



## Qualitative study of yoga for Young adults in school sports

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### ABSTRACT

**Objectives:** Distress and stress-related diseases are an increasing public health problem at schools. This qualitative study was nested in a non-randomized, controlled trial studying the effects of a 10-week yoga course as an alternative for regular school sports in two secondary schools in Germany.

**Methods:** We conducted a qualitative evaluation in 3 focus groups with 6 participants each. The focus groups were audio-recorded, transcribed verbatim, pseudonymised and analysed using qualitative content analysis. Furthermore open questions were asked in questionnaires.

**Results:** The analysis of the participants' interviews (mean age  $19.6 \pm 2.9$  years,  $n = 10$  female,  $n = 8$  male) resulted in 4 key topics: 1. encountering yoga, 2. yoga practice, 3. effects and benefits of yoga, and 4. yoga in the school context.

Yoga was very well accepted by most participants. They reported a variety of physical and psychological benefits as well as overall restorative effects. The relief of pain or other physical ailments, higher mobility and flexibility, improved posture and improved sleep were mentioned by the participants. Some participants used the new exercises and experiences (e.g. working with the breath) in their everyday life. The possibility for self-responsible action was a welcome change from the perceived pressure and heteronomy in normal (school) life. Controversial was the question of whether yoga - if it is part of school sport - should be assessed or graded, and whether it should be compulsory or voluntary.

**Conclusion:** Yoga can offer both physical and psychological benefits in young adults as well as offer general regenerative effects. Yoga by sensitizing the participants to negative patterns of behaviour can encourage healthy behaviour.

## 1. Background

Studies have shown that more and more people in western societies suffer from stress and stress-related illnesses.<sup>1</sup> The prevalence of chronic stress in Germany among young adults was around 13 % in the years 2008–2011.<sup>2</sup> Young adults transitioning from school to university or working life are especially affected by distress due to work overload and

life stressors from school settings, many of which are known risk factors for the development of psychological disorders.<sup>3,4</sup> Mind-Body interventions are promising candidates for stress management and emotion regulation.<sup>5,6</sup>

Yoga is an integral mind-body practice which can improve mental and physical health.<sup>7,8</sup> In the USA yoga programs are well established in many schools,<sup>7</sup> whereas in Germany only few schools with yoga

*Abbreviations:* FG, focus group; M, male; F, female.

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implementation exist so far. Moreover, yoga studies with adolescents and young adults are lacking in general as most studies have been conducted within elementary schools.<sup>5,6</sup>

Yoga is a complex holistic intervention in which each participant's experience is subjective. A qualitative approach, which allows for collecting data from individual participants seems to be a suitable tool for exploring such experiences and can enrich our scientific knowledge beyond quantitative measurements.<sup>9</sup> Qualitative studies including adolescents<sup>10,11</sup> and young adults,<sup>12</sup> showed stress reduction and further health benefits: In a qualitative study the interviewed 13-year middle school students reported positive effects of yoga on stress, sleep and relaxation. The students' opinions on the effects of yoga on self-regulation, social interaction, substance consumption and academic performance were overall positive.<sup>10</sup> In another qualitative study with 15-year old high school students reported psychological benefits including stress reduction.<sup>11</sup> Many students also used yoga to cope with negative emotions. Lastly, young adults who practiced yoga described in qualitative interviews a positive influence on their food intake, through increased motivation to eat healthy after class and through greater awareness of the needs of their body.<sup>12</sup>

The aim of this study is to gain a deeper understanding of the subjective perspectives of young adults participating in the yoga intervention arm of the parent study. This approach allows for a broad description of the entire data giving a good overview of the investigated field<sup>13</sup> and as such was particularly suitable for the exploratory character of the study project.

## 2. Methods

In our trial we aimed to evaluate potential effects of a weekly, 90 min yoga course over a period of 10-weeks for young adults. A prospective non-randomized controlled pragmatic pilot study with an active control group (school sports) was implemented in two secondary schools in Berlin, Germany (called *Oberstufenzentren* - OSZ). OSZ are a vocational school form in Berlin and Brandenburg, where different courses of education (up to the A-Level) are offered in the same institution.

The study protocol was approved by the ethics committee of the Charité – Universitätsmedizin Berlin, Germany and all study participants gave their informed consent. If under 18 years of age a formal passive consent with information about the study was sent home to the parents. Trial registration was done at [clinicaltrials.gov](https://clinicaltrials.gov) (NCT02741973).

In the quantitative part of the study the primary outcome of measure was stress from baseline to week 10. Secondary outcomes included measuring depression, anxiety, attention, quality of life, mood states, visual analog scales (for general pain, neck pain, headache, fatigue and sleep quality) and heart rate variability. The results of the quantitative part were published elsewhere.<sup>14,15</sup>

In our qualitative evaluation, which is the focus of this paper, focus groups with participants of the yoga classes were conducted. The selection was made through a random ranking of subject numbers, taking into account the gender ratio of the school yoga classes. A focus group is a form of group interview that is based on a discussion among participants and generates verbal data through group interaction.<sup>16</sup> This creates a conversation in which the interviewer primarily assumes a moderating role (focus group moderator), regulates the dynamics within the group and ensures that the focus of the discussion is maintained.<sup>17</sup> The interview guideline was "as open and flexible as possible and as structured as necessary due to the research interest".<sup>18</sup> According to this maxime, the interview guide was developed by the interviewer (MH) in cooperation with the study team. Three main thematic blocks were structured according to their priority: 1. yoga teaching in general, 2. changes and effects of yoga and 3. general opinion about yoga in schools. These themes were generated from literature and in discussion with (yoga) teachers. They were mainly used for orientation - only the key question was fixed (e.g., "How was the yoga class for you?"). The

narrative impulses of the other themes were intended to encourage free narration and discussion. Each interview ended with a concluding question whether aspects that the participants considered important are not yet known and whether there are other points that should be included. After the interview each participant received a cinema voucher.

In addition, we included open questions with short free-text answers in the questionnaires of all participants (n = 92), which focused on changes in physical and mental state due to the yoga classes. We also asked what was good and not so good about yoga. Further comments were possible as free text. Selected results of this publication were part of an unpublished author's master thesis (MH, formerly University of Potsdam).<sup>19</sup>

### 2.1. Participants

Young adults were included if they 1. were students of a secondary school (OSZ) and 2. if they signed an informed consent. They were excluded if they 1. had severe chronic or acute diseases, 2. were pregnant or lactating, 3. had an immobility or restriction for gymnastic exercises through orthopaedic, neurological or other medical causes or 4. participated in another clinical trial.

### 2.2. Data collection

The interviews were audio-recorded with students' permission. Verbatim transcription was done with the program f5 (Version 3.1 by Dr. Dresing & Pehl GmbH). All data was pseudonymized. The analysis was performed by MH using the software program MAXQDA® software (version 12.2.1). MH was supervised by BS in the coding process. Regular once-a-month meetings were conducted with the core study team (MH, BS, MJ) over one year to reduce subjectivity. The analysis followed an inductive approach - meaning that coding topics derived directly from the text data - and deductively according to the interview guide. Thus, this approach allows a broad description of the whole material, giving a good overview of the field of investigation<sup>13</sup> and was therefore particularly suitable for the exploratory character of the study project. Free-text answers were summarized descriptively.

### 2.3. Yoga intervention

Our 10-week, 90-minute, once-a-week yoga program included the following four basic elements of yoga 1. postures, 2. breathing exercises, 3. relaxation techniques, and 4. meditation practices. The structure of each class was 1. welcome and feedback to the last class (5 min), 2. introduction and perception exercises (10 min), 3. warm-up (10 min), 4. more intensive yoga practice (20 min), 5. floor exercises and transition to relaxation (15 min); 6. breathing exercises (5 min), 7. silent meditation while sitting (5 min), and 8. feedback round (5 min). The intervention is described in detail in the original publication (supplement in the parent study)<sup>(14)</sup>. Subjects received printed materials on yoga principles and exercises (appendix in the parent study).

Participants were taught by three certified yoga teachers of the Berufsverband der Yogalehrenden in Deutschland e.V. - Professional Association of Yoga Teachers in Germany e.V., who all had been practicing Yoga for over 20 years.<sup>20</sup> Throughout the program, subjects were encouraged to continue yoga practice at home (20 min daily).

All participants were asked to maintain their routine activities and not to begin any other new exercise or stress reduction programs.

## 3. Results

### 3.1. Participants

A total of 18 students (6 from each of the three yoga groups) participated in 3 focus groups (FG). FG1 took place just after the 9th

session and the other 2 on the day of the 10th session because of organisational issues. All 3 focus groups lasted between 50 and 60 min. Of the 18 students randomly selected for the interviews, 12 did not participate in the interviews (8 were missing on the day of selection and therefore could not be asked for participation; 2 were missing on the day of the interview; 2 did not want to participate). To achieve the adequate number of participants for the focus groups, new interview participants were selected by the next higher study number following the previous participant. Finally, in FG1 and FG2 equal number of male and female participants were achieved (3 female, 3 male), while in FG3 4 female and 2 male adolescents participated. Adolescents age ranged from 17 to 26 years (mean age  $19.6 \pm 2.9$  years) and were comparable to the parent's study population. The participants of the focus groups were present  $8.5 \pm 1.3$  times in the yoga classes (out of a total of 10; all yoga participants in the parent study had attended  $7.3 \pm 1.9$  times).

### 3.2. Main topics

The analysis resulted into four themes with several sub-themes (Table 1):

- 1 Encountering yoga: contains first impressions, general conceptions about yoga as well as the early processes of getting familiar with it.
- 2 Yoga practice: includes everything that has to do with the actual practice of yoga, e.g. what happens during the practice, within a session or immediately after the practice.
- 3 Effects and benefits of yoga: includes all reported effects and changes which were observed in the course of the yoga classes and are described as directly related to yoga.
- 4 Yoga in the school context: contains all themes which relate to the school system or everyday school life or are of primary importance to the school context.

### 3.3. Encountering yoga

Most interviewees perceived yoga as positive. They agreed that yoga is "good and beneficial" (focus group 1, male 2 [FG1M2]), "interesting" and a "positive new experience" (FG3M1) as well as "fun" (FG3F3). This was also underlined in the open questions of the questionnaire, where nearly all students wrote positive remarks and thus experienced yoga positively. Only few interviewees expressed criticism and scepticism, with one participant repeatedly expressing negative attitude, however still remarked that he would take part in a yoga program again and that the practice per se was beneficial. Especially "for him as someone who likes to think critically" the "spiritual aspect surrounding it" resulted in a "rejecting effect" which made it difficult to "fully engage with the practice" (FG1M1). In contrast, most other participants found that the "different mindset and concepts were especially valuable" (FG1F2).

For some participants, the view of yoga changed for the better within the course and their own practice and existing prejudices could be reduced. While most students said that they would continue yoga practice, only three students did not intend to continue with yoga.

**Table 1**  
Main themes.

1. Encountering yoga	2. Yoga practice
	2.1 Effects during yoga practice
	2.2 Long-term process
	2.3 Practicing in a group
3. Effects and benefits of yoga	4. Yoga in the school context
3.1. Physical benefits	4.1. Yoga as a counterbalance and support of individuality
3.2. Stress reduction	4.2 Yoga as an optional activity 4
3.3. General well-being	4.3 Grading yoga within school sports
3.4. Health behaviour	
3.5. Application in everyday life	

### 3.4. Yoga practice

#### 3.4.1. Effects during yoga practice

The actual yoga practice was the most discussed theme which lead to four major aspects:

**3.4.1.1. Relaxation.** "Switching off" or "letting go" (FG1F3) was a recurrent main theme because of its lasting effects and touched many other topics. During and after the relaxation participants were able to "rest", "recharge (FG3F4), or "recover" (FG3M1, FG2M1). "Honestly, I have to say that I could really switch off. So I did not sleep, I was awake, but shut off - in sleep mode. So that was not familiar to me before. I've never really been able to lie down and relax - and be awake at the same time" (FG1M2). In the open questions of the questionnaire, many participants reported more relaxed states in their everyday life, some mentioned calmer states, less rumination, and "more inner peace". The relaxation phases were positively evaluated in the yoga classes of several participants. However, some participants wanted to practice more relaxation and meditation exercises.

**3.4.1.2. Self-observation and body awareness.** These are special aspects of relaxation, which could be described as non-judgmental self-observation and body awareness. "And in yoga it was always: 'Okay, we just watch, we don't judge' and everyone experiences for themselves what feels good and how far they can and want to go. It's more important that you just take it really seriously and stay focused and do something for yourself. I see this as a big advantage compared to normal sports lessons and [...] school in general" (FG1F2).

**3.4.1.3. Dealing with oneself.** These new facets of dealing with oneself formed another thematic aspect of yoga practice. Yoga was seen as an intimate and personal practice, where one does not have to "fit into any pattern", but on the contrary, an "individual view "was allowed, in which it "actually does not matter [...], how big you are, what conditions you are in, or how much you weigh or whatever" (FG1F2). Therefore, yoga seemed to promote an intensive examination of oneself and not about achieving any objective guideline values or outdoing others. It was therefore necessary to reflect again and again on one's own constitution in general as well as on one's individual daily form, to take this into consideration and then to follow one's own assessment. This opportunity for self-responsible action was basically seen as a welcome change from the perceived pressure and the heteronomy in the normal (school) life.

**3.4.1.4. Breath.** The deliberate observation of the breath, its regulation and the coordination with the movements was important for most of the students and could initially confront the participants with challenges and difficulties: "So I thought it was quite good that you really have to pay attention to breathing in yoga, because with me it is often [...] like that I simply forget to breath or breath uncontrollably and in any case I believe yoga can be a good exercise if you really do it right and [...] pay attention to it" (FG3M2). In the open questions of the questionnaire some participants reported a better regulation of the breath. The breathing phases were positively evaluated in the yoga classes of several participants.

#### 3.4.2. Long-term process

**3.4.2.1. Exercise and progress.** The progress that became noticeable with constant practice was an important point for the students: "In the beginning, of course, it was exhausting, because almost everything was new and then you have [...] sore muscles the next day [...]. But in the last blocks I did not have any sore muscles anymore, the body got used to it [...] and everything went well. [...]. The exercises became easier and easier" (FG1F1).

The analysis revealed that the attitude towards yoga is crucial: “Everything really counts” (FG2M2). According to this participant, “you have to do it and want [to do] it of your own accord, you need to get involved in it and maybe even have a specific motivation or goals”. Furthermore, “one should be willing to practice it regularly and intensively for a longer period of time”.

**3.4.2.2. Familiarization and development of a routine.** For some students, it took a while to get warmed up to yoga and all the new exercises and circumstances. “I think it’s just a matter of getting used to it for the first two or three hours. [...] I knew I am going to practice yoga now and that feeling of wellbeing has also improved. And over time the sequences established, so that it became part of everyday life” (FG1M2). While some participants became more involved as the yoga practice progressed, others gradually lost interest as their initial curiosity waned. The reasons for the latter were especially the lack of variety, frequent repetitions and similar exercises. This issue was also several times mentioned in the open questions of the questionnaire. Reasons for a positive development were above all the habituation to the new circumstances, the overcoming of initial difficulties or resistance and the tangible progress.

### 3.4.3. Practicing in a group

The group setting of the yoga classes was also a relevant factor. The students expressed in particular the importance that everybody really participated in the classes and engaged with concentration and sincerity. Only in this way a calm, open and focused atmosphere could emerge, which, according to the students, is necessary for the yoga classes and conducive to all beneficial effects. It was perceived as extraordinary and sometimes paradoxical that this climate on the one hand allowed the students to concentrate on themselves during the yoga practice, but on the other hand also strengthened the sense of community. “I already think that this yoga class has connected us in some way. [...] due to the fact that everyone is doing the same thing and that almost everyone participated in the course. That was already [...] different than in normal sports courses” (FG3M2). These aspects were also mentioned from some participants in the open questions of the questionnaire. On the other hand, few participants who seriously wanted to practice yoga felt disturbed by students who were not so motivated to practice yoga.

## 3.5. Effects and benefits of yoga

### 3.5.1. Physical benefits

Positive physical effects have been generally described as “feeling fitter” or having a “better perception of the own body” (FG3F4) or more concrete e.g. the relief of pain or other physical ailments, higher mobility and flexibility, improved posture and a good balance to other sports or one-sided physical stress seen in everyday life. These changes on the physical level were mostly perceived as very salutary and edifying. “In sports exercises, it may well be that physical problems can arise again and again and [...] yoga has just done exactly the opposite, it has helped” (FG2M3).

“Yoga helped me a lot, too. I had back problems and a bad posture and through yoga, I realize that my posture is much better now and I really take care to sit straight and I do not have that much back pain anymore. That really helped me there” (FG3F1). In the open questions of the questionnaire especially less pain was reported (less back pain and neck pain). However, one participant mentioned that his knee pain had worsened with yoga. Moreover less tension, less headache, more flexibility, more fitness, better/improved posture were mentioned.

### 3.5.2. Stress reduction

An important point for the students was the topic of stress reduction. The spectrum ranged from “balanced”, “calm down”, “find rest”, “stay calm”, “clear the mind”, “empty the head”, “switch off” to “let go” or

“easier to set boundaries”. “And I was able to switch off. Because with me it is like this: I cannot switch off properly during the day and always think about a lot and it helped me really a lot to just switch off” (FG2F2).

### 3.5.3. General well-being

Also, in terms of overall well-being, various aspects have been developed. There was a general consensus that yoga is “beneficial” and “good”, it “wakes you up”, makes you feel “mentally more fresh”, and “more fit” and the “general body feeling improves”. One student said she was “always in a good mood” after yoga. In the open questions of the questionnaire one participant wrote: “First I was always tired after the yoga class, but suddenly I was full of energy and wide awake. “Also a good mood and more positive feelings were reported by some participants.

### 3.5.4. Health behaviour

In terms of health behaviour, apart from sleep, the aspects of self-care and the associated consumption behaviour also played a role. One student (FG1F3) reported that she skipped the cigarette in the morning before yoga, although she would never have cared about it when the regular sports class was on the schedule. Another student could not tell the difference when she was smoking, but with regard to her eating behaviour: “Since I practice Yoga, I rarely grabbed a quick snack that filled me, I now rather make sure that is healthy for my body as well” (FG1F2).

Three participants (FG3M2, FG3F2, FG3F4) reported to fall asleep more easily the night after the yoga class and slept better.

### 3.5.5. Application in everyday life

In one group the discussion arose about specifically using yoga exercises in problematic situations during their daily routine: “The breathing exercises and meditation techniques, for example, definitely helped to fall asleep. If I could not fall asleep, I often did [...] breathing exercises and then went through these meditation [...] again in my head - eventually I slept like a baby” (FG2F3).

In all focus groups, the breathing technique was again central in this context and for many interviewees a useful tool in everyday life, as an impetus for self-attention and self-regulation: “At least I noticed in everyday life that when I get under pressure or felt stressed, that I just looked at it ‘okay, how does the breath go?’ (And it was) just totally flat and by breathing a little deeper and consciously you could bring yourself down a little bit. I think otherwise one does not pay attention” (FG1F2).

## 3.6. Yoga in the school context

### 3.6.1. Yoga as a counterbalance and support of individuality

In the school context, yoga was seen as important as a counterbalance to the school induced stress. Moreover, the students expressed the need to be recognized as individuals by the school and for their individual potential to be fostered. The students’ desire for self-determination in their overall development was in contrast to the perceived rigidity of the school system, which was seen to be limiting students’ individuality and uniqueness. Some students perceived that the yoga course might be a first step of the school orienting itself more towards supporting individuality. “There was no right or wrong” (FG2M1). “I just thought it was nice because it was not really associated with school. So you just went there after class, but it wasn’t really ‘well, now we have sports lessons’, but rather ‘yes, we still do yoga’. So it was just more fun and really cool” (FG3F2).

### 3.6.2. Yoga as an optional activity

The participants had differing opinions as to whether yoga should be a compulsory component or be offered as an elective. Only one group agreed that yoga should be obligatory as a health-promoting activity, as a health benefit was clearly evident in yoga and rather not in school sports.

“I also think that maybe some people should be forced to do their luck in this case. Because many have said before ‘yoga is definitely stupid’ - and now, however, the majority of the group likes it and is totally motivated and wants to continue with its practice. That’s why it would probably not be so bad to introduce the fact that everyone has to try at least once” (FG1M3). The other two groups, however, mostly tended to recommend yoga as a voluntary activity as “relaxation for the students” (FG3M1), which “allows students to indulge” (FG3F3).

Many students found it a good idea for yoga to be offered as an (optional) activity at school. For example, one focus group had just passed the exam and 5 of the 6 interview participants felt that yoga had helped them, especially during this stressful time to be resilient. Students would spend a lot of time at school and often have very limited time outside of the school and limited financial capacity. According to the interviewees it would be a good opportunity for interested students to practice yoga at school. This issue was also underlined in the open questions of the questionnaire, where the majority of the students welcomed the practice of yoga in school sports as an optional activity.

### 3.6.3. Grading yoga within school sports

After the yoga classes were integrated into regular school sport, the responsible sports teachers had to grade the performance of the students. In two courses this was done with a written portfolio, in which the students described their individual experiences they had over the period of the yoga program. In the third course, the sports teacher assessed the yoga performance of the students with grades.

The first variant seemed to promote the discussion of the topic and could thus have program-specific effects on the motivation. The second variant seemed to have an external influence on the practice. As the focus groups showed, the absence of factors such as assessment and performance pressure was rare in the usual school environment, which was highly valued by students within the yoga program. Grading performance of students in yoga was explicitly criticized by the respective focus group. Only few - mostly male - participants felt that yoga should also be graded as part of school sport. Here, a more individualized modality of assessment, incorporating the conditions and possibilities of the students and judging their progress was suggested, but at the same time viewed as critical or as disproportionately time-consuming.

## 4. Discussion

This qualitative study was nested in a non-randomized, controlled trial studying effects of a 10-week yoga course as an alternative for regular school sports in two secondary schools in Germany. The analysis of the young adults’ interviews resulted in four key topics: 1. encountering yoga, 2. yoga practice, 3. effects and benefits of yoga, and 4. yoga in the school context.

In the focus groups many students reported a variety of positive effects of yoga regarding health and health behaviour. They mentioned especially physical (e.g. pain reduction or improving of other physical complaints and improved posture and sleep) and psychological improvements (e.g. stress reduction and general well-being). Some students became aware of their health behaviour, especially self-care and consumer behaviour played a role. In our study some interviewees changed their health behavior (cigarette skipping in the morning before yoga class and another skipped junk food). Recent reviews showed that school-based yoga interventions may enhance the students mental and emotional state, the physical health, and may also induce positive health behaviour.<sup>5,6,21</sup> In addition, our results are in line with qualitative studies including younger students<sup>10,11</sup> and young adults,<sup>12</sup> which especially cited stress reduction and further health benefits (e.g. better sleep).

In the yoga classes most participants were able to relax, recharge and recover. Some participants developed an inner attitude of non-judgemental self-observation and self-acceptance. Yoga seemed to promote an intensive examination of oneself and the body – may be similar

to mindful practices. Also, youth-adapted MBSR programs have been found to be beneficial in improving mental health symptoms, cognitive performance and resilience to stress, and self-regulatory processes.<sup>22–24</sup>

Yoga was experienced as an individual and personal practice, where one does not have to “fit in any pattern”, but on the contrary, there was an “individual view allowed”. Moreover, students specifically used yoga exercises, particularly breathing, as an effective tool in everyday life, e.g. as an impulse for self-awareness and self-regulation.

It was precisely these new experiences, embedded in a progress in which the students became aware with constant long-term yoga practice, that were important for the perception of change and also gave some students relatively direct feedback on the process. In other publications as well the breath was of central importance for yoga participants in younger ages.<sup>11</sup> Regular breathing exercises have been shown to reduce stress in adults.<sup>25</sup> Despite existing research in this field – almost only in adults – (yogic) breathing exercises should be further explored systematically in future studies, especially examining various breathing exercises to induce distinct (health promoting and stress reducing) effects.

In our study the participants reported that the calm, open and focused atmosphere during the yoga class allowed them to concentrate on themselves during the practice and at the same time strengthened the sense of the group. This is particularly interesting, because our yoga program was not explicitly designed for promoting prosocial behaviour. This is in line with other qualitative studies.<sup>10,11</sup> School-based empathy interventions programs for children and adolescents has been shown to be effective in improving children’s positive social behaviour.<sup>26,27</sup> Also Social and Emotional Learning (SEL), a well-known and established program in the US, which combines learning contents with key competencies for a healthy handling of emotions and positive relationships, demonstrated improved social and emotional skills, healthy behaviour, and academic performance.<sup>28</sup>

Most students found it a good idea to offer yoga at school. The possibility for self-responsible action was a welcome change from the perceived pressure and heteronomy in normal (school) life. Yoga could set an opposite pole to the school system and was perceived as a pleasant change. The authors consider that, on the one hand, it can be useful to offer the students balance and relief through yoga. On the other hand, when investigating the causes of school stress, one should also question the prevailing system that causes a lot of pressure and overload and look for long-term solutions for a student-friendly and supportive climate. The methods and exercises of yoga and other programs like SEL may help to initiate such changes. The question of whether yoga - if it takes place in the context of school sports - should be compulsory or voluntary, was discussed controversial. The majority of the interviewees spoke out in favor of implementing yoga at schools as a voluntary offer. And those who took the opposite position were primarily of the opinion that one could be encouraged to try out yoga if made compulsory even if at least once.

It may be valuable to offer individual elements of yoga and to integrate them into everyday school life. Regular and active relaxation should already be taught in the school to get more familiar with mind-body techniques from a young age on to reduce stress-related sequelae. Regular relaxation courses or more broader “health classes” including various themes like “healthy living” are conceivable, so that yoga does not replace school sports but instead is an optional education class as already mentioned by Conboy et al.<sup>11</sup> Such accompanying health classes may also stabilise the effects and may integrate these new experiences. Health promotion and prevention are proclaimed in this context as priority tasks in Germany and represent important components of school life.<sup>29,30</sup> Health-promoting interventions should be behaviour-oriented and should take into account the lifestyle and background of the students, strengthen resources and life skills.<sup>29</sup>

These are aspects that also a well-designed yoga program may fulfill. A 5-year long non-randomised school-based multi-intervention yoga study (including diet and general health recommendations) - showed

improved physical fitness and other health-promoting changes in children from 7 to 10 years until 12–15 years of age in comparison to school sport.<sup>31</sup> This approach, a course including various health-promoting topics, seems to be particularly promising in the context of an integrative yoga program. Most participants evaluated yoga classes as very good. Only few young adults expressed scepticism and resistance - mostly because of the spiritual aspect associated with yoga. It could be valuable to examine the perception and meaning of yoga from the perspective of participants with critical views in order to further explore critical viewpoints. According to other qualitative studies yoga in school settings seem to be well accepted among children and adolescents.<sup>10, 11</sup> In our study the view of yoga changed for the better within the course for some participants. Considering the reported resistance of some students (although our yoga courses intended to be taught with ideological neutrality), it seems important to introduce yoga to sceptic adolescents with emphasizing exercises and postures, without overwhelming them with worldviews or concepts of yoga. While for some participants the commitment increased in the course of the yoga practice, some others gradually lost interest, as the initial curiosity faded. In order to absorb this effect, an intrinsic motivation and personal commitment is required. While most students said that they would continue yoga practice, only three students did not plan to continue with yoga. A certain amount of perseverance seems to be an important factor in yoga practice, and it is also essential in order to experience and sustainably stabilize potential positive effects. Therefore, it might be good to identify factors to lead to a continuation of the yoga practice and promote yoga practice, e.g. by offering voluntary drop-in classes.

#### 4.1. Strengths and limitations of the study

The interviewees in this study attended more sessions overall than the participants in the parent study population, which may indicate participants' bias towards yoga. Furthermore, it might be beneficial to conduct control group and/or (school sports) teacher interviews, which could have provided a more detailed picture of the yoga intervention and perception of school sports. It should be taken into account that focus groups could lead to different results than individual interviews, as focus groups tend to reflect group opinions. In addition, this study was conducted in a special form of secondary schools in Germany (with mostly older students), so that comparability with other secondary schools is limited. Compared to other qualitative studies, our yoga intervention was quite short with eight weeks, but still showed benefits and was perhaps well appropriate for getting to know yoga. Finally, it is possible that the team's personal opinions regarding potential effects of yoga may have influenced the themes that were coded from the interviews. Future qualitative studies should consider the possibility of recruiting study personnel who are unfamiliar with yoga or have neutral opinions regarding yoga.

Our interview guide was as open and the questions were as neutral as possible, and to our surprise deleterious effects of yoga were rarely mentioned. This can be seen as a strength rather than a methodological weakness. Further strengths of the study were the supervision of another experienced qualitative researcher, regular discussions of the results and reflections of the analytic process in the study team over one year to enhance intersubjectivity and the quality of the analysis.

## 5. Conclusion

In conclusion, implementing yoga in schools seem to be a valuable addition to regular school sports. This study shows promising results for investigating the impact of mind-body practices like yoga on health, quality of life and well-being of young adults. Young adults had physical and psychological benefits, overall restorative effects as well as improved health behaviour by becoming aware of negative health patterns.

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## CRediT authorship contribution statement

**Michael Jeitler:** Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Writing - original draft, Project administration. **Manuel Högl:** Investigation, Formal analysis, Data curation, Writing - original draft. **Alexander Peters:** Writing - review & editing. **Dania Schumann:** Writing - original draft, Writing - review & editing. **Vijayendra Murthy:** Writing - review & editing. **Holger Bringmann:** Writing - review & editing. **Georg Seifert:** Writing - review & editing. **Andreas Michalsen:** Conceptualization, Supervision, Funding acquisition, Project administration. **Barbara Stöckigt:** Methodology, Formal analysis, Data curation, Supervision. **Christian S. Kessler:** Conceptualization, Methodology, Supervision, Project administration.

## Declaration of Competing Interest

The authors do not have any conflict of interest with the content of the manuscript.

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## Appendix A. Supplementary data

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