathogenic terms of deviance from a designated norm.

To our best knowledge, there is no research on the use of body mapping (a) in the context of dealing with early prediction of increased disease risk, nor (b) for teaching purposes in the field of medical education. With this contribution, we therefore aim to elucidate the potential of body maps and body-map storytelling in research and medical education with a focus on risk and early prediction in medicine.

In the current article, we will first give a short overview of existing research on the methodological particularities and variations of BMs and the process of body mapping. Second, we will introduce our research with a focus on disease risk and describe the findings of our analysis, based on 33 BMs created in the context of (a) narrative interviews with persons with an increased risk of either familial breast and ovarian cancer or psychosis; and (b) seminars with medical students based on a case vignette on early onset dementia. Third, drawing on our findings and experiences, we will provide a methodological and ethical (self-)reflection on the use of BMs in research and teaching.

Methodological particularities and variations of body maps

BM and the process of body mapping can be considered a field of epistemological and methodological discovery. In their manual for the use of BMs in research, Gastaldo *et al.* (2012: 5) distinguish between the BM as human body image, and body mapping as "the process of creating BMs using drawing, painting or other art-based techniques to visually represent aspects of people's lives, their bodies and the world they live in." They coined the term 'body-map storytelling' to refer to the specific use in research as a data generating method. The outcome of this process is a mapped story consisting of three elements, i.e. "a *testimonio* (a brief story narrated in the first person), a life-size BM, and a key to describe each visual element found on the map." (Gastaldo *et al.* 2012: 10). While the authors refer to BMs as life-size human body images, variations can be found in the literature; for example, drawings on Miro-boards (van Rantwijk 2021).

They can also be applied in different settings, such as workshops, face-to-face meetings, online via video-call (van Rantwijk 2021), or in focus groups (Skop 2016: 29–43). For the process of body-map storytelling, a longer timeframe with several group sessions is described (Gastaldo *et al.* 2012; Skop: 2016 29–43) in order to provide sufficient time for reflection during and also in-between the sessions. To facilitate the process and set the scene, the relevance of suitable prompts is discussed; for example, a list of questions for reflection (Skop 2016: 29–43) or a box with different visualisation prompts (Lys *et al.* 2018: 1185–1198). Likewise, a variety of art supplies is recommended in order to allow participants to choose the most appropriate material for themselves according to their skills and preferences, and also address concerns regarding their artistic talent. For example, a collage from magazine cut-outs can be an alternative to drawing (Gastaldo *et al.* 2012).

Data analysis of BMs should take into account the abovementioned trinity of data sources (testimonio, BM, and explanatory key), as well as the process of creating the BM, in an integrative approach (Gastaldo *et al.* 2012). Different approaches to data analysis can be found in the literature, such as (Constructivist) Grounded Theory (Skop

2016: 29–43; VAN RANTWIJK 2021) or thematic analysis (LYS *et al.* 2018: 1185–1198) which are considered suitable for the analysis of the stories narrated in the BMs as constructed by people's experiences. To pre-structure data analysis, techniques from the field of visual analysis can be used. For example, ROSE (2012) distinguishes between the level of composition, semiology, and discourse; and SKOP (2016: 29–43) developed a multi-layered visual coding scheme including features such as use of colour, themes and discourses, repetition and location, tone, or elements of design.

Study design and methods

Context

In the context of a study on health literacy among persons with an increased disease risk in four different clinical fields, we employed BMs in research and in teaching. The Project RisKomp was funded by the Robert-Bosch-Stiftung and the study was conducted at the University of Cologne and the University Hospital of Cologne in Germany (2017–2019). Ethics approval was obtained in March 2018, (registration number 18-014) from the Ethics Committee of the University of Cologne. The study's aim was to generate findings on health literacy of individuals at risk of developing Alzheimer's disease, familial breast and ovarian cancer (fboc), coronary heart disease, or psychosis. We employed a qualitative research design and conducted narrative interviews with 34 persons who had been informed about having an increased risk of one of the aforementioned diseases. Findings from the narrative interviews were published previously (HARZHEIM *et al.* 2020; LORKE, SCHWEGLER & JÜNGER 2021; LORKE *et al.* 2021), one of the publications also referring to the BMs in the field of Alzheimer's dementia (HARZHEIM *et al.* 2023).

In connection to the project we also conceptualized and conducted student seminars on medical ethics that were dedicated to risk prediction and communication in medicine. The ethics seminars were either part of the regular curriculum of the medical education (07/2018 and 07/2019) or part of a 2-days workshop organised for a selected number of medical students that took place outside the campus (06/2018). During the seminars, preliminary findings on risk perceptions and risk communication from the RisKomp study were discussed and in this context, BMs were employed as a didactic feature.

For the purpose of this article, we decided to concentrate on three different disease risks – psychosis and fboc for the use of BMs in research and early-onset dementia for the use of BMs in teaching.

Methodology

In the field of research, we invited our informants to visualise their (communicated) disease risk at the end of each narrative interview. For this purpose, we provided the participants with a stylised human silhouette on an A4-sized sheet of paper and a pen or pencil. We asked the participants to draw how they perceive or feel the condition of being at risk within their body. After finishing the drawing, we asked participants to explain their thoughts during the process of body mapping and audio-recorded their testimonies.

In the field of teaching, we invited medical students attending an ethics seminar to do a body mapping exercise. We divided the group into smaller groups of 5–8 students and provided each group with the same case vignette. The vignette presented the story of a young male who was confronted with a high genetic risk of developing an early-onset dementia. We asked the students to read and discuss the case of the young man and encouraged them to put themselves in his shoes. Next, we asked the students to draw a BM of the feelings of risk (from the perspective of the young male) using a human silhouette on a flip chart sheet. After the group exercise was finished, we discussed the BMs and related the different dimensions of the BMs to existing research on patients' perspectives and/or theories on risk. After each class, we made notes on the procedure and the topics of discussion and photographed the BMs.

The iterative process of data collection through the narrative interviews and the integration of assumptions, previous knowledge and preliminary findings in the conceptualisation of the courses for medical students posed many challenges to the development of an adequate strategy of ana-

lysing the BMs. On the one hand, it was essential to refer to our previous knowledge generated by the analysis of the narrative interviews conducted in the RisKomp study; on the other hand, it was necessary to perform an analysis of the BMs interpreting the data from a different angle. The focus on the methodology of BMs and on answering the question of what can we learn and teach about risk using BMs informed the decisions on the development of the current analysis strategy. We used Reflexive Grounded Theory as a starting point for the analysis inspired by VAN RANTWIJK (2021) who pointed out that "the way you introduce, design, and surround your BM with other data collection activities influences the data you get" (VAN RANTWIJK 2021: 10). That is why we started the analytical process with explicitly collecting our previous theoretical knowledge on disease risk, the findings on specific clinical fields (in this case psychosis and fboc) and a reflection on how we as researchers applied the method of body mapping. This analytical step made it possible to build a controlled distance towards the data and move to the second step, which contained a new, more ingenuous approach to well-known data and to open space for new angles of interpretation. In this second step, we embedded the interpretive concepts of composition, semiology, and discourse by ROSE (2023) into our analysis strategy and interpreted the data along the three concepts. On the level of composition we described the location and relation of different images on the map (Table 1); on the level of semiology (or semiotics) we concentrated on the use of symbols and their meanings; and on discourse level we interpreted specific knowledge about the world, which shapes how the world is understood and how things are done in it. Each interpretation step was critically reviewed and discussed by both researchers; herein, the different academic backgrounds (psychology and social anthropology) and related preconceptions were considered. To protect participants' privacy, any features in the body maps potentially disclosing their identity (such as handwriting) were reproduced. In the following chapter, we will outline the findings of this analysis (1) looking at what we learned about disease risks using BMs and (2) reflecting on the different methodological settings.

Results

Description of the data

In sum, we analysed 33 BMs – 9 in the field of fboc, 10 in the field of psychosis and 14 in the field of early-onset dementia (Table 1). The BMs in the field of fboc and psychosis were performed individually in the context of the narrative interviews while the BMs in the field of dementia were drawn collectively in the context of the teaching units on ethics in medicine based on a case vignette.

On the composition level of the analysis, the majority of the analysed BMs on risk (25 of 33 BM) depicted risk in- and outside the body (Table 1). Details regarding the location of drawings in- and outside the body will be described in the results section further below. On the semiotic level of analysis, in the case of all three risk types, certain symbols were depicted as an expression of danger, body suffering, and (not-) knowing about the risk. The display of the symbols in the BMs on early-onset dementia, which were collectively performed by medical students, was more detailed, elaborated and emotional. In the case of psychosis and fboc, in contrast, the symbols were closely related to certain body parts associated with the medical definition of the disease risk (e.g. breasts and ovaries in the case of fboc, and the head in the case of psychosis). On the discourse level, the BMs in all three risk fields displayed metaphorical meanings of risk, as being situated both in the body and in the environment. The majority of the BMs displayed the following oppositions: danger vs. safety, medical vs. social meanings of risk, knowing vs. overthinking, determinism vs. agency; uncertainty (about the future) vs. control.

Findings of the analyses of the body maps

The analysis of the BMs showed that: a) The drawings on risk are a product of individual experiences related to risk and disease, which turn the unmanageable uncertainty of everyday life into a manageable one; risk is experienced as an enabling phenomenon (GUPTA 2022: 336–344) and is related to identity (BOHOLM 2015). b) The BMs represent shared collective experience and narratives on risk, mirroring society's symbolic order

	Familial breast and ovarian cancer	Psychosis	Early-onset dementia
Context	Individual narrative interviews (personal experience of risk)	Individual narrative interviews (personal experience of risk)	Groups of students in medical education (case vignette on risk)
Body Maps	9	10	14
Composition level[1]	only inside the body 5 in- and outside the body 3 only outside the body 1 no body map 1	only inside the body 3 in- and outside the body 7 only outside the body	only inside the body in- and outside the body 13 only outside the body a body was not depicted 1
Semiotic level[2]	circles (5 BM) and crosses (2 BM) to mark specific body parts arrows and lines to mark specific areas of impact or affected areas in- and outside the body (3 BM) hearts (1 BM) question- and exclamation marks (1 BM)	circles (7 BM); circled or painted areas (2 BM) and crosses (1 BM) to mark feelings associated with risk arrows and lines to mark specific directions of impact and interrelation (4 BM) hearts (2 BM); stickman (1 BM) question mark (1 BM)	chains or belts (7 BM); symbols of bad weather like clouds and rain (6 BM); symbols of weights (5 BM); cemetery and crosses to symbolise the risk of death (3 BM); symbols of losing ground (3 BM) arrows and lines to mark impacts and interrelations (3 BM); wavelike lines to symbolise trembling or fear (5 BM) hearts (6 BM) and human organs (4 BM); sad faces (5 BM) question marks (7 BM)
Discourse level[3]	responsibility for maintenance or restitution of one's health boundaries between 'normality' and 'insanity' medical power of definition pervasiveness of diagnosis metaphorical meanings of risk, as being situated both in the body and in the environment danger vs. safety, medical vs. social meanings of risk, knowing vs. overthinking, determinism vs. agency; uncertainty (about the future) vs. control		

Tbl. 1 Data analysis according to the analytical framework for visual data by Rose (2023).

and boundaries (Douglas & Wildavsky 1983). c) The visual representations of risk perceptions on the BMs are related to respective coping strategies as purification practices (Douglas & Wildavsky 1983).

a.) Risk as a product of individual experiences, enabling phenomenon and related to identity

It is well known from previous research that the feeling of a certain disease risk is closely related to individuals' previous experiences with the illness (Sanders *et al.* 2007: 510–520).

The analysed BMs in the field of fboc displayed several further dimensions of individual experiences that impact individual risk perceptions (Figure 1). One BM demonstrated the fluid border between felt risk and health complaints in general, depicting knee pain on the same level of importance as cancer risk (fboc_01). Similarly, another BM depicted risk as distributed in one specific body area (the chest/breast area) and the study participant explained her drawing on risk as strongly associated with the feeling of as it were already having cancer (fboc_09). Another participant, who had already had cancer, depicted risk in her BM based primarily on the feeling of stress and pressure caused by the fear of cancer recurrence (fboc_07). Another individual experience with risk is referred to as a diffuse feeling. Drawing techniques like crossed diagonal lines marking the whole chest area (fboc_09) or the use of unclosed circles in the chest and lower belly areas (fboc_10) may be interpreted as depicting such a

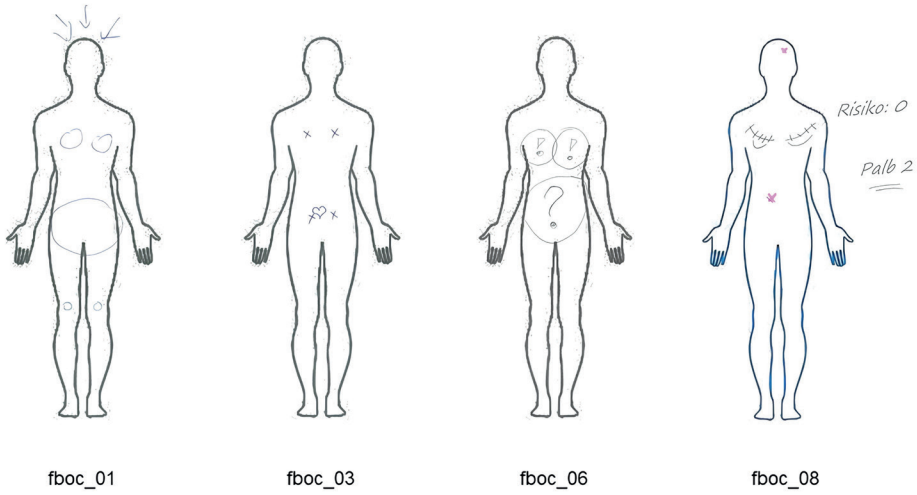

Fig. 1 Selected body maps from the field of increased risk of familial breast and ovarian cancer.

diffuse feeling of risk, which is not directly associated with the single breasts or specific organs.

In the field of psychosis such dynamics within certain parts of the body were also drawn (e.g., psy_01, such as ellipses representing weight, space, or boundaries; arrows representing forces that can either reinforce the meaning of the ellipses (weight on the shoulders) or be in opposition to them (trying to break out (chest) or to implode (head) in terms of a black hole that absorbs everything; Figure 2). In commenting on their drawings, interviewees specified the temporal occurrence of certain experiences, either explaining how often and in which situations certain sensations occur, or pointing out how one thing can cause or reinforce another. Unlike the field of fboc, the individual experiences of risk in the field of psychosis displayed in the BMs were closely connected to the bodily sensations and symptoms of the diverse variations of psychotic experience, e.g. hearing voices; fear; pain; depersonalisation and derealisation (like in the case of psy_03); or persecutory delusion. The majority of the drawings focused on the head, and more particularly on the forehead or the crown of the head where the brain is situated. The interviewees' explanations accompanying their drawings in some cases underscored this focus, e.g. in terms of the explicit mention that 'it is actually the head' (psy_02). Concerning the quality of the experience, some of the participants particularly referred to the feeling of being 'trapped in one's head' or 'trapped by one's thoughts' (psy_01; psy_07). The risk of psychosis is perceived as something mainly happening inside the head; however, also as influenced by factors outside the body, and by an interplay between bodily areas. The drawings were used to express how parts of the body were interconnected or communicating with each other, or also to visualise emotions and dynamics, for example opposite forces struggling inside one's body or interactions between the inner and outer world. One participant (psy_07) drew a dense jotting or 'tousled' scrawl in the crown of the head and a heart being surrounded by a circle with sharp triangles pricking or puncturing it (barbed wire); head and heart being connected by a two-sided arrow. The interviewee pointed out a mutual influence between the confusion in his head and a feeling of having a barbed wire around his heart. 'Health' would mean that the axis between head and heart is in balance and calm can occur.

The BMs in the field of early-onset dementia, drawn by students in the context of medical edu-

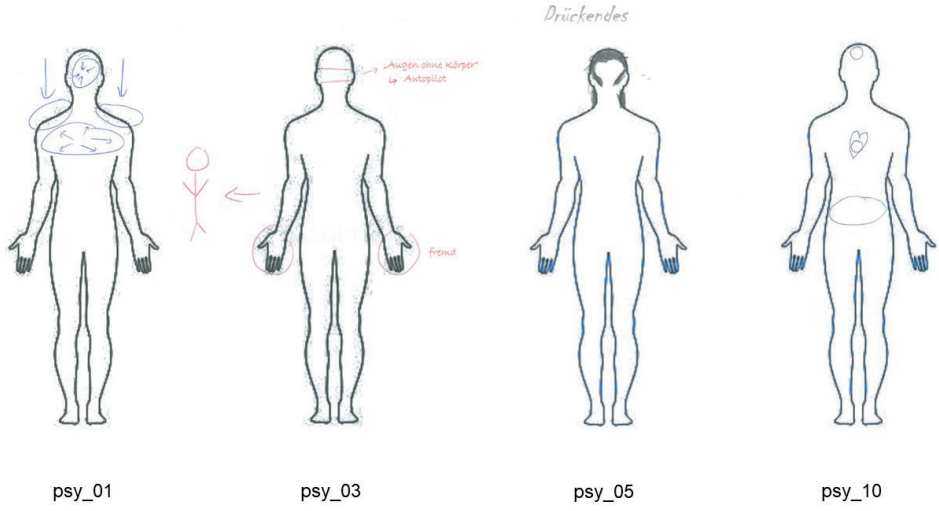

Fig. 2 Selected body maps from the field of increased risk of psychosis.

cation, revealed individual and collective experiences and sensations associated with risk (Figure 3); mainly, these can be read as symptoms of fear (e.g. widened eyes, trembling knees, a tormented stomach), burden (e.g. weights), uncertainty (question marks), the incapability to see clearly (e.g. clouds, storm), sad mood or depression (e.g. black clouds or rain, broken heart), helplessness (feeling trapped in chains), and loss of control (e.g. standing on a slippery ground or losing ground under one's feet). In this field, students interpreted the risk primarily based on the severity of the medical prognosis, which was displayed by symbols of bodily and social experiences associated with negative medical future scenarios.

In her recent study on women's worlds in Banaras, Gupta (2022: 336–344) examines risk as a feminist keyword that "presents women as active technicians of their own lives". Borrowing on this conception we suggest looking at disease risks also as enabling phenomena. The analysis of the BMs included in the current study supported this perspective on risk.

In the analysed BMs in the case of fboc, risk was depicted (1) solely inside the body following the medical terms on risk, (2) both in- and outside the body, emphasising the mental dimension of knowing as well as social factors that may impact risk and (3) solely outside the body, whereby risk is seen as non-existent (due to risk-reducing surgery). All three understandings of risk reveal its enabling role - risk was depicted as a function of individual's actions. In some cases to take action on risk was associated with achieving a balance between being aware and excessive concern, whereby excessive concern is depicted as driven by outer factors and not coming from the body's inside (fboc_01, fboc_02). In other cases the risk is clearly located into the respective organs (breasts, ovaries and womb) and there is no clear mental or outer dimension. In these cases agency is closely related to certain medical decisions like surgery (fboc_03, fboc_08, fboc_10). In one case risk is solely depicted as outside the body and its role is explained as a warning system that activates from time to time (fboc_04). In this case agency consists of the ability to be able to pay attention to this warning system in the right time.

In contrast to the other fields, only in one BM a question mark was used in the field of psychosis (psy_04). Instead, more symbols visualising insight (such as arrows illustrating connections or dynamics) were employed. This can be interpreted in the sense that knowing about the risk

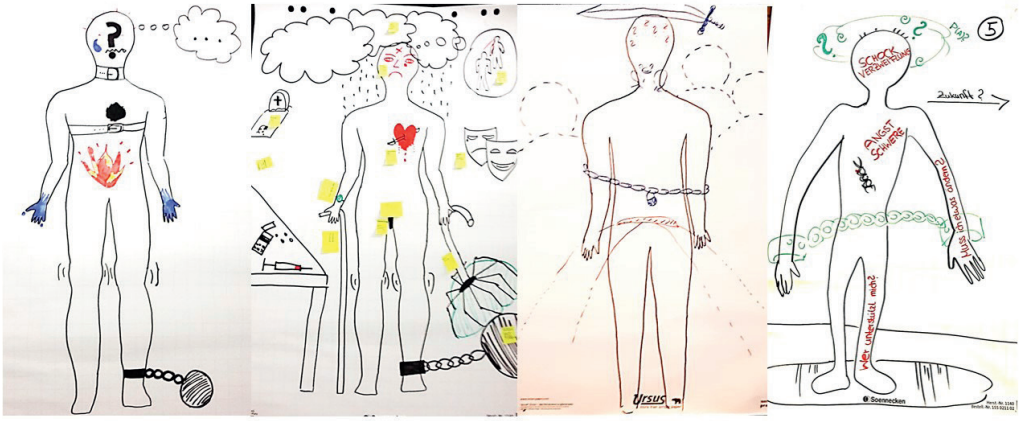

Fig. 3 Selected body maps from the field of increased risk of early-onset dementia.

of psychosis is more strongly associated with understanding and certainty concerning a vague situation rather than uncertainty. When commenting on their drawings, participants also referred to their risk of psychosis as a chance, as a means of becoming aware, of finding oneself, of re-integration of parts of oneself and of oneself into society (e.g. psy_09).

The BMs in the field of early-onset dementia drawn by students hardly appear to show risk as an enabling phenomenon; only in one of the BMs (psy_12) elements can be found that refer to the potential perspectives of the situation. In contrast to the other BMs, despite symbols and writings indicating negative feelings and uncertainty (question marks) or confusion, the composition of the entire picture has something light, agile, which may be reinforced by the dynamic posture of the person, looking as if they are walking or at least in some preparation for movement. Also the writing next to the left shoulder (Zukunft?) with the arrow directed to the right may suggest that there is hope or something can be done. This is reinforced by the writings 'Muss ich etwas ändern?' in one arm and 'Wer unterstützt mich?' in one leg. However, the arrow could also indicate determinism and hopelessness (Ausweglosigkeit) since this is where the person will have to go, without any uncertainty. Or it might indicate that it is uncertain at all whether there will be a future for the person. Next to the uncertain and threatening components, this BM entails the idea of risk as a turning point or a trigger for transition in one's life, and the image of the person at risk as an active, reflective and responsible individual who needs to make decisions on his or her future.

Social anthropologist Åsa Boholm (2015) emphasised the importance of looking at identity and not solely at cultures while doing research on risk. She suggested a context-based theory on risk (Boholm 2003: 159–178) and claimed to look at the "situated risks". The analysis of the BMs in this study demonstrated their value as a source of understanding better the situatedness of disease risks for a certain individual, in a specific situation, at a certain point of time.

In the case of fboc, such situatedness was represented by the different sources of knowledge on risk and the possible disease, which were depicted and made visible through participant's testimony. In the case of one participant, e.g. the drawing displayed three different sources of knowledge on risk: (1) medical knowledge (use of medical terms) about certain medication and the associated side

effects as well as the function of the different organs, (2) symbolic knowledge on the cultural concepts of femininity and fertility and their "danger" of causing cancer and (3) embodiment of risk as the ability to hear and feel the own body and to recognize the interrelation of body and mind (fboc_01). In another case, a participant referred to normality as a state of happiness and well-being and reaching normality (as the state before cancer) as essential for the restoration of identity after surviving cancer (fboc_07).

The BMs in the field of psychosis also visualise attributes concerning identity. For example, one participant put a strong emphasis on his head in his drawing (psy_07) and described himself as an analytical type (German: *Kopfmensch*). Other participants referred to the idea of people with mental illness as being particularly blessed or gifted with special capacities. For example, one participant described 'being different' as a moral resource; in contrast to people with high cognitive and social skills, persons with 'that particular disposition' were not as aware of their own appeal and therefore not able to manipulate others (psy_09). One participant used the metaphor of 'my halo' (psy_02) to describe her drawing pointing to the dizziness, confusion and thoughts inside and outside her head; looking into the iconographic meaning of a halo, it has been used in images of saints or of rulers (Britannica: undated). Another participant (psy_03) talked about her derealisation and depersonalisation; in the comments on her BM, a high, nearly literal convergence can be found with the symptoms of these experiences mentioned e.g. in Wikipedia. This can also be interpreted in the sense that encyclopaedic knowledge about one's risk can serve as a resource for 'legitimation' and identity.

The BMs in the field of early-onset dementia drawn by medical students bespeak the pervasiveness of risk for a person's identity; it could even be said that the identity vanishes behind the risk or the person's identity is reduced to his or her 'at-risk state'. For example this becomes evident by the way students depicted the faces on their BMs. In many cases, extensive symbols were drawn in place of faces such as huge question marks, thunderstorms with rain, or writings. If faces (or elements thereof) were drawn, the face looked sad, crying (stud_05, stud_14), terrified (stud_08) or somehow depersonalised (stud_01, stud_10, stud_13). In the case of stud_01, the face is even crossed out which may be read as a symbol for striking through a person's identity. This may partly be explained by the fact that students depicted the situation when the person first comes to know about their risk which is characterised by shock. This is a snapshot in time compared to the BMs by our interviewees who had already been dealing with their risk for a longer time and with the opportunity to integrate the risk into their biographical narrative.

b) Narratives of risk, mirroring society's symbolic order and boundaries

The high value of certainty in nowadays' industrial societies has led to the development of technologies and scientific methods that claim to assess risks in a rational way. Nevertheless, such methods and technologies have intrinsic limitations, since they cannot answer the question "why a particular individual suffered a particular misfortune at a particular moment in time. Nor can they change uncertainty into absolute certainty in the same way as magic" (Alaszewski 2018: 21–41). In Purity and Danger, Douglas (1966) examined risk as a product of symbolic order and cultural classification work, providing evidence that risk cannot be reduced neither to pure objectivity (natural deficits) nor to pure subjectivity (psychology of an individual). Her argument is to look at risk as a symbolic system that is taken for granted by the individuals using these symbolic classifications. The depictions of risk in the BMs analysed in this study may serve as a good starting point to look at these symbolic taxonomies.

Interestingly, in the case of fboc, the BMs depicted primarily the two extreme risk dimensions – pure objectivity, in this case guaranteed by medical knowledge and genetic testing as well as pure subjectivity, whereby the psychological dimension of risk (as enabling phenomenon) is emphasised. Some participants accentuated on the objectivity of risk employing a medical explanation to describe their drawing (fboc_08), or explicitly mentioned that they decided against including the head in the drawing, revealing certain anticipated expectations on part of the interviewer or also to societal discourses about dealing with risk

and disease (fboc_10). Contrastingly, other participants accentuated on the subjective and psychological dimension of risk as also related to the soul (fboc_02). Similar to the findings by Skop (2016: 29-43) we also found across-group commonalities in the use of specific symbols to depict certain body parts or risk perceptions. This speaks for a dimension of universality of certain images and metaphors (Skop 2016: 41). In the case of fboc, participants used circles to mark the body parts affected by risk. Circles may be associated with female roundness and the shape of the depicted body parts (breasts, belly, knees). In the same vein, the risk for the breasts and the ovaries is depicted in some BM by small crosses, which may be interpreted as less emotional than a heart e.g., used to symbolise the womb. Crosses may be also interpreted as a sign for crossing out, erasing, for something that is missing (fboc_03). Such symbolic meaning may also be related to shared meanings on femininity: e.g. the "danger" of femininity in medicine (fboc_01) and medicalisation of the female body (Nisha 2022: 25-40). The use of arrows may depict the sharpness and "danger" of the knowing about the risk and its burden (fboc_01). The symbolic system of normality is also made visible through the BMs and the respective explanations of the drawings. For example, it is considered as a norm that people follow the medical recommendation (undergoing regular check-ups etc.) (fboc_08) and the normal life is considered the one without cancer and with minimised risk (fboc_07).

The symbols and respective explanations in the BMs in the field of psychosis also showed attributions of characteristics or 'roles' of certain parts of the body in their mutual interplay, referring to the duality of head and heart or belly. For example, the head was attributed the role of 'authority', analytic force, rational control, 'switching on' or 'intervening / stepping in' (German: *sich einschalten*; e.g. psy_04, psy_07), while feelings were located in the heart or in the belly, associated with loss of control, irrational, intuitive forces (e.g. psy_04). Moreover, the drawings strongly visualised the discourse of mental illness as being located inside the head and mental problems being confined to the head. Moreover, some BMs illustrated the discourse about risk as being located inside the body and impacted by outside factors (e.g. psy_02, psy_06).

The BMs in the field of early-onset dementia drawn by medical students pointed to symbolic orders shaped by the power of definition of medicine and – closely connected to this – the duality between 'ratio' and analytic knowledge versus feelings and emotional knowledge. Concerning the power of definition of medicine, in many BMs the determinism of medical diagnosis becomes evident: from one moment to another, a person is trapped and his or her identity is determined by medical reality (e.g. in stud_02, there is a huge question mark instead of a face). The medical power of definition also affects people's lifetime (stud_04), their freedom (being trapped, symbolised by chains), their ability to think clearly, their dignity (e.g. stud_04 – the person looks humiliated, unmasked, naked). In one BM (stud_05), the total helplessness and disability in the face of a medical diagnosis becomes visible: even the means and resources that the person might want to use to cope with the situation are made unsuitable or ineffectual as symbolised by the broken umbrella. One picture (stud_07) did actually not contain a BM but only the writing 'Die weite Leere'. This could be interpreted in a way that with the knowledge about one's risk, everything else in life is wiped away. The duality between ratio and feelings can be seen as closely related to the medical power of definition, since risk-related knowledge is considered as 'factual', based on analytical evidence, while the person's reaction is considered as emotional and uncontrolled. For example, stud_14 visualised discourses about patient roles in medical conversation, depicting information as raining down on the person whose hands are trapped so that he or she is helpless, passive, lacking agency, having to endure his or her destiny as a person at risk.

In her work, Douglas (1966) pointed out that boundaries are crucial to the identification of risk. Common for most societies are boundaries of the body and boundaries that mark different social groups. Body and social group are often symbolically linked in terms of risk identifications. In the case of disease risks such boundaries are related to the body as risk carrier and the boundary between the culture of medicine and the culture of non-medicine (Napier *et al.* 2014) wherein different classifications of risky and non-risky factors and behaviour build the respective symbolic

order. On a methodological level the BM can be also seen as a boundary itself between the presence and the future in terms of risk. In one case in the field of fboc, e.g. a participant perceived the BM as an unwished intervention in the course of life, which may turn risk into a disease. In this case, drawing on a BM was perceived as a taboo since the abstractness of the risk was preferred compared with its clear visualisation (fboc_05). In another case the degree of medical/scientific knowledge was seen as a boundary between objective and non-objective risks. In the case of fboc_06, non-sufficient medical knowledge is interpreted as a liminal stage that would be passed once enough knowledge will be generated. This is the explanation why the risk of pancreas cancer is marked by a question mark instead of an exclamation mark as in the case of the breast cancer risk (fboc_06). A third boundary in the case of fboc is marked by the possibility of action to minimise risks. On one BM, e.g., the drawing of the breasts (crossed lines) together with the writing 'Risk: 0' appeared like an achievement, something you can be proud of or at least relieved about – while the two red crosses seem like dangers lying in wait, lurking and still not leaving the person in peace (fboc_09).

The BMs and the accompanying explanations in the field of psychosis can be interpreted in the context of the literature concerning the boundaries between 'normality' and 'insanity' (Lorke, Schwegler & Jünger 2021). From a critical anti-psychiatric stance, it is argued that these boundaries are rather fluid than deterministic (Dörner *et al.* 2019); this argument is a strong motive in scientific literature as well as in arts (e.g. novels or movies such as 'Repulsion' by Roman Polanski, or 'An angel at my table' by Janet Frame). One participant (psy_09) explicitly referred to this argument by stating that a person with a seemingly stable life can all of a sudden lose his or her mind if several factors come together. From a systemic perspective, a person with mental illness, instead of being labelled as 'other' (assuming a sharp boundary between 'normal' and 'insane') could be considered as integral part of the system in terms of a 'symptom carrier' for problematic phenomena in a family or in an industrialised, capitalist society. For example, in the case of depersonalisation (psy_03) the feeling of being dissociated from one's body or reality could be seen as an extreme form of the detachment that may be considered as common for many people in a mechanised, digitalised world characterised by an overloaded everyday life.

The BMs drawn by medical students gave evidence of the dualistic and deterministic boundaries between 'healthy' and 'at risk', between 'health' and 'disease'. It is striking how many of the BMs contained symbols of being trapped and captivated, such as chains around the body with a padlock (e.g. stud_06, stud_08), chains around the arms with handcuffs (stud_04, stud_12), or a shackle (stud_02, stud_05). This gives the impression that the information concerning an increased health risk is like an imprisonment or a bane, and people have to find strategies to free themselves out of this situation. It also points to the power of medical prediction and diagnostics to attribute or even impose roles, feelings, and realities upon people based on professional knowledge. One BM (stud_06) was particularly interesting in terms of the roles and boundaries related to disease risk: in this BM, there were three human silhouettes drawn in dashed lines standing behind the person; risk, amongst other symbols, was visualised by a pending sword of Damocles above the person's head. The silhouettes could point to the relational / familial dimension of genetic risk. At the same time, they remind of the pictograms with human silhouettes to illustrate the risk e.g. in fact boxes (1 out of 10 or 23 out of 100) and could hence refer to the different possible outcomes of the risk prognosis. In this regard, the persons in the background could also be interpreted as silent bystanders, as trying to hide away, being silent, trying not to attract attention since they could be the next to be affected – with the threat of impending risk for everyone, you can never be sure whether you might be the next one. Another BM (stud_05) also referred to boundaries between the person at risk and other people, visualised by a smiling and a sad theatre mask. These may symbolise that a person is hiding their feelings and faking a smile while crying inside. Here, discourses of coping with disease in society become evident – feeling lonely with the new reality of being affected, and hiding one's feelings and pretending good mood while being sad.

c) Risk perceptions and coping strategies as purification practices

The analysis of the BMs in this study revealed the process of how individuals reflect on their risk perceptions and link them to certain coping strategies. The majority of BMs does not just depict the disease risk out of and within the body but moreover tells the story of the individuals' way to handle the risk. In the case of fboc, e.g., one participant displayed risk as situated lightly above the shoulder like an angel and a devil performing a navigating function and being an advice-giver (fboc_04).

Other than in the field of fboc, the BMs in the field of psychosis showed less emphasis on the idea of risk and less focus on the future. Instead, bodily sensations and connections of experiences of the past or present are expressed by the drawings. The accompanying explanations indicated processes of meaning-making, causal explanations of experiences, and reconstruction of determining factors that may either aggravate or help to ameliorate one's situation. The interviewees' comments described risk as variable in time, as contingent, as depending on one's life situation – and as a balance of rational thinking, feeling and intuition. They also revealed a reflection concerning the attribution of their experiences to internal or external forces, often describing risk as a complex happening and interaction between the inner and the outer world, including different parts of the body. For example, one participant (psy_05) who has drawn a sort of helmet and written the word 'pressing' above his head, describes risk as a variable of too much distress over a longer time. He appears to struggle with both localising the source of his pressure and distress, and also interpreting the function of the helmet. His accompanying explanation illustrates this struggle for meaning between forces from outside ('someone pushing onto my face' / 'someone puts me a helmet on') and forces from inside ('perhaps it is my own head that puts all this on'); and between protection (a mask that can cushion things) and uncomfortableness (pressing, boiling).

In the case of early-onset dementia, risk was displayed as an inevitable event that completely changes individual's present and future, disrupting the course of their life and identity. Due to the high certainty of the risk prognosis and the devastating effect of the illness on personality and well-being, risk perceptions were depicted based on shared cultural beliefs associated with risk, disease and the human body. Thereby, the disease is displayed mainly using representations of the social dimensions of the disease as well as the psychological experience of the fear of death. Since the participants were medical students, in some of the BM, the medical power of definition and the determinism of the medical diagnosis were displayed (stud_02, stud_04). The perceptions of risk in the field of dementia are displayed from the perspective of the individual as a "patient" whereby the medical diagnosis dominated the individual's entire life (stud_05, stud_12).

Turning the uncertainty into certainty is related to the crossing of boundaries on risk. In the case of health risks, such boundaries are placed on the body and in the culture of medicine. Following the classic study of rites of passage of VAN GENNEP (1960), who saw society as a house with rooms and hallways, where the passage from one to another is considered dangerous, the danger lies primarily in the liminal stages "inbetween" (TURNER 1964: 4–20), where the pure and the impure blend. In order to ensure protection and enable the transition a ritual or a purification practice is needed; a practice that turns the disorder, abnormality and otherness into normality and safety (DOUGLAS 1966). In this sense, it may be worth to look at this process from TURNER'S perspective of liminality (1964) outlining different forms of *becoming*. Such perspective may seem provoking or constructed on the one hand, but it may also provide valuable insights in the process of translating risk meanings into illness, life experiences and identity.

Purification practices can also be considered in the context of sociocultural illness narratives such as the "restitution narrative" (WONG & KING 2008: 580), implying a normative view of bodily integrity as normal state that needs to be maintained and restored. Likewise, communication regarding risk prevention by Human Papilloma Virus (HPV) vaccination is characterised by metaphors of protection of a pure, integer, in a way childlike and immaculate original state of health (JÜNGER 2024: 157).

The BMs in the field of fboc displayed two different purification practices: a physical one (in

terms of preventive surgery or preservation of the body through healthy way of life) and a psychological one related to the development of narratives that make risk controllable through mental resilience. In one case, the participant described surgery as a way to get control over risk, claiming that the changes in her body as a result of it did not affect her self-image (fboc_07). In this case the surgery as purification practice restored the cultural definition of normality. Similarly, in another case, the controlled risk (minimised after surgery) was depicted on the BM even though the participant did not consider it as any longer existing (fboc_08). In other cases, emphasis was made on the importance of one's own way of coping and dealing with risk (fboc_01). The risk of cancer was depicted as related to an individual's self-perception and coping strategy whereby the strong performative power of thoughts is accentuated, causing e.g. physical discomfort or affecting choice of clothes (fboc_02, fboc_07). Dissociating oneself from anticipated expectations and the knowing about the risk is also a form of purification practice (fboc_10).

In the field of psychosis, different coping strategies and purification practices become evident in the interviewees' reflections on their BMs. For example, some participants focus on the disruptive forces, referring to the bursting nature of their experience that metaphorically reminds of a volcano with hot lava blubbering under the surface before breaking out. This outburst also appears to entail a relief, the chance of healing, and a transition in terms of becoming whole. For example, psy_01 talks about a 'burden on his shoulders' and 'something radiating from his chest, crying that it wants to get out, that something needs to burst outside of him, particularly in low times'.

In some accounts, the adjustable nature of risk as a function of lifestyle becomes visible. For example, the emphasis on the relevance of a balance between head, heart, and belly reveals a sense of agency concerning risk as something that can be modulated by one's own attitude and behaviour. Coping and purification can here be achieved by modifying one's lifestyle in a more 'healthy' or more 'risky' way, for example, by maintaining structure, balance, and equilibrium in one's everyday life, paying attention to a 'healthy diet' and thinking positively. For instance, psy_08 used the metaphor of a slider on a numerical scale to indicate the current degree of risk that can move towards lower and higher risk depending on his current lifestyle. Also psy_10 comments on the function of equilibrium for the modulation of risk, for example with respect to a healthy diet. These explanations also refer to discourses of (re-)gaining control by self-regulation and self-discipline, and by making healthy and rational choices and learning strategies and techniques to calm down one's distress. Since contact with our interviewees was established by a centre for early detection and intervention and many of them had attended the centre's day care unit with a focus on cognitive behavioural therapy (CBT), it can be assumed that their perceptions of risk and disease are shaped by the concepts of this therapeutic approach. Metaphors such as 'drifting' or 'being off track' as a way of losing control, and 'coming down' or 'bringing oneself down' when the head 'switches on' or 'intervenes' (e.g. psy_05; psy_07; psy_08) also bespeak this idea of cognition taking over, sorting out the situation, and helping to regulate emotional escalation. However, the interviewees' comments on their drawings also reveal the ambivalence between agency and control in terms of the visible effects of one's actions on the one hand, and a perceived disproportion between one's efforts and discipline (working hard, renouncing) and only small effects on the other hand. A contrast between the 'linear' and logical explanation models of CBT and a perceived complexity and contingency in terms of not being able to explain everything becomes evident. Also finding a balance between the comforting, positive effect and a negative impact of certain actions is described as challenging; for example with regard to smoking pot as a self-medication and a relaxation that enables to perform in everyday life, and as a risk factor for psychosis (psy_07); or with respect to an abundance of experience that may imply positive impressions (eustress) and at the same time lead to time pressure and distress (psy_08). The metaphor of a 'halo' (psy_02) could also be associated with a purification practice, maybe to contrast inner feelings of inadequacy, or in terms of symbolically purifying these inner feelings.

The BMs in the field of early-onset dementia offer another picture of handling risk. Since risk is perceived as inevitable, the danger of the lim-

inal space is associated with the emotional aspect of knowing that something devastating and inevitable will happen at some point in future without being able to change the course of the events. The agency of the individual is depicted as a hopeless effort to get control over the chaos caused by the knowing about the risk (like the broken umbrella in stud_05 or the chains and belts in stud_04, stud_08, stud_12 and stud_13). Nonetheless, one BM represents also an image of the person at risk of dementia as an active, reflective and responsible individual who needs to make decisions on their future (stud_12). The life with knowledge about an inevitable risk before disease occurrence is perceived as the liminal stage that needs to be overcome and the decisions on how to live this life as a purification practice in order to "guarantee" orderly life when entering the state of illness.

Methodological and ethical reflection

The findings in this article may provide deeper insights in the meaning-making of risk in predictive medicine from the perspective of those considered to be at risk, and also in the use of body maps in research and teaching. Nevertheless, the findings demand a thorough reflection on both methodology and interpretation of the data. In general, the article faces the challenge of providing a secondary analysis of the body maps without coupling it with a direct analysis of participants' narrative interviews on risk (already published in Harzheim *et al.* 2020; Lorke, Schwegler & Jünger 2021; Lorke *et al.* 2021; Harzheim *et al.* 2023). This was an obstacle the authors faced due to the pre-defined structure of the project; for future research we will recommend triangulating all types of data in the analysis and publication.

The use of body maps as research tool

First and foremost, the rationale for the use of BMs should be carefully argued – in which situations and for which research questions can this method be considered appropriate? In the case of our study, this implies a reflection on the potential of the chosen methodology for knowledge generation concerning embodied risk. From an epistemological point of view, BMs can be considered as integrating body, mind, and social context (Skop 2016: 29-43) and therefore as particularly suitable to explore individual and collective representations concerning a certain health-related condition or risk.

Moreover, the method needs to be designed in a manner that is suitable in the context of the respective research purpose. In our study, we needed to choose a way to integrate it into our interviews without causing participants additional effort or demanding more time from them while still inviting them to share with us their visual representations of risk. We therefore decided to use a standardised silhouette printed on an A4-sheet and to ask participants spontaneously towards the end of each interview to perform the exercise. From a methodological point of view, this has several implications. First, participants had only little time to unfold their story on the BM or even develop it further over several sessions as in other studies. This may have restricted the richness of data; for example, Skop (2016: 29–43) reported that many participants did not complete the self-portrait of their faces until the fifth session which suggests that some layers of introspection may need more time to be accessible to awareness and expression. Second, we used a small standardised silhouette instead of people's own personalised life-size body sketch. The template can be considered as gender-neutral, but at the same time also abstract and not fitting to individual particularities. van Rantwijk (2021) emphasised the effects of different representations of the bodily figure, such as size, shape, gender-specificity, only front view or also rear view of the body, or 3D-BMs. Indeed, in our study only in one instance the rear view of the body was used, while in all other cases either a clear front view (indicated by a face) or an unclear perspective was observed. Also the types of material provided to work on the map are considered important (van Rantwijk 2021); in our study, little material was available to participants, restricting the creative process to drawings with pens in one or two colours. However, despite these restricted means, participants used these to express and document the quality of their experience, e.g. by drawing several circles instead of a single line; making a 'tousled scrawl'; or putting pressure on the pen to indicate an emphasis or point to the impact of a particular experience.

From an ethical point of view, body-map storytelling may be considered as an appropriate method when applied in a caring and respectful manner. This includes informed consent in the form of a process rather than an event, particularly if body mapping extends over a longer period with several sessions (Gastaldo *et al.* 2012). Also, confidentiality needs to be ensured; it is therefore important to reproduce BMs or alter information that might potentially identify the participant, such as handwritten notes. For participants' protection, a safe space needs to be created and potential risks of the body mapping process deserve reflection. For example, in our study it became apparent that for one participant (psy_05), the interview and the process of drawing the BM were evoking the same distressing feelings that were also associated with his symptoms. A phone call sometime after the interview could clarify that the participant was fine and did not feel burdened by the interview. However, it is important to anticipate emotional triggers and the potential of releasing repressed traumatic experiences while dealing with embodied phenomena. Another risk that needs to be considered is related to the constructivist nature of the BM as a means to re-construct a person's health-related reality. Particularly in the context of risk, drawing risk-related symbols into a BM can be perceived as evoking one's fate like in a voodoo doll or a self-fulfilling prophecy (e.g. one participant (fboc_05) refused drawing the map since this was perceived as unduly interfering with fate). On the other hand, we also observed that body mapping was seen as a source of self-reflection; while drawing and commenting and gaining introspection into one's bodily sensations, many of our interviewees were able to engage in a process of meaning-making with regard to certain dynamics and connections.

Last but not least, the process of body-map storytelling also poses special demands on the researcher in order to ensure that participants – and they themselves – feel emotionally safe (Skop 2016: 29–43). During the research process, we therefore regularly took some time within our team for reflection, and to provide mutual feedback and support.

In summary, body-map storytelling can be a source for rich data on people's experiences as individuals and as a collective (Gastaldo *et al.* 2012; Lys *et al.* 2018: 1185-1198), when carefully planning the study in terms of a justification for the use of BMs, well-founded methodological decisions, and sensitive ethical considerations.

The use of body maps in teaching

The application of BMs in teaching context entails various methodological and ethical dimensions that need to be reflected on: the context of research/application, the researcher's/lecturer's role in the process, the level of participants' involvement and group dynamic, the interpretation and publication of the data.

The use of BMs in the context of medical education has certainly affected the tone of the BMs included in this study – the mood evoked through the images and words used by participants to express their positive or negative healthcare experiences (Skop 2016: 40). On the one hand, the occupation with risk in a study-related environment (the medical faculty) in the context of seminar on medical ethics may have led to an overemphasis on the medical definitions of risk and to a neglecting of individual and social dimensions that may be individually relevant for each participant. In the current project, we decided to adjust the methodology in order to create a safe space for the particular group (following the example by Skop 2016: 29-43 who assured her material was scent-free because many people with fibromyalgia have chemical sensitivities). We conceptualised the risk case as learning material, and the creation of the BMs as a group work (role play). The clear rules of the role play and the scripted risk experience helped to create common responsibilities in order to establish group cohesion, trust, and rapport. Nevertheless, even using a scripted risk situation, we could not fully eliminate the risk of emotional triggers in some individuals and the potential of releasing repressed traumatic experiences. That is why we strongly encourage developing strategies to maximise emotional safety in group situations and consider involving at least two researchers in the body mapping process. The impact of teachers (Gastaldo *et al.* 2012: 14) on the body mapping process also needs to be reflected upon. We were continuously sensitive to potential discomfort during the mapping process and modified the way we supported the groups during the exercise

accordingly (e.g. provided more context to our research or repeated the guidelines for performing the body mapping). We as teachers were also emotionally affected by participants' experiences with risk and constantly questioned the different risk definitions (e.g. often thinking about symbols/images in other contexts). In order to reflect on these experiences we established regular "formal debriefing meetings" throughout the project to mitigate any concerns caused by the body mapping process and help develop useful strategies (Gastaldo *et al.* 2012: 14). This step was also important during the phase of analysis, since it was necessary to include existing knowledge into the analysis and make it visible. One significant limitation in the context of the BMs used in a teaching context was that we were not able to take detailed notes during the process of body mapping. Since the meaning of a BM may be "fully understood only by the accompanying story and experience of its creator" (Coetzee *et al.* 2019: 1237–1254) the process of analysis was complicated because we needed to rely on no direct accounts of the participants, but only on the researchers' notes and memory. This challenged the movement from a descriptive to a critical interpretation of the mapped stories (Gastaldo *et al.* 2012: 18).

In spite of all limitations, we experienced the use of BMs in teaching as a valuable resource in the following three dimensions. (1) BMs can contribute to a more diversity-sensible teaching environment offering access to different types of knowledge (technical, cultural or experiential). (2) BMs can contribute to the development of new teaching approaches in medical education that may increase empathy since there is evidence that integrating arts and humanities in medical education may enable the flowering of empathy (Laughey *et al.* 2021: 1941–1950) and stimulate of individuals cognitive capacities (Roberts 2021: 1075). (3) BMs in teaching may draw students' attention to the cultural, social and psychological aspects of risk (following the concept that the health-illness process is primarily social and cultural, into which the biological and psychological aspects are inserted (Quintero 2014)) in order to respond to current and future challenges posed by ongoing technical progress in biomedicine.

Conclusion

The BMs in the context of this study revealed their role as a medium for meaning-making and (co-) construction of risk in science, society and individual lifeworld. Drawing on our findings and experiences, we can conclude that the use of BMs in research and teaching offered a great potential as a means of reflecting on and understanding embodied health risks. BMs on risk revealed a plurality of perspectives, lifeworlds and way of meaning-making of risk. Such visual methodologies can help participants pay attention to phenomena in new ways (Lys *et al.* 2018: 1186) and address both individuals' different sources of knowledge as well as their personal emotions on risk, hereby opening up spaces for analysing the situatedness of risk (Boholm 2015). In a way, the body mapping allowed participants to 'unpack' the stylised human silhouettes in infographics on risk statistics that are used as anonymous placeholders for probabilities in risk communication, unfolding their personal story of risk.

The analysis of the BMs collected for this study showed risk as a product of individual experiences, enabling phenomenon and related to identity and puts the role of risk in individuals' personal and social contexts up for discussion. The analysed BMs also demonstrated that risk was constructed through narratives, which mirror society's symbolic order and boundaries. The ways individuals and societies cope with risk may be seen as purification practices that help to re-establish the social order of normality and abnormality, order and chaos, purity and dirt.

The integration of BMs into research practices may open up spaces for the interrelation between body, risk and society offering corner stones for the investigation of risk situatedness. In teaching, BMs can contribute to the development of new teaching approaches in medical education that enable the flowering of empathy and resilience (Laughey *et al.* 2021: 1941–1950) on the one hand and training students' skills in interpreting the social and cultural dimensions of the health-illness process (Quintero 2014) on the other hand. In spite of all ethical and methodological limitations of the current project, we experienced the use of BMs as a valuable resource for both research and teaching and therefore encourage further initia-

tives in this field, which is still an area of methodological discovery.

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