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Physical, psychological, and spiritual benefits of hatha yoga practice

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Budapest, 2021

DOI: 10.15476/ELTE.2021.128

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Foreword

"*Don't accept, don't reject, contemplate on it.*" This was the first sentence my philosophy teacher, Roshan Singh, said as he started his philosophy lectures in my first Yoga Teacher Training (YYT) in Rishikesh, India, back in 2014. For Western minds, grounded in materialistic and modern scientific way of thinking, many of the yoga teachings sound very weird or counterintuitive at first time. This is why one needs to open his/her mind and listen to the teaching with an open and non-judgmental attitude and give time for "digestion". Yoga, as a practical path, offers various techniques with which' help one can experience and decide whether the teachings can be true. Knowledge is one thing, however, together with practice, a deep understanding of the teachings can happen. Additionally, the faith for continuing study and practice can occur which helps the aspirant for further progress. There are many things what we cannot comprehend at the moment, but this does not mean that they do not exist, therefore trust and the guidance of great teachers is needed.

When I returned to the same school one year later and completed my second YTT, I could understand what I had been trying to comprehend during and after my first training. Since then, also, many doubts, questions, experiences arose; however, I always continued to study and practice the wisdom and teachings of yoga, and a lot of things became more and more clear. I am completely aware that I am on the path with many limitations, and what I experience as truth now, can substantially change in the future. So, I humbly say, that I hope that my writings on yoga is true, but I can assume that looking back to it after several years I would see how less I understood it at this point of time. Nevertheless, this is the path of evolution. Since my YTT, I adopted the sentence of my teacher and apply it always when I teach or talk about yoga.

Beside my deep inquiry of yoga, I also have a great interest in science. I do believe that yoga and science are not contradictory but complementary viewpoints of life. Both have some limitations, and both give great gifts and supports for humankind. My personal intention – similar to other yoga practitioners who do scientific work – was to put one brick in the bridge between yoga and science. In my personal life, I often experienced that people were either "too scientific" and denied various not yet detectable but still valid beneficial practices (of yoga), or also many yoga practitioners or followers of other spiritual paths refused opportunities provided by science. However, I was very fortunate to meet great teachers and friends who were engaged in both paths and could learn a lot from them for which I am very grateful.

I know that since I have a personal connection to yoga, I can be biased, so I cannot try to be objective enough in scientific work. Nevertheless, since yoga helped me unspeakably lot

in various aspects of life, I am happy if anyone else can benefit from the teachings and practices of it. As a psychologist, I also found several teachings of yoga helpful in general or if psychological theories and tools reach their limits. Of course, I do not claim that everyone should practice yoga, however, I presume that some specific elements of it (which are often not exclusively yogic practices but are part of other traditions or exercises as well) can be useful in general, only it needs to be found which one fits the particular person the best. Scientific investigation of yoga practice is a great opportunity to show evidence of which practices and special aspects of yoga are beneficial for different people. The proven tendencies can help individuals or group of people to find a good choice if they aim to improve their health, well-being or engage in spirituality. Furthermore, it can be useful for professionals to provide proper advices for particular issues (e.g., various asana and pranayama practices and relaxation techniques for physical weakness or illness; pranayama, meditation, and relaxation techniques for mental health problems, such as restlessness and anxiety). The present doctoral thesis investigates some specific aspects of yoga practice concerning its effects and associations with physical and psychological health measures, including spirituality. The first part of the doctoral thesis provides an overview of yoga philosophy, paths of practice, its change over time, followed by the scientific approach of yoga, previous findings, and remaining questions. Thereafter, the main studies of the doctoral work are presented in four sections: the first two cover the investigation of some physical and psychological effects of a weekly setting beginner level hatha yoga training, with a special inquiry of the significance of verbal instruction during practice. The third one presents a cross-sectional investigation which explores associations between psychological characteristics and yoga practice, more precisely regularity of practice and yoga expertise among regular practitioners. The fourth section includes a systematic review on available empirical findings on the relationship between yoga and spirituality and provides future directions. At the end, there is a discussion of the findings together with preliminary outcomes and suggestions for yoga practice according to results, and thereafter the work ends with final conclusions.

As a final thought in the foreword, I would like to phrase that yoga is a self-practice, is a path of self-improvement. Of course, great gurus, teachers and support of fellow practitioners are needed for a proper progress. However, yoga is an inside work which then is reflected to the outside and effects the surroundings. “Start local to be global” or start with your own self if you want to help others and the world. Maybe I am a little naive, but I believe that yoga (and naturally, not merely yoga) can not only help the individuals but slowly-slowly the whole society to become more conscious, tolerant, peaceful, and healthy.

Acknowledgments

First of all, I would like to express my gratitude and thanks to my supervisor, Ferenc Köteles, who helped me many ways regarding my doctoral work. He provided a great support in planning and conducting the studies, analyses of data, writing of the manuscripts, and most importantly, he highlighted the rules of scientific life and balanced my spiritual emotionality. I am grateful for his constant availability, his immediate responses, and great discussions during the whole process. I am also thankful to György Bárdos, whose teachings and personal sharing always motivated and encouraged me throughout my work, and who stood as an example of dedicated work. In addition, I am highly thankful to all my colleagues of Ádám György Laboratory, who provided not only a professional but also a great personal support and friendship.

I would like to thank for the work of several colleagues who helped in planning and other phases of the particular researches, namely Raechel Drew, Eszter Ferentzi, Benedek Tihanyi, Szilvia Boros, Csongor József Selmeci, Constanze Maria Springinsfeld. Additionally, I thankful to György Bárdos, Renáta Szemerszky, Tekla Sümegi, Renáta Szilvia Engi, Oxána Nagy, Anna Rebeka Neuberger, and Rebeka Csala, who assisted in data collection. Special thanks to Tamás Bogdány and János Körmendi for data collection and analysis of heart rate measures during yoga classes. Also, special thanks to Zsuzsanna Szabolcs whose experiences in the integration of scientific research, practical fieldwork, and personal engagement in an Eastern movement form showed me directions and encouraged me.

I am highly thankful to all my yoga teachers and philosophy teachers. I would like to express my gratitude to some of my greatest teachers, Roshan Singh, Deepti Kulshrestha, Krishna Sikhwal who not only shared the wisdom of yoga, but showed great examples how to life the teachings in daily life. I am grateful to Swami Pujan (Stephan Kahlert) and James Swartz for their teachings on Advaita Vedanta and showing light on the spiritual path. I am thankful to yoga scientists of advanced practice I met in Kaivalyadhama Institute in Lonavla, India for highlighting and reinforcing how yoga and science can hand in hand help for many. In addition, I am highly grateful to teachers of the Himalaya Yoga tradition I met in Rishikesh, India, as well as all my friends I met along my journey, especially Chris Tracy who helped and encouraged me on my path in various way.

Last, but not least, I would like to thank to my family for all their support, help, and love throughout both my scientific work and yogic, spiritual path. I am grateful to my several friends for all their encouragements.

List of the most important terms concerning yoga philosophy

Ahamkara: part of the mind, the sense of "I-ness", the individual ego

Ajna chakra: referred to as third eye or mental command center, the sixth of the seven main chakras

Akasa: unmanifested matter, the element of ether/space

Anahata chakra: referred to as heart chakra, the fourth of the seven main chakras

Anandamaya kosha: bliss body, the most subtle body layer of the five ones

Annamaya kosha: physical body, literally food body, the grossest body layer of the five ones

Asana: means body posture, the third one of the eight limbs of yoga

Ashtanga: *ashta* means eight, *anga* means limb; it refers to the eight limbs of yoga (in contrast *ashtanga vinyasa* is a modern style of asana practice based upon K. P. Jois)

Atman: the individual self (which is pure consciousness)

Avidya: the root cause of all sufferings and diseases

Ayama: lengthening

Bandha: often referred to as "body lock", specific physical movements to lock and then redirect the energy flow in the body

Bhakti: means devotion; bhakti yoga refers to devotional path of yoga, self-surrendering

Brahman: the universal self (which is pure consciousness)

Buddhi: the intellectual, discriminative mind, also referred to as "higher mind"

Chela: student of yoga, disciple

Chitta: storehouse of all contents of the mind, storehouse of all memories

Consecration: dedicating or offering the practice for a higher aim – for something good/for someone – this concept is line with the teaching of karma yoga, the path of self-less action (namely, dedication the fruits and benefits of the action for someone or something good, or for a higher aim)

Dharana: concentration, the sixth limb of the eight limbs of yoga

Dharma: the eternal law of life

Dhyana: the state of meditation (once the focus flows in a steady stream without any interruption), the seventh limb of the eight limbs of yoga

Duality: matter and consciousness are two different realms (in Sanskrit *dvaita* refers to "dual")

Esoteric: a special knowledge which is shared by only a few people

Guru: teacher, guide, expert, dispeller of darkness

Hatha: hatha yoga is an effortful practice; the term can be separated into "*ha*" and "*tha*" which represent the opposites of life

Ida: one of the three main nadis, the one which flows through the left nostril; it represents the moon, the feminine energy

Ishvara: a part of Brahman, more precisely it is an outpouring force of it which has the power of creation; it can be understood as a more personalized God (often also translated as God)

Iyengar-yoga: a modern hatha yoga style created by B. K. S. Iyengar; it is an alignment focused practice

Jnana: means knowledge, jnana yoga refers to yoga of knowledge, the path of understanding of the non-dual reality behind the apparently dual world

Kaarana sharira: causal body of the tree bodies, the finest one encompassing subtle imprints

Kaivalya: means isolation, it indicates the freedom or isolation of the self/consciousness from matter, the final state of absoluteness, the state of non-duality

Karma: means action, it is the constant fluctuation of action and reaction; law of karma is the law of cause and effect; karma yoga refers to dedication of one's own action for the sake of spiritual progress, yoga of selfless action

Kriya: literally means action or effort; kriyas are purification practices (actions) which are part of hatha yoga (they are also called as *shatkarma)*

Kumbhaka: pause or retention of the breath (natural stopping of the breath called *kevala kumbhaka)*

Kundalini: dormant energy symbolized by a sleeping snake at the base of *susumna/*spine*;* through the practice of yoga this dormant energy can be actualized (referred to as kundalini rising)

Laya: means absorption, it refers to dissolution of the mind; varieties of laya are means of absorption, e.g., nada (sound) is referred to the best of them

Manas: sensory mind which interacts with the external world, also referred to as "lower mind"

Manipura chakra: referred to as navel chakra, the third of the seven main chakras

Manomaya kosha: mental body (instinctual and emotional mind), one of the five body layers

Mantra: numinous syllable/set of syllables or group of words (mainly in Sanskrit) which aim to direct the mind

Maya: illusion

Mitahara: controlled diet

Moksha: liberation (liberation from the illusion and sufferings, liberation from rebirth - called *nirvana* in Buddhist tradition)

Mooladhara chakra: referred to as root chakra, the first of the seven main chakras

Mudra: specific physical position or gesture of the hands, head, and eyes which affects the pranic flow

Nada: the internal sound, it is the best laya

Nadi: subtle channel in the pranic body (pranamayakosha) in which the prana flows

Niyama: the second one of the eight limbs of yoga: personal commandments

Nonduality: there is only one reality, matter and consciousness are not separate, final state of absoluteness (in Sanskrit *advaita* refers to "nondual")

Pancha kosha: five layers or sheaths of existence, aka the five body sheaths

Philosophy: the study of the nature and meaning of the universe and of human life

Pingala: one of the three main nadis, the one which flows through the right nostril; it represents the sun, the masculine energy

Prakriti: matter (the opposite of purusha)

Prana: life force, vital energy which pervades the whole universe

Pranamaya kosha: energy body, one of the five body layers

Pranayama: usually referred to as breath regulation or breathing technique, literally it is a practice to control prana; the fourth limb of the eight limbs of yoga

Pratyahara: withdrawing of the senses from the outside to the inside; the fifth limb of the eight limbs of yoga

Puraka: inhalation

Purusha: pure consciousness ((the opposite of prakriti)

Raja: means royal; raja yoga refers to the royal path of yoga described by Patanjali as the eight limbs practice (ashtanga)

Rechaka: exhalation

Reincarnation: cycles of life and death (called *samsara* in Buddhist tradition)

Religion: a fellowship based on commonly accepted, unquestionable faith which provides the knowledge of a transcendent reference point, namely God, and shows the path to reach it

Sahasrara: referred to as crown chakra, the seventh of the seven main chakras

Samadhi: the last one of the eight limbs of yoga which occurs if only the object is present in awareness, and there is no sensation of one's own self; it is also referred to as the state of bliss

Samkhya: one of the six the six schools of Hindu philosophy; Samkhya describes the manifested world and the process of manifestation; it sands as a basis of Yoga

Samskara: subtle imprint, deeply ingrained habit or schema, result of the clustering effect of several *vasanas*

Samyama: perfect control over the mental processes: it encompasses dharana, dhyana, and samadhi together

Sat darsana: the six schools of Hindu philosophy

Shatkarma: the six main purification techniques in hatha yoga

Sukshma sharira: subtle body of the tree bodies, the middle which is the mental body

Susumna: one of the three main nadis, the middle nadi flowing from the base of the spine till the head; it represents balance

Sutra: thread, an aphorism which carries a vast teaching

Spirituality: a vital principle of a human being, a (free, individual) search for and a belief in something sacred beyond the material world

Sthula sharira: gross body of the tree bodies, it is the physical body which is tangible

Swadhistana chakra: referred to as sacral chakra, the second of the seven main chakras

Swara yoga: a path of yoga which teaches the mystics of prana and breathing to achieve self-realization

Trisharira: doctrine of three bodies

Vasana: subtle imprint, tendency (footprint of actions) which create habitual emotions, thoughts, behaviors

Veda: the word means knowledge or wisdom – the four Vedas are main texts of yoga and Hindu tradition

Vedanta: one of the six the six schools of Hindu philosophy; Vedanta teaches about the final truth, pure consciousness; Yoga leads toward this final truth, to the soul

Vidja: wisdom, inner knowledge, understanding

Vijnanamaya kosha: intellectual or wisdom body (instinctual and emotional mind), one of the five body layers

Vishuddhi chakra: referred to as throat chakra, the fifth of the seven main chakras

Yama: the first one of the eight limbs of yoga: ethical principles, social commandments; the term *yama* means to control

Yoga: it can be described as holistic teaching, an ancient discipline about how to live human life on a higher level of awareness, and how to utilize the dormant potentials of our own being; it is a complete view of life, a path of self-realization and liberation

I. INTRODUCTION

"Yoga has a complete message for humanity. It has a message for human body, it has a message for human mind, and it has also a message for human spirit." Swami Kuvalayanandaji (Sahay, 2013, p. iii.)

Yoga in scientific research has gained high popularity in the last two-three decades, mainly due to its promising health benefits (Field, 2016; Patwardhan, 2017). Research trends show that publications on yoga significantly increased since 2000, and in the last decade there was a three-fold accretion (Jeter et al., 2015; McCall, 2014). A search in Google Scholar with the term of "yoga" results in around 15.000 outcomes between 1980-1990, circa 25.000 between 1990-2000, 146.000 between 2000-2010, and 230.000 between 2010-2020. According to a bibliometric analysis, most of the therapeutic yoga studies between 1967 and 2013 were conducted in India, followed by United States, and Canada (Jeter et al., 2015).

While the original purpose of yoga was spiritual, motivations for yoga practice today are mostly connected to its physical and mental health benefits (Birdee et al., 2008; Groessl et al., 2015; Park et al., 2015, 2016). Research on yoga incorporates a wide variety of physical and mental health-related topics among both healthy and diseased populations (Büssing, Michalsen, et al., 2012; Domingues, 2018; S. Dwivedi & Tyagi, 2016; Field, 2016; Govindaraj et al., 2016; Hendriks et al., 2017; Ross & Thomas, 2010). A vast number of empirical studies and several reviews and meta-analyses examined the effects of yoga on various indicators of physical health, such as body composition, heart rate and heart rate variability, blood pressure, respiration, overall cardiovascular endurance, strength, flexibility, and balance (Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016; Field, 2016; Raub, 2002; Roland et al., 2011; Ross & Thomas, 2010). Similarly, impact of yoga practice was inspected in various physical health conditions, for example, in musculoskeletal conditions (e.g., low back pain, arthritis), cardiovascular (e.g., hypertension, coronary atherosclerosis) and pulmonary diseases (e.g., chronic bronchitis, asthma), metabolic/endocrine conditions (e.g., diabetes mellitus), autoimmune disorders (e.g., sclerosis multiplex), various types of cancer, neurological conditions (e.g., epilepsy, pain syndromes), or other abdominal system (digestive, renal and reproductive) problems (Büssing, Michalsen, et al., 2012; Cramer et al., 2014; S. Dwivedi & Tyagi, 2016; Field, 2016; Govindaraj et al., 2016; Raub, 2002; Ross & Thomas, 2010; Sengupta, 2012). Concerning mental health, numerous studies and reviews reported on the positive effects of yoga practice on indicators of mental health, such as mindfulness, resilience,

affect, happiness, well-being, satisfactions with life, self-compassion, flourishing, level of energy, and social relationships (Domingues, 2018; Hendriks et al., 2017; Riley & Park, 2015; Ross et al., 2013). In addition to these, yoga practice was proved to be beneficial in various (neuro)psychiatric disorders including but not limited to depression, fatigue, anxiety and anxiety disorders, posttraumatic stress disorder, schizophrenia, attention-deficit hyperactivity disorder, eating disorders, and sleep complaints (Balasubramaniam et al., 2012; Büssing, Michalsen, et al., 2012; Field, 2016; Mooventhan & Nivethitha, 2017; Sengupta, 2012).

However, before going into a deeper analysis of the scientific results of yoga practice, evidences and remaining questions in research, it is important to overview the concept and meaning of yoga including its origin, the different paths and styles of yoga, and the Eastern and Western approaches to it.

1.1. Yoga

Yoga is a philosophical framework and a set of different methods which has evolved over thousands of years in ancient India (Baktay, 1992; Iyengar, 1991). It consists of various physical, mental, moral, and spiritual practices aimed at improving holistic health, self-awareness, and self-realization (Impett et al., 2006; Iyengar, 1991; Kaczvinszky, 1995; Ross & Thomas, 2010). However, in Western society, it is often interpreted purely as a form of physical fitness (MacDonald, 2013; Sarbacker, 2014). Indeed, one of the most common yoga practices in the West is hatha yoga which emphasizes physical postures (asana), breathing exercises (pranayama), relaxation, and meditation techniques (Devereux, 1994). In scientific research, yoga is mostly interpreted and investigated as a form of mind-body exercise (Mehling et al., 2011; Park et al., 2018). However, yoga is a more complex system with various paths (Devereux, 1994; Sahay, 2013). The present doctoral thesis makes also an emphasis on presenting the system of yoga and its philosophical views. Deeper understanding of yoga might promote greater clarity in interpretation of scientific results and foster future research with a more comprehensive perspective.

To start with, the meaning of the word can be overviewed. The term of “yoga” derives from the Sanskrit root verb of “*yuj*” which means to join, integrate, yoke, or control (Iyengar, 1991; Kaczvinszky, 1943; Sahay, 2013). On the one hand, this refers to union of the individual self with the supreme or universal self. On the other hand, it means yoking all aspects of the body and mind (Devereux, 1994; Iyengar, 1991; Sahay, 2013; Weninger, 1986). This yoking is not a force but a gentle taming, which aims to reach higher level of control and awareness in

order to recognize the final reality and our true nature (Baktay, 1992; Kaczvinszky, 1995; Weninger, 1986). Different ancient texts of yoga define its meaning variously (see below). Nevertheless, we can describe yoga as holistic teaching, an ancient discipline about how to live human life on a higher level of awareness, and how to utilize the dormant potentials of our own being. It is a complete view of life, a path of self-realization. To attain the final aim of yoga, constant and persistent practice is required; this so called "yogic lifestyle" means that one is dedicated to evolution or development through yoga (Weninger, 1987, 1991). To sum it up, yoga provides a philosophical framework of life and teaches several methods and practices to become aware of and perfect the body and the mind in order to attain realization of the oneness of all things, which results in harmony, peace, and bliss (Devereux, 1994; Iyengar, 2014; Kaczvinszky, 1995; Satyananda Saraswati, 2013; Weninger, 1991). As we can see, the traditional purpose of yoga was spiritual; its final goal was to reach oneness, or in other words, self-realization or liberation. In modern times, however, it is important to note, that even if one is not aiming to reach the traditional or final goal of yoga, he/she can still utilize several teachings or practices to overcome physical and mental imbalances and gain better health and well-being (Groessl et al., 2015; Iyengar, 2014; Michelis, 2005).

1.2. Yoga, religiosity, spirituality[1]

There is another common misconception about yoga, namely that it is a religion. Yoga originates from ancient India, the culture of Hinduism, thus some of the teachings of Hindu tradition and yoga are overlapping (e.g., some philosophical views of life). This, however, does not mean that yoga is a religion, or one would need to adopt Hinduism to practice yoga (Kaczvinszky, 1994, 1995; Weninger, 1986, 1987). On the one hand, yoga is free from all religions. In contrast to religions, which is usually (but of course, not always) adopted by birth, the path of yoga is mainly a free choice to follow. In religion there are sacred scripts which prescribe religious rules and rituals for a large group of people (more precisely for the whole society of the particular area), and the system is based on a specific beliefs and values. Also, the feeling of fear or guilt can be part of following a religion (even though there is an evidence

[1] This chapter contains exact copies of some segments of the following paper:
Csala, B., & Köteles, F. (2021). Validation of the Hungarian version of the short form of Spiritual Connection Questionnaire (SCQ-14). *Mentálhigiéné És Pszichoszomatika*, *22*(2), 207–228. https://doi.org/10.1556/0406.22.2021.006

of the beneficial health effects of religiousness) (Fetzer/NIA Working Group, 1999). Yoga has also ancient scripts, practices and rituals, however, even traditionally, students chose to dedicate their life to yoga. (Today this free choice is also present by religions, but it was not ordinary previously). Similar to religion, there is a need of belief and faith of the teachings, however, yoga facilitates personal experience and understanding of them. It acknowledges personal differences, and even offers different yoga paths which suits the best the particular practitioner (Govindaraj et al., 2016; Weninger, 1986, 1987). On the other hand, yoga can be interpreted as similar to or implied in all religions, since it aims ultimate and radical cognizance, aka the realization of the final truth beyond the illusory world, that is the oneness with the divine (Baktay, 1992; Kaczvinszky, 1995). This type of understanding can also refer to construct of spirituality.

Spirituality is a complex construct which can be approached from various viewpoints, e.g., from philosophical, transcendental-religious, phenomenological, and psychological aspects. The term originates in the Latin word "*spiritus*", which means breath, that is a vital principle of a human being (Simpson & Weiner, 1989). Spirituality has been defined as a universal, solely human phenomenon (Emmons, 2006; Piedmont & Leach, 2002; Tomcsányi et al., 2011), as a search for and a belief in something sacred beyond the material world (Emmons, 2006; Hill & Pargament, 2003).

Although spirituality was originally not discriminated from religiousness, the two concepts are not identical (Emmons, 2006; Tomcsányi et al., 2011). Religion (particularly in the Western culture) is a fellowship based on commonly accepted, unquestionable faith which provides the knowledge of a transcendent reference point, namely God, and shows the path to reach it (Hill & Pargament, 2003; Pikó et al., 2011). It represents a system of beliefs, religious practices, and symbols which is given as the solely path to the ultimate world (Emmons, 2006; Hill & Pargament, 2003). In contrast, the term spirituality refers to a free, individual search for the sacred which obviously does not exclude religious attempts. It can be also a spontaneous, informal, subjective experience and expression (Koenig et al., 2001). It is important to note that the definition and conceptualization of religion and spirituality have changed over time, thus traditional and modern understandings of these phrases can highly differ (Pargament, 1999). Some authors report that spirituality can appear in both religious and not religious form (aka traditional or non-traditional form) and is considered a broader concept than religiousness (Oman, 2013; Pikó et al., 2011; Zinnbauer et al., 1997). In contrast, it can be interpreted the other way around, i.e., that spirituality is part of religion (Emmons, 2006; Pargament, 1999). Also, it is relevant to mention, that within the concept of spirituality, dualist and non-dualist

views exist (Wheeler & Hyland, 2008). According to the dualist approach, the material and the spiritual world represent two different realms, i.e., an independent spiritual reality beyond material life is assumed. Phrased differently, matter and soul/consciousness are two different essences of reality (Baktay, 1992; Héjjas, 2005). This belief concurs most of religious traditions, thus in this interpretation spirituality and religiousness can be highly overlapping (Pargament, 1999; Wheeler & Hyland, 2008). In contrast, the non-dualist view holds that there is only one reality with seemingly different aspects. According to this approach, everything is interconnected and governed by the same laws and principles (Wheeler & Hyland, 2008). There is only one truth beyond the experienced world (Swartz, 2015).

Despite of the definitional and characteristic differences of religiousness and spirituality, they show a considerable overlap. Their shared aspects are the search for the sacred and the aim to be connected with the divine or transcendent. As yoga share common roots and ancient texts with Hinduism, the misconception of its religious aspect is understandable. However, according to modern definitions of spirituality and religiosity, yoga can be noted as a spiritual practice. (This implies the understanding that spirituality is a broader concept than religiousness. Indeed, in modern spirituality research there is an attempt to create a unified language for all spiritual and religious traditions to avoid conflicts and gain better understanding between these traditions (Wigglesworth & Neal, 2013). In traditional yogic terminology, spirituality refers to the spirit, or other words, the soul (i.e., the most inner core of humans), which can also be interpreted as pure consciousness (Baktay, 1992; Rama et al., 1976; Swartz, 2015). As mentioned before, the final aim of yoga practice is to "be absorbed by the spirit within" which corresponds to the universal spirit (i.e., universal consciousness). This experience is often referred to as "absolute", "oneness", "union" or "highest state of consciousness" (Iyengar, 1991; Kaczvinszky, 1995; Rama et al., 1976; Swartz, 2015).

1.3. The origin of yoga

The complete overview of the origin of yoga is very difficult. There is vast amount of modern literature about the history of yoga, however, available information can vary concerning various details, e.g., the first mentioning of yoga, age of several scriptures, and also there are different interpretations about yoga's mingling or interrelation with other traditions (Feuerstein, 2008; Muktibodhananda, 1985; Sahay, 2013; Singleton, 2010). Here, the aim is not to unfold these discrepancies but to provide a concise description about the most important elements of this topic.

The history of yoga goes back to pre-Vedic Indian traditions, in the Indus valley civilization over 5000 years ago. A number of seals and fossils were found from this era with motives and figures performing yoga (mainly meditation) (Devereux, 1994; Vígh, 1972; Weninger, 1986). The first ancient text with the word of yoga is the Rig Veda. Rig Veda is one of the four Vedas which derive from around the second millennium (1550) BCE. Vedas are collections of songs, mantras, and rituals written in Sanskrit and traditionally used by Brahmins, i.e., the Vedic priests (Vígh, 1972). The word "*veda*" means knowledge or wisdom; according to tradition, the content of the Vedas were received by rishis (enlightened persons) after long spiritual experiments and compiled by Vyasa (Bhavanani, 2013; Devereux, 1994; Vígh, 1972; Weninger, 1986). Other important writings are the Upanishads from around 900 BCE, which are the secret teachings at the end of the Vedas. The word Upanishad means "sitting next to", since the students were sitting next to the teacher listening to the sacred teachings. The four Vedas stand as the basis of the complete Hindu philosophy. There is a system of the six orthodox Indian philosophies based on the Vedic wisdom which is called "*sat darsana*". These six traditional schools are Nyaya, Vaisheshika, Samkhya, Yoga, Mimamsa, and Vedanta (Baktay, 1992; Héjjas, 2005). This system of Yoga is described in the famous Patanjali Yoga Sutras, which is one of the most important text on yoga originating from around the 1st – 2nd century CE. Literature of yoga is also found in the Hindu mythological writings called the Puranas, as well as in the two Hindu epics, the Mahabharata and Ramayana. Bhagavad Gita, which is part of the Mahabharata, is a highly appreciated scripture of both Hinduism and yoga. It can be translated as "Song of God" and it derives from around 350 BCE but supposed dates vary considerably (from 1st century BCE to 1st century CE) (Héjjas, 2005; Vígh, 1972; Weninger, 1986). There are several other resources of yoga literature, such as Yoga Upanishads, Yoga Tantras, and agamas (various scriptures, compendia) dating from several centuries BCE up to the 11-13th centuries CE (Devereux, 1994; Singleton, 2010). Other major and popular writings on yoga are the texts of hatha yoga from later times, such as the Hatha Yoga Pradipika (1350 CE), Shiva Samhita (15th-17th century CE), and the Gheranda Samhita (17th century CE) (Devereux, 1994; Singleton, 2010).

To sum it up, the traditional literature of yoga is vast, and there are considerable overlaps with the sacred scripts of Hinduism, Tantra, and other religious or esoteric writings. In ancient times, yoga was also an esoteric path referring to the fact that the teachings were not available for many people (Simpson & Weiner, 1989), only for some students (*chelas*) who were chosen by the gurus (teachers) and initiated into the teachings. For millennia, teachings were handed down by means of speech and practice (Drury, 1994; Weninger, 1987).

1.4. Teachings of yoga

As we can see, there is no one exclusive literature on yoga, but there are many scriptures and writings which are even overlapping with contiguous philosophies. Many Sanskrit phrases and terms are shared by these philosophies, however, they define them slightly differently due to their diverse perspectives (Baktay, 1992; Héjjas, 2005). This section does not clarify the proper origins and the various understandings of specific terms or teachings, but gives an overview about the holistic, universal concept of yoga on life (Bhavanani, 2013; Devereux, 1994).

Philosophy of life

As stated before, yoga, as a spiritual path, aims to reveal the truth of life and the true nature of a human being. Life, as one usually experiences it, is a constant change of happiness and sufferings, despite that there is a common desire in all human beings, namely, to live in harmony, peace, and love. The question arises: why is there so much suffering and why can one not find ultimate harmony, peace, and love? According to yoga, people live in ignorance called *avidya* which is the root cause of all sufferings and diseases. This *avidya* is caused by *maya*, the illusion, which makes one to see the phenomenal world as real (Bhavanani, 2013; Satyananda Saraswati, 2013). In contrast to *avidya*, *vidya* means wisdom, inner knowledge, or understanding. Yoga is a path which can unfold the illusion and direct to *vidya*. For that, one needs correct knowledge and proper practice. Instead of searching for the truth in the external world, the student needs to turn his/her focus inside for the revelation of the real. One of the main illusions, which needs to be dispelled, is the sense of separation, namely the false sense of "I-ness". A person usually experiences him/herself through his/her likes and dislikes (or in other words, with his/her typical patterns of the mind), however, the real "I" is nothing else but the soul, i.e., pure consciousness which is called in Sanskrit *atman*. This *atman*, the individual self is the same as the universal self, *Brahman*. Once this truth is revealed, one attains liberation which is called *moksha* and freedom or "isolation" that is *kaivalya. Moksha* (also called *nirvana* in Buddhist tradition) refers to liberation from the illusion and sufferings, liberation from rebirth, and *kaivalya* indicates the freedom or isolation of the self/consciousness from matter, the final state of absoluteness, the state of non-duality (Baktay, 1992; Bhavanani, 2013; Devereux, 1994; Héjjas, 2005; Kaczvinszky, 1995).

Another important core concept of yoga philosophy is the law of *karma*. *Karma* in itself means action, and the *law of karma* refers to the fact that after each action there is a re-action, and each happening in our life was preceded by past actions. It is also called the law of cause and effect (Baktay, 1992; Bhavanani, 2013; Devereux, 1994; Héjjas, 2005; Weninger, 1986, 1987). *Karma* actually implies the constant fluctuation of action and reaction which bounds one to the wheel of life, namely, to cycles of life and death (this is called *samsara* in Buddhist tradition), and to endless changes of happiness and suffering. Reaction, that is the fruit of the action (no matter if it is good or bad), can appear immediately or subsequently. Actions leave subtle imprints (*samskaras or vasanas*) which can manifest later on in life or in one of the next rebirths (Baktay, 1992; Bhavanani, 2013; Kaczvinszky, 1995; Satyananda Saraswati, 2013). According to this law, if one chooses a responsible and conscious life, one can create a happy and healthy life. (However, the *law of karma* is very complex, a person is often not aware of his/her deeds of the present life or previous lifetimes and does not see him/herself in control). Yoga is the path of consciousness which aims actions leading towards harmony and truth. At the end of the path, one can become liberated (as previously mentioned as *moksha*) of the *law of karma* and *reincarnation* and reach final freedom (Baktay, 1992; Bhavanani, 2013; Devereux, 1994; Héjjas, 2005; Weninger, 1986, 1987). The path of yoga is in tune with *dharma*, the eternal law of life (or in other words the natural order of life). *Dharma* is the underlying truth, that is the law of the universe, and *karma* is a manifestation of this cosmic law. Yoga aims to create thoughts, words, and actions which are aligned with the law of *dharma*. If one is attuned with *dharma*, he/she can live a harmonious, healthy, and happy life (Baktay, 1992; Bhavanani, 2013).

In modern psychology, mindfulness and positive psychology accords with some yogic philosophical views. Spiritual approach in positive psychology aims observance and the direction of the attention for changing the perspective of ourselves and our life. Thus it enhances acceptance and presence (Henry, 2006). Similarly, mindfulness emphasizes non-judgmental attention (observation of something without liking or disliking it, aka with open awareness) and there is a change in perspective on the self (Hölzel et al., 2011). Application of mindfulness techniques and spiritual practices are shown to lead to subjective well-being (Henry, 2006; Hölzel et al., 2011). Similar to yogic teachings of karma and subtle imprints (and the aim of taming the mind), cognitive psychology focuses on mental patterns (automatic thoughts, beliefs, schemata) and draws the attention on their role on our life and well-being (actions,

bodily feelings and emotions). Becoming aware and changing our mental tendencies can foster mental and physical health (Beck, 2014).

Yoga anatomy and physiology

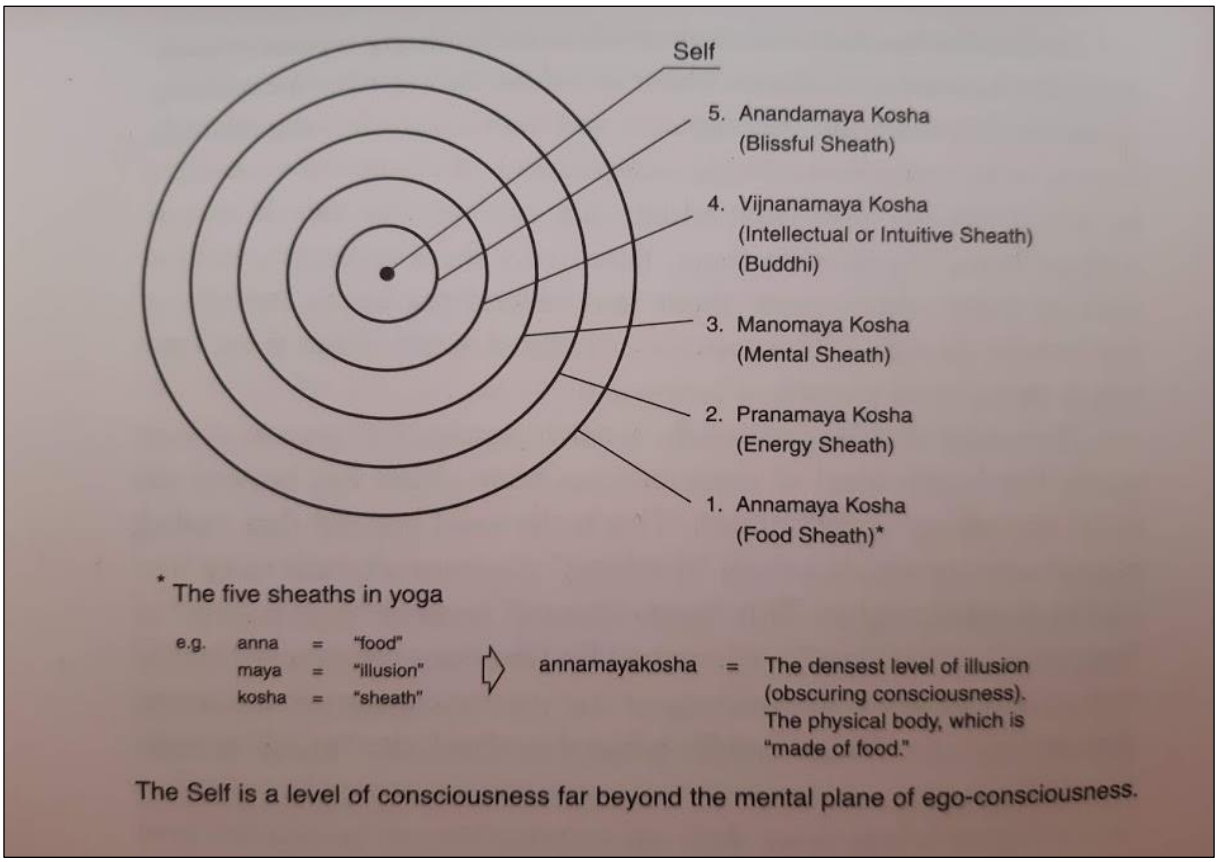
According to yoga, the human being is a complex entity having a spiritual center, *atman* which dwells in a body-mind vehicle to interact with the material world (Rishi, 2005). Yoga considers that one is not only the physical body but has three bodies which is called *trisharira,* and five layers or sheaths of existence named *pancha kosha* (Bhavanani, 2013; Rishi, 2005; Swartz, 2015). The word "*sharira*" means body, that is, which is subject to change. Thus, everything what changes is part of the body, or in other words, it is matter. This matter has various forms from very subtle to gross. The three bodies are called: *sthula, sukshma,* and *kaarana sharira,* i.e., the gross, the subtle, and the causal body. The gross body is made up by the five gross elements, earth, water, fire, air, and ether. It is actually the physical body what is tangible, and implies the five sense (nose, tongue, eyes, skin, ears) and the five active organs (anus, genitals, legs, arms, vocals) (Baktay, 1992; Swartz, 2015). The second one, the subtle body, is the body of the mind and the vital energies which keep the physical body alive. The five subtle elements (smell, taste, sight, touch, hearing) belong to it. The subtle body contains four main aspects of the mind or psyche: *chitta, manas, ahamkara,* and *buddhi*. *Chitta* is the storehouse of all contents of the mind, storehouse of all memories. *Manas* is the sensory mind, also referred to as the "lower mind", which interacts with the external world. *Ahamkara,* the sense of "I-ness", is the individual ego which feels itself as a distinct entity and provides an identity according to its likes and dislikes. It creates various emotions, also the feeling of separation and pain. *Buddhi* is often translated as the intellectual mind which has the power of discrimination and conscious decision. It is also referred to as the "higher mind" which is the doorway to inner wisdom (Baktay, 1992; Rama et al., 1976; Swartz, 2015). "On the other side of the mental complex" lies the innermost core of our nature, namely *atman,* but it is covered by the restless fluctuations of the mind. Since one identifies him/herself with the mind, the true self cannot be revealed. Therefore, yoga aims to turn the focus within and quiet the mind in order to get to know the true self (Baktay, 1992; Rama et al., 1976; Swartz, 2015). The third body, the causal one, is the most subtle body which contains the so-called *vasanas* and *samskaras*. *Vasanas* are imprints, tendencies, or patterns which derive from repeated acts of the past and create habitual thoughts, emotions, and actions in the present. *Samskaras* are deeper

imprints than *vasanas*, namely deeply ingrained habits or schemata. *Samskaras* and *vasanas* can be neutralized by conscious awareness and effort (Baktay, 1992; Swartz, 2015).

The concept of the five body sheaths or layers of existence are described in the old sacred text called *Taittiriya Upanishad*. The five layers are the followings: *annamaya kosha, pranamaya kosha, manomaya kosha, vijnanamaya kosha,* and *anandamaya kosha* (Bhavanani, 2013; Govindaraj et al., 2016; Rishi, 2005). As it can be seen, all include the term of *maya*, namely illusion, which implies that they are actually just apparently real. They surround and conceal the true self, *atman* (see Figure 1). They can be visualized as layers within each other starting from the most subtle and ending in the grossest called *annamaya kosha* (see Figure 2). Naturally, this is in line with the Hindu creation theory, namely that manifestation starts from the most subtle substances which procreate the less subtle and finally the grossest elements and components. This indicates that information and happenings of the subtler layers effect the grosser ones. Thus, power of the mind on physical health is obvious (Baktay, 1992; Bhavanani, 2013; Hariharananda, 2004; Satyananda Saraswati, 2002).

Figure 1

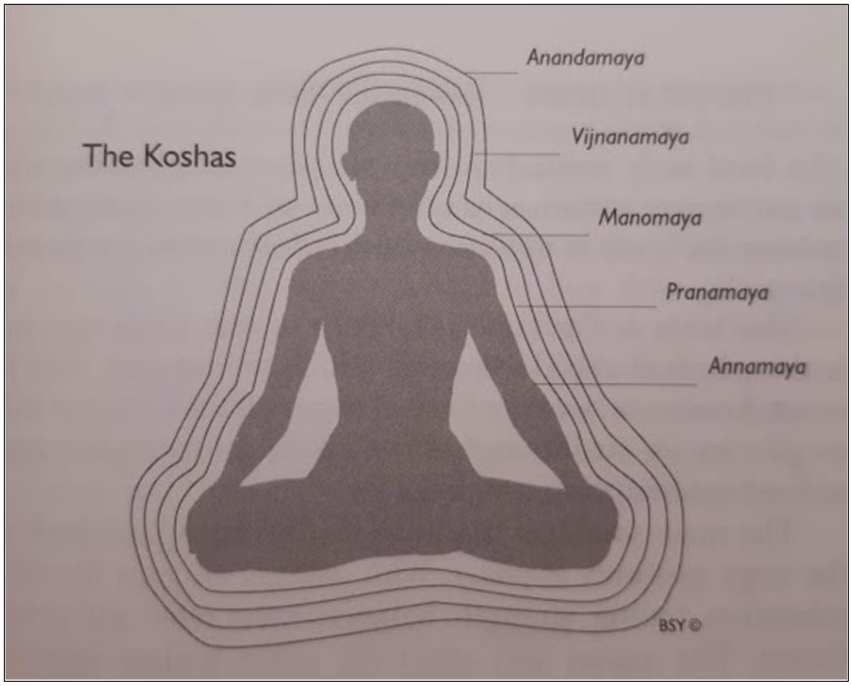
The five layers of existence/ five body sheaths (pancha kosha) depicted as they conceal the true self



Note. Rama et al., 1976, p. 78.

Figure 2

The five body sheaths (pancha kosha) as they can be visualized concerning the body



Note. Rishi, 2005, p. 25. (Bihar School of Yoga).

Annamaya kosha represents the physical body and belongs to the gross body (*sthula sharira*). The word *anna* means food implying that proper food and balanced diet are essential for health of the physical body (Rishi, 2005; Swartz, 2015).

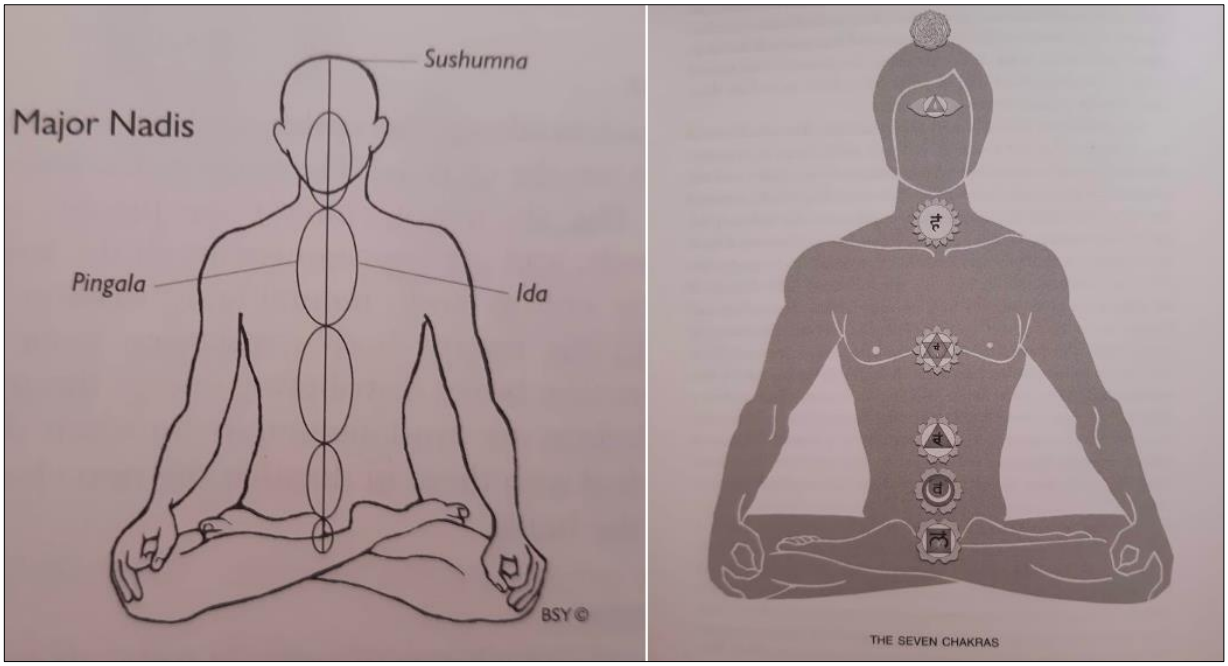
The next layer, *pranamaya kosha*, is the energy body, which can be understood as a physiological system making the physical body alive, providing vital energy for its motions. *Prana* means vital energy which pervades the whole universe and also the human body (the term prana actually refers to three levels of understanding: prana of the universe, prana of the human body, and prana as one of the 5 sub-pranas of the body). This energy flows through the body in subtle channels called the *nadis*. They weave through this kosha (such as the nerves do it in the physical body) (Rishi, 2005; Swartz, 2015). According to yogic texts there are around 72.000 *nadis* in the body (however, other numbers are also available), among those three are highly relevant. *Ida*, which flows through the left nostril, *pingala* which streams through the right nostril, and *susumna*, the "middle nadi" flowing from the base of the spine along it (inside it) till the head (see Figure 3, left-hand side).

Susumna represents balance, while *ida* represents the moon side (right hemisphere), the feminine energy, passivity, and the mental tendencies, and *pingala* represents the sun (right hemisphere), the masculine energy, activity, and physical tendencies. Yoga (especially hatha

yoga) aims to create balance between the two sides and thus awaken the pranic flow in *susumna*. This can happen by the activation of the dormant energy called "*kundalini*". This is symbolized by a sleeping snake, which coils three and a half times at the base of *susumna*. Once the unconscious potentials of the body are activated through yoga practices, this dormant energy starts to lift which is often referred to as "kundalini rising" (Rama et al., 1976; Rishi, 2005; Satyananda Saraswati, 2002). In this pranic system there are also so-called chakras which are junctions of nadis distributing energy throughout the body. Chakra literally means wheel or vortex, and there are several of them, however usually six or seven main chakras, energy centers are mentioned. These chakras are actually represented in all the koshas and are responsible for specific physical, mental and behavioral characteristics. The seven main chakras are located along *susumna* nadi, and they are symbolized specific ways (these can differ according to various texts) (see Figure 3, right-hand side). Teaching about the chakras is vast (complete books or chapters are written on this specific topic (Rama et al., 1976; Rishi, 2005)), here, they are only shortly presented. *Mooladhara chakra* is located at the base of the spine, its gross element is earth and represents stability, the feeling of "being grounded". *Swadhistana chakra* is at the line of the genital organs and is associated with pleasure and sexuality. It has the element of water. *Manipura chakra* dwells at the level of the navel and owns the element of fire. It represents the ego, self-assertion, dynamism, and personal power. *Anahata chakra* is located at level of the heart, it is connected with the element of air and indicates unconditional love, tolerance, and gratitude. *Vishuddhi chakra* is situated at the line of the throat it is the center of purification, communication, free self-expression, and creativity. The element of space belongs to it. The next two chakras are above the gross elements. *Ajna chakra* is called the third eye, it is located in the middle of the forehead or midbrain and stands as the command center. It is the center where intuition and wisdom can develop, and the mind becomes steady and strong. Also, clairvoyance and telepathy are associated with this chakra. The last one is *Sahasrara*, the crown chakra, located at the top of the head. It is sometimes not even referred to as a chakra but a gateway to or abode of highest consciousness. It is symbolized by a thousand petals lotus. It is the center where the mystical union of matter and consciousness and the merging of the individual soul with the supreme soul takes place. Since this experience lies beyond the realm of mental functioning, it cannot be explained by verbal terms (Rama et al., 1976; Satyananda Saraswati, 2002). Concerning the second layer of existence, *pranamaya kosha*, it is also worthy to note that even prana can be differentiated into further sub-pranas. In fact, there is a special path of yoga called *swara yoga*, an ancient profound teaching of the

pranic body (Muktibodhananda, 1984). *Pranamaya kosha*, together with the next two koshas are the part of the subtle body, *sukshma sharisa.*

Figure 3
Illustration of the major nadis and chakras



Note. Rishi, 2005, p. 27. (Bihar School of Yoga) (left-hand side); Rama et al., 1976, p. 172. (right-hand side).

Manomaya kosha is translated as mental body since the word "*mano*" refers to *manas*, which means mind. It is the instinctual and emotional mind which takes care of the basic needs and desires of the individual. Thus, the focus of this sheath is turned outward. It includes the above-mentioned *chitta, manas, ahamkara*, and even the lower levels or basic functions of *buddhi*, such as rational thinking (Rishi, 2005; Swartz, 2015).

Vijnanamya kosha is called the intellect or wisdom sheath. It is aware of itself, and it embodies the higher level of *buddhi* with high level of self-reflection, good psychic abilities, wisdom, and intuition. With the help of Western psychotherapy, one can develop to about the middle level of this layer (Rishi, 2005; Swartz, 2015).

The last sheath is *anandamaya kosha*, the bliss body layer, which belongs to the causal body (*kaarana sharira)*. This bliss is not an emotion, but an ineffable experience of peace and love which derives from the contact with pure consciousness. For that, the focus must be turned inside and thereby the bliss of the eternal consciousness which is reflected in this sheath can be experienced (Rishi, 2005; Swartz, 2015).

As it can be seen, yoga owns a very different perspective on the human body compared to modern sciences. One main difference between them is the concept of matter. According to yoga philosophy everything is matter except from pure consciousness, thus layers of the body encompass the physical body, the psyche and all mental tendencies. In contrast, in Western science – roughly saying – anatomy and physiology describe the physical body and its functioning, and psychology is a separate science which deals with the mind and mental tendencies (Baktay, 1992). Despite this basic discrepancy and the very different terminology yoga and science use, they show many similarities. Both Eastern and Western scientists have drawn many parallels between various aspects of yogic views on the body and scientific facts (e.g., the theory of chakras and nadis in line with physiological functioning; physiological effects of yogic practices), even complete books are written on this topic (Bhalekar, 2018; Vígh, 1985, 2007). Nonetheless, energetical components of yoga (prana, nadis, chakras) are not accepted by science yet. These concepts of yoga are similar to other medicines are treatments of complementary and alternative medicine (CAM), and are explained by intuitive thinking and beliefs and superstitions of CAM believers (Lindeman & Saher, 2007; Saher & Lindeman, 2005). According to scientific understanding, physical phenomena attributed to energy (namely "energetical sensations") are possibly attention-disclosed, i.e., attention induces sensory information (and then again are interpreted according to the person's beliefs) (Tihanyi et al., 2018). Concerning the concepts of the mind and mental functions in yoga and psychology, they can be comparable if one looks behind the terms and phrases (Bhogal, 2017; Kaczvinszky, 1994; Kaczvinszky, 1995; Rama et al., 1976; Vígh, 1985). For example, both yoga and psychology similarly accept the importance of the unconscious and that it works on the level of symbols. Both denotes that un/subconscious motives role human behavior, and both foster self-knowledge and self-reflection (Kaczvinszky, 1994). However, even if yoga aims to tame the mind, its final goal is to go beyond the mind. In turn, psychology aims to discover and deal with various aspects of the mind and psychic events. In fact, theories and practices of yoga and psychology can also greatly complete each other for becoming free of burden (Bhogal, 2017; Kaczvinszky, 1994; Rishi, 2005).

Summarizing the philosophy, anatomy, and physiology of yoga, the human being is a very complex creature. The final aim of yoga is to realize that one's true nature is *atman*, that is pure consciousness. However, for that, one needs the understanding and cultivation of his/her body and mind (Baktay, 1992; Bhavanani, 2013; Rama et al., 1976; Rishi, 2005; Swartz, 2015).

Yoga is a path which starts from the body and the mind in order to go beyond them and reach the spirit/soul.

1.5. Classification and further teachings of yoga

As mentioned before, there are several resources of yoga literature, also, teachings were traditionally handed down from guru to students, and yoga paths were not necessarily separated. It can be stated that there is only one yoga, however, there are various yoga paths or schools. They all aim to reveal the final truth beyond the experienced world and discard duality, but they use different methods for that. These paths can be classified variant ways (Baktay, 1992; Devereux, 1994; Weninger, 1986), two main classifications are presented in Table 1. According to one system (Sahay, 2013), yoga can be divided into two main categories, namely *Bhavanayoga* and *Prana Samyama Yoga*. *Bhavanayoga* refers to yoga paths which aim to cultivate proper attitude of the mind. These are: *jnana yoga*, the path of knowledge, *bhakti yoga*, the path of devotion, and *karma yoga*, the path of proper action (Sahay, 2013). These three yoga paths are unfolded also in Bhagavad Gita (Baktay, 1992; Hari, 2014). *Prana Samyama Yoga* consists of yoga paths which teach to control the breath in order to control the mind. *Mantra yoga*, *hatha yoga, laya yoga,* and *raja yoga* belong to this division. This classification is also found in Shiva Samhita (Vasu, 1914), which denotes that yoga aspirants are of four order: mild, moderate, ardent, the most ardent. Weak or mild students can engage in *mantra yog*a which works with the concept of sound, namely with recitations of special sounds or syllables. Reciting mantras along with proper breathing can result in the desired mental states. *Hatha yoga* aims to gain control over the breath and the subtle energies in the body with special physical practices (see later). It is closely connected to *laya yoga*, which refers to absorption or dissolution of the mind which can be reached through varieties of *laya* (means of absorption). The best *laya* is called *nada*, the internal sound. This dissolution of the mind can be attained through the practice of *hatha yoga*, or in other words, *hatha yoga* results in *laya yoga*. These practices are for quick-minded, eager students. Students with largest amount of energy, who are competent and firm, can be initiated to *raja yoga*, and actually all kinds of yoga. *Raja yoga* means royal path of yoga. Goal of *hatha yoga* practice is also to enter into the practice of raja yoga and can be noted as a preparation for the royal path (Sahay, 2013; Vasu, 1914).

Table 1

Classifications of main yoga paths

Divison according to Sahay (2013)		Division made by Swami Vivekananda
Bhavanayoga: yoga paths aiming to cultivate proper attitude of the mind*)*	*Prana Samyama Yoga:* yoga paths which teach to control the breath in order to control the mind	4 main paths for 4 main personality characteristics
Jnana yoga*:* the path of knowledge	***Mantra yoga****:* works with the concept of sound	***Bhakti yoga****:* for emotional and devotional persons
Bhakti yoga*:* the path of devotion	***Hatha yoga****:* uses specific physical practices	***Karma yoga****:* for active, diligent ones
Karma yoga*:* the path of proper action	***Laya yoga****:* uses means of absorption	***Jnana yoga****:* for ones with strong intellect and intuition
	Raja yoga*:* royal path of yoga; various teachings and practices – the eight-fold path	***Raja yoga****:* for ones with strong willpower and conscious control

Note. Many modern yoga styles are not mentioned here as they are mainly various forms of hatha yoga or combination of these paths.

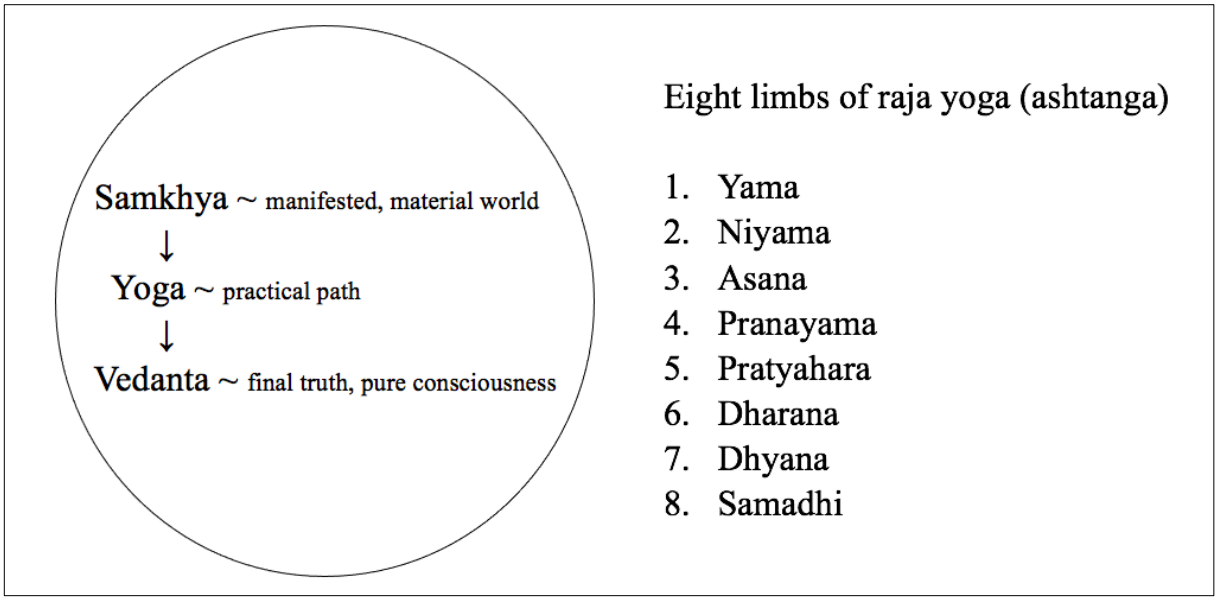
There is another modern division of yoga made by Swami Vivekananda at the end of the 19th century (Govindaraj et al., 2016; Michelis, 2005). He categorized yoga into four main branches which suit four personality characteristics. *Bhakti yoga* is for emotionally and devotionally inclined persons; *karma yoga* is for ones who are active and engage in diligent work, daily duties, or selfless service. *Jnana yoga* work through the intellect, thus it is suitable for aspirants with strong desire of knowledge and understanding and who are intuitive by nature (since mental knowledge is limited). Lastly, *raja yoga* is the path of ones who have strong willpower and conscious control (Devereux, 1994; Govindaraj et al., 2016; Satyananda Saraswati, 2013). Of course, these various paths can be practiced simultaneously (in fact, they even cannot be completely separated), which facilitates the spiritual progress. The path of raja yoga is presented in the next section, while the path of jnana, karma, and bhakti yoga is described in more detail in Appendix 1.1.

Raja yoga

Raja yoga literally means royal path of yoga. It is usually referred to yoga explained by Patanjali in his sutras which is part of the *sat darsana* system, that is the six schools of Hindu philosophy (Baktay, 1992; Héjjas, 2005; Satyananda Saraswati, 2013). For complete understanding of yoga, two other philosophies of the six, namely *Samkhya* and *Vedanta* need to be introduced. Samkhya stands as the basis of yoga. It describes the material world, and it is a dualistic teaching that differentiates between matter and consciousness (or soul) and takes them as two basic principles of life. In contrast, Vedanta (more precisely, Advaita Vedanta) is a non-dualistic philosophy which teaches about the final truth that only pure consciousness (i.e., the self or soul) exists. Matter and all the manifested world are just apparently real and are in fact the same as pure consciousness. Yoga stands between the two as a practical path, which leads one from the material world to the final non-dualistic truth, to the soul. These three together provide a comprehensive picture of yoga philosophy (Baktay, 1992; Héjjas, 2005) (see Figure 4, left-hand side); for more detail, see Appendix 1.2.

Figure 4

The system of yoga together with other philosophies (left-hand side) and the eight-fold path of raja yoga (right-hand side)



Practical path of raja yoga

The path of raja yoga – as mentioned above - is referred to Patanjali Yoga Sutras. This scripture contains 4 chapters and 196 sutras, namely verses. In fact, *"sutra"* means thread which

implies that the short aphorisms carry a vast teaching which can be comprehended only by competent yogis (true yoga practitioners) (Baktay, 1992; Satyananda Saraswati, 2013). In ancient times, gurus handed down the teachings by speech and these sutras served only as short reminders or "keywords". Later on, the sutras were supplemented with comments (Baktay, 1992). As the complete teaching embraces length of books, only some major elements are presented here.

Patanjali advices four main techniques to attain yoga, that is stopping the fluctuations or patterns of the mind ("Yogaschitta vrtti nirodhah" (Satyananda Saraswati, 2013, p. 31.). The first one is "*abhyasa and vairagya*" (Chapter 1, Sutra 12) which means repeated, persistent practice, and the mental condition of detachment which denotes ceasing attachment to desires. The second option is "*Ishvarapranidhana*" (Chapter 1, Sutra 23), that is complete devotion and surrendering to *Ishvara* or God. For that, for example, the recitation of aum mantra can be a great tool. The third path is called *kriya yoga* (Chapter 2, Sutra 1) which consists of *tapas, svadhyaya,* and *Ishvarapranidhana (see below).* The last one is the eight-stage path (Chapter 2, Sutra 29) which is also called ashtanga yoga (*ashta* means eight, *anga* means limb), one of the most known set of practices. The eight parts are the followings: *yama, niyama, asana, pranayama, pratyahara, dharana, dhyana,* and *samadhi* (Baktay, 1992; Satyananda Saraswati, 2013) (see Figure 4, right-hand side).

There are five *yamas* and five *niyamas* which are social and personal commandments or rules to serve the individual and the society. *Yamas*, the ethical principles are as follows:

- *Ahimsa*: non-violence to oneself and to others
- *Satya*: truthfulness
- *Asteya*: non-stealing
- *Brahmacharya*: often translated as celibacy or sexual abstinence, however it rather means continence or moderation in general (concerning aspects of both the body and the mind)
- *Aparigraha*: non-possessiveness or non-hoarding

These apply at the level of intention, thought, speech, and action. Following the *yamas* brings a calm and tranquil state of mind (Baktay, 1992; Héjjas, 2005; Iyengar, 1991; Satyananda Saraswati, 2013). *Niyamas* are rules for the individual, such as:

- *Saucha*: purity, cleanliness (both physically and mentally)
- *Santosa*: contentment
- *Tapas*: austerity, ardor

- *Svadhyaya*: it has a twofold meaning, that is study of the self and autodidact learning or education
- *Ishvarapranidhana*: complete surrendering to *Ishvara* or God, devotion to the "Lord" or to the universe

Each yama and niyama can be unfolded in long discussions since all have a very deep meaning. Practicing them stands as basis and fosters the progression on the path of yoga. However, perfection in any of them is a complete discipline in itself and results in a *siddhi,* i.e., great power or supernatural faculty (Baktay, 1992; Héjjas, 2005; Iyengar, 1991; Satyananda Saraswati, 2013).

The third limb is *asana*, which literally means posture. "Sthirasukhamasnam" (Satyananda Saraswati, 2013, p. 206.) says that asana is a steady and comfortable posture. Besides, it must be effortless. According to Patanjali, asana is a posture for meditation, he mentions it only in two sutras. However, achieving a posture which is suitable for meditation most often requires preparation (also, not only the body but the mind needs preparation), therefore the path of hatha yoga can be practiced. The relevance of proper posture lies in the fact that a steady and comfortable posture strengthens mental balance and prevents fickleness of mind (Baktay, 1992; Iyengar, 1991; Satyananda Saraswati, 2013).

Accomplished asana is proceeded by *pranayama*. *Prana,* the vital subtle force travels into the body through breath. "*Ayama"* means lengthening; "*yama"* refers to control. Thus, pranayama is controlling the movement of prana with the help of regulation of the breathing. This means firstly lengthening the breathing; however, final pranayama is the cessation of the breathing. Pranayama has four main aspects: *puraka*, the inhalation, *rechaka*, which is exhalation, *kumbhaka,* that is pause or retention of the breath (which can happen after inhalation called *antaranga kumbhaka* or after exhalation called *bahiranga kumbhaka*). There is a fourth type, which is natural stopping of the breath called *kevala kumbhaka*. In practice of pranayama, place (referring to the passage where the air travels, i.e., mouth or nostrils), number and time of breathing can be regulated. As a result of pranayama, the breath becomes prolonged and subtle which quiets down the mind and prepares it to turn inside. With this, the next step, namely *pratyahara* occurs (Baktay, 1992; Héjjas, 2005; Iyengar, 1991; Kaczvinszky, 1995; Satyananda Saraswati, 2013).

Pratyahara is the withdrawing of the senses from the outside to the inside. It is actually a mastery over the sense organs which are not any longer attracted by the external stimuli, but they are turned within. This state is the outcome of the previous stages. The first five limbs are called *bahiranga* meaning that they work on external world, namely on social and personal

behavior, the body and the breath, while the last three stages are named *antaranga* implying that they work on the internal world (Baktay, 1992; Iyengar, 1991; Satyananda Saraswati, 2013).

The next three stages, *dharana, dhyana,* and *samadhi* are also called together as *samyama,* perfect control over the mental processes. *Dharana* means concentration, focusing on one single object, which can be an external or an internal target. It can be a simple dot, a yantra (geometric mystical diagram), light of a candle, the breath in itself, or an internal focus point, such as a chakra, or even a mantra (a syllable which is a tool to direct the mind). Once the practice of dharana is strong and the focus flows in a steady stream without any interruption, the state of meditation, *dyhana*, happens. In common language, meditation is often interpreted as a mixture of contemplation, quieting the mind, or concentration, however, according to yogic understanding mediation takes place only once the focus is unbroken, and in addition to this, there is a conscious awareness over this process. The state of *samadhi* occurs if only the object is present in awareness, and there is no sensation of one's own self. It can be said that the person becomes one with the object of focus. This state of oneness gives glimpses of meditative trans, complete peace and bliss (Baktay, 1992; Iyengar, 1991; Satyananda Saraswati, 2013; Vígh, 1985). Even samadhi, however, has several stages. Reaching the final stage, there is only the existence of consciousness, pure bliss, and profound silence. This is, however, not possible to be described by words since it departed the dual world into a non-dual reality (Baktay, 1992; Iyengar, 1991; Kaczvinszky, 1995; Rama et al., 1976; Satyananda Saraswati, 2013). As a great yogi, Ramakrishna, phrased it, "It is a state wherein self-identity and the field of consciousness are blended in one indissoluble whole" (Rama et al., 1976, p. 213.).

Hatha yoga

As stated before, raja yoga, the royal path, is for aspirants with strong willpower and control, thus it often requires preparation (Devereux, 1994; Govindaraj et al., 2016; Satyananda Saraswati, 2013). Hatha yoga is a branch of yoga which aims to build up to raja yoga. Also, some of the hatha yogic practices, namely asana and pranayama are in fact part of raja yoga, however, in hatha yoga, they are described in much deeper and detailed level and practiced intensively (Devereux, 1994; Rama et al., 1976; Sahay, 2013). It can be stated that teachings of raja yoga mainly focus on the mental practices (control over the mind). In turn, hatha yoga firstly prepares (purifies and strengthens) the body before entering into to the field of mental techniques and meditation (Muktibodhananda, 1985). That is why hatha yoga is called as "yoga

of the body", "physical yoga", or "yoga of health" (Devereux, 1994; Muktibodhananda, 1985; Yesudian & Haich, 1992).

The word of "*hatha*", on the one hand, means force or determined effort, thus it refers to the fact that yoga (union) can be reached through dedicated and effortful practice. On the other hand, the term can be separated into "*ha*" and "*tha*" which represent the opposites in life. "Ha" indicates pingala, the nadi of the right nostril, the sun, and activeness, and "tha" stands for ida of the left nostril, the moon, and passiveness. With achieving balance between these two sides (which can be also understood as balance between the body and the mind, or consciousness and prana, aka Shiva and Shakti) union is reached (Muktibodhananda, 1985; Sahay, 2013). For that, hatha yoga aims to control over prana, especially with the help of respiration. Once balance is created between the pranic flow in ida and pingala, then directed into susumna (the main channel), and lifted till the crown, the state of samadhi is reached. It can be seen, that breathing and prana are highly important in hatha yoga (Muktibodhananda, 1985; Sahay, 2013).

Elements of hatha yoga

Hatha yoga encompasses various techniques, such as *asana, pranayama, kriya (shatkarma), mudra, bandha,* and *samadhi* or sometimes texts cover also *pratyahara, dharana,* and *dhyana* (the terms have also various synonyms). Most of the hatha yoga scriptures do not mention the *yamas* and *niyamas,* however, they give advices how to live, what are the so called "do's and don'ts" (e.g., H.Y.P. Chapter 1, Sutra 15-16.). Also, time and place of practice, appropriate clothing is described, as well as proper diet (controlled diet called *mitahara*) for success in hatha yoga is presented (Mallinson, 2004; Muktibodhananda, 1985; Sahay, 2013; Vasu, 1914).

As mentioned before, hatha yoga starts with the physical body, the two main practices are *asanas* and *kriyas*. *Asanas*, the specific postures bestow stability, health, and suppleness (or feeling of lightness) both physically and mentally (Sahay, 2013). Additionally, asanas possess so called trans-physical effects. In line with tantra, according to the principle of resonance and correspondence, physical postures effect the subtle body, namely the pranic flow, the nadis and the chakras, thus also the mind (Sahay, 2013; Sarbacker, 2014; Satyananda Saraswati, 2002). For example, a disturbance in the flow of prana, which is referred to as an energetic blockage, can be dissolved by asana, or other techniques such as kriyas or pranayamas (Satyananda Saraswati, 2002). Beside the final goal of reaching raja yoga and liberation, hatha yoga also aims to create a balanced energy flow in the body which results in better mental and physical

health, and fosters further progression on the path of yoga (Sahay, 2013; Satyananda Saraswati, 2002).

Most hatha yogic texts refer to 84 as the total number of asanas (e.g., H.Y.P. Chapter 1, Verse 33; Goraksa Sataka, Chapter 1, Verse 9), however, majority of them does not introduce all, but only a few (Mallinson & Singleton, 2017; Sahay, 2013; Satyananda Saraswati, 2002). For example, Hatha Yoga Pradikpika describes 15 asanas, among those 4 are meditation poses, one is Savasana, the corpse position for relaxation, and there are 10 cultivated poses (difficult ones which possibly need preparation). These poses often require preparation, thus various asanas could be formed in order to perform these ones (Muktibodhananda, 1985; Sahay, 2013). Performing an asana starts with attaining the posture with movement, then maintaining it without movement by keeping constant breathing, and then releasing the posture (Govindaraj et al., 2016). Maintaining a pose comfortably together with normal, relaxed breathing requires time, that is why persistent practice is needed (Sahay, 2013).

Along with asana, *kriya* which is also called *shatkarma* ("*shat"* means six; "*karma"* means action) is practiced. Kriyas are purification techniques in order to cleanse the nadis for the sake of pranayama. Kriyas prepare and give strength to the body and the mind since one needs to gain voluntary control over the involuntary reflexes to perform these kriyas. Practices encompass various cleansing techniques of the nostrils, the respiratory system, the eyes, and the digestive system. According to yogis, these practices lead to a deeper knowledge of the body and enhance both physical and mental health and immunity (Sahay, 2013; Satyananda Saraswati, 2002).

After success in asana and kriyas, the practice of *pranayama* follows. According to hatha yoga, the pattern of breathing is in relation with the life span: "the longer the breath is the longer the life lasts" (Mallinson, 2004; Sahay, 2013; Satyananda Saraswati, 2002). On the other hand, breathing has a direct connection to the body and the mind: patterns of the breathing are quickly reflected on them, and vice versa (Kaczvinszky, 1995; Rama, 1983; Sahay, 2013; Satyananda Saraswati, 2002). Furthermore, breathing is also a great mean of gaining control, since it flows involuntarily, however, with attention it can be easily manipulated willfully. Controlling the breath can result in both control of the body and mind, and enhancement of voluntary functioning. The mystics of prana and breathing embraces a vast teaching, there is even a complete branch of *swara yoga* which unfolds this topic (Muktibodhananda, 1984). The final aim of pranayama practice is the purification of the nadis and conscious control of prana in order to reach the state of mental balance, stability, namely the state of samadhi (Baktay, 1992; Bhalekar, 2017; Sahay, 2013; Satyananda Saraswati, 2002). Two main texts on hatha

yoga (Hatha Yoga Pradipika and Gheranda Samhita) describe eight types of pranayama (named also as *kumbhaka*), however these are not exactly the same ones. All pranayama practices operate with inhalation, exhalation, and most importantly, with retention. Number of repetitions, time of practice, place of breathing (nostril or mouth), quality of breathing, place of concentration, and direct effects are, however, very diverse (Mallinson, 2004; Sahay, 2013; Satyananda Saraswati, 2002).

Pranayama practices in general result in great health benefits such as the breath slows down leading to mental calmness, the digestive system improves, many diseases get destroyed, and also blissful experiences and extraordinary powers can be gained (Muktibodhananda, 1985; Sahay, 2013). "By proper practice of Pranayama, all diseases get diminished (whereas) due to improper practice of Pranayama, all diseases get generated" (H.Y.P. Chapter 2., Verse 16.) (Sahay, 2013, p. 58.). In fact, pranayama in itself is a great tool for purification, and even serve as a complete path up to samadhi/enlightenment (Bhalekar, 2017; Sahay, 2013). However, for that, a great guru and personal teaching is needed (Satyananda Saraswati, 2002).

Mudras and *bandhas* are also important elements of hatha yoga. Mudra is translated as gesture which aim to activate particular psychic attitudes. Mudras are specific physical positions or gestures of the hands, head, and eyes, or a pose of the whole body, which affect the pranic flow and enhances subtle awareness of the practitioner. Bandha means "hold" or "lock". Bandhas are specific physical movements to lock and then redirect the energy flow in the body. As these practices, together with kriyas and pranayamas, are very precise, they are essential to be taught personally as in traditional times (Sahay, 2013; Satyananda Saraswati, 2002).

The later limbs of hatha yoga differ across texts but they are all means of mental practices, such as concentration, meditation, and the final step of samadhi. This is already a stage where hatha yoga enters raja yoga, and aims to reach the final state of oneness (Sahay, 2013). For some further details on the various limbs of hatha yoga, see Appendix 1.3.

To sum it up, hatha yoga starts with physical practices in order to attain raja yoga. Another important aim of hatha yoga is also to remove all kind of pains and sufferings (H.Y.P. Chapter 1, Verse 10.) Both physical and mental health are very important aspects of hatha yoga, many verses emphasize the beneficial health outcomes of various practices (Sahay, 2013; Satyananda Saraswati, 2002). Final aim of yoga might not be possible to reach, if the aspirant has not completely dedicated his/her life to the practices. Nevertheless, yoga practice does not require an ascetic life. Even if one is engaged in society, work and family life, he/she can advance from yogic practices and seek for spiritual progress. For that, also the mental attitude

of karma and bhakti yoga can be helpful, and the various paths of yoga can foster each other's positive effects (Baktay, 1992; Iyengar, 1991; Vasu, 1914).

1.6. Yoga in modern times

During the last 1.5 century, tendencies in yoga teaching started to change tremendously, and the expression of "modern yoga" emerged (Michelis, 2005). For today, yoga became entirely globalized, its renewed form is available in form of classes, workshops, retreats, and teacher trainings all around the world. Classes and workshops are offered in person or even online in schools, colleges, fitness studies, gyms, or at workplaces, and, of course, at dedicated yoga studios and ashrams (Michelis, 2005; Singleton & Byrne, 2008). This renewal of yoga started around 150 years ago when Westerners showed higher interest towards the Hindu culture than before, and at the same time, an intention from the Indian gurus arose to spread the teachings of yoga in the word. Thus, an interaction of the Western and Eastern culture began (Hauser, 2013; Michelis, 2005; Singleton & Byrne, 2008). There are complete books about the emergence and development of modern yoga (Hauser, 2013; Michelis, 2005; Singleton, 2010; Singleton & Byrne, 2008); a summary about the most important elements and figures of that are presented in Appendix 1.4.

In a nutshell, this transnational exchange and alteration of yoga resulted in many forms and variations of yoga teachings. The process happened though the interaction with other traditions and teachings, and with adaptation to different times, places and people (Singleton & Byrne, 2008). In this change, the most effected aspect of yoga practice was its physical aspect: asana practice has become highly popular and got spread in both fitness-oriented and therapeutic forms (Singleton, 2013). In line with this, in the modern, globalized world yoga is often solely understood as a physical practice (Singleton, 2013; Singleton & Byrne, 2008).

The majority of the yoga classes offered in the West are body-focused practices which fall under the umbrella of hatha yoga. There are various types and styles of yoga from well-known to less famous ones, such as basic hatha yoga, Iyengar yoga, ashtanga vinyasa, vinyasa, power, restorative, tantric, anti-gravity, Kripalu, Viniyoga, Bikram yoga, etc. (Park et al., 2018). These classes involve asanas, more precisely physical exercises in dynamic, static, or in both forms, and also often pranayamas, and other components such as relaxation and meditation techniques. Asana and pranayama techniques may include bandhas and mudras (Devereux, 1994; Park et al., 2018). Classes, if they are taught in a more holistic manner, can be

supplemented with short kriya techniques, mantra chanting, or philosophical teachings. Accordingly, yoga classes considerably differ with respect to their content, especially concerning the inclusion of philosophical or spiritual elements. Practices might be thought in a more materialistic or spiritual manner or combining the two, thus people with various interest can find their choice (Cramer, Lauche, et al., 2016; Park et al., 2018; Rama et al., 1976).

Yoga as it is practiced today might be roughly classified into two main categories: asana-based yoga classes which are taught individually without a particular background (such as simple hatha yoga, flow, vinyasa, power, anti-gravity, or yin yoga (Park et al., 2018)) or teachings of yoga traditions and schools formed in the last 1.5 centuries (see Figure 5). These traditions and schools can vary according to their focus. Some of them put more emphasis on the physical practice (e.g., Iyengar yoga or ashtanga vinyasa yoga of K. P. Jois), and some focus mainly on the mental level (e.g., Ramana Maharishi's teachings, the early Transcendental Meditation of Maharishi Mahesh Yogi, Sri Chinmoy's teaching, the Chinmaya Mission). There are ones which equally include philosophy and physical and mental practices (Himalayan Yoga Institute, Kriya Yoga, Sivanada Yoga, Satyanda's Bihar School of Yoga, Kaivalyadhama Institute at Lonavla, or The Yoga Institute in Santacruz, Mumbai). Some of those incorporate denominational aspects, even if they are not exclusive for devotional aspirant (ISKCON of Swami Prabhupada, Sahaja Yoga of Shri Mataji Nirmala Devi, or Kundalini yoga of Yogi Bhajan) (Devereux, 1994; Michelis, 2005; Tóth-Soma, 2017).

Figure 5
Yoga practice in modern times

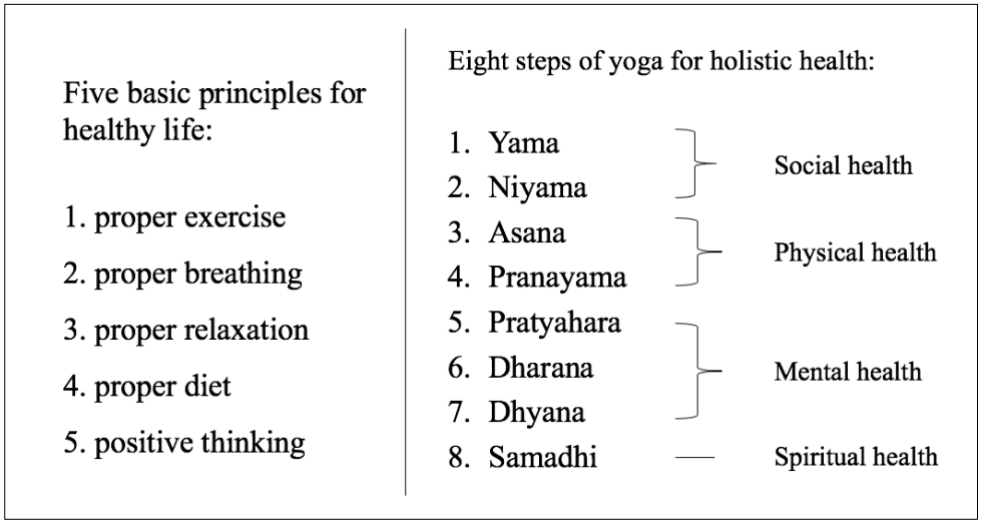
Asana-based yoga classes (taught individually without a particular background)	**Teachings of yoga traditions and schools formed in the last 1.5 centuries**			
	Emphasis on physical practice	Emphasis on mental practice	Integrative ones	Integrative ones with denominational aspects
• Hatha • Flow yoga • Vinyasa yoga • Power yoga • Anti-gravity • Yin yoga	• Iyengar yoga • Ashtanga vinyasa • Bikram yoga	• Ramana Maharishi's teachings • Sri Chinmoy's teaching • Chinmaya Mission	• Himalayan Yoga Institute • Kriya Yoga • Sivanada Yoga • Satyanda's Bihar School of Yoga • Kaivalyadhama Institute • The Yoga Institute	• ISKCON • Sahaja Yoga • Kundalini yoga

Note. This summary is only an overview and not full list of existing yoga types and styles today. Especially, there are several other asana-based yoga classes.

Yoga for holistic health

Even if asana practice is probably the most dominant practice of yoga nowadays, many modern traditions or yoga schools – as mentioned above – teach it as a holistic path (Iyengar, 2014; Rama, 1983; Sivananda Yoga Vedanta Centre, 2008; Tóth-Soma, 2017). For example, in Sivananda Yoga tradition jnana, bhakti, karma, and raja yoga are all relevant beside hatha yoga practices. In this tradition, five basic principles of yoga for healthy lifestyle (phrased by Swami Vishnudevananda) of modern people are the followings: 1. proper exercise, 2. proper breathing, 3. proper relaxation, 4. proper diet, 5. positive thinking and meditation (Sivananda Yoga Vedanta Centre, 2008; Tóth-Soma, 2017) (see Figure 6, left-hand side). Also, many modern traditions and schools teach the eight limbs of raja yoga according to the Yoga Sutras of Patanjali, which actually describe steps for holistic health. They work on various levels of health, by and large, *yamas* and *niyamas* stand for social health, *asana* and *pranayama* for physical health, *pratyahara*, *dharana*, *dhyana* for mental health, and *samadhi* reaches the spiritual level (Satyananda Saraswati, 2013) (see Figure 6, right-hand side). Furthermore, several books give yogic advices for holistic health, such as physical practices, time and place of practice, bathing, diet, relaxation and sleep, ethical and social guidelines, or suggestions for sexual life (Devereux, 1994; Iyengar, 1991; Sivananda Yoga Vedanta Centre, 2008; Vígh, 1972; Weninger, 1991).

Figure 6
Yogic advices and practices for holistic health



Note. Five basic principles for healthy life according to Swami Vishnudevananda (left-hand side); Eight steps of yoga according to Patanjali Yoga Sutras (right-hand side).

To sum up, in modern life, yoga is a tool for holistic health. Original texts on yoga also emphasized the importance of health. According to Patanjali Yoga Sutras, disease is one of the main obstacles on the path of yoga, thus to maintain health is highly important (Kaczvinszky, 1995; Satyananda Saraswati, 2013). Hatha yoga directly aims to create both physical and mental health (Sahay, 2013; Satyananda Saraswati, 2002). Today, there are already great amounts of books and yoga courses or workshop which provide techniques for specific age groups or diseases (Bhavanani, 2013; Iyengar, 2014; Kramananda, 1983; Sivananda Yoga Vedanta Centre, 2008). The term "yoga therapy" came alive and is widely used (Bhavanani, 2013); therapeutic yoga is becoming more and more prominent for both various physical and mental illnesses (Bhavanani, 2013; Bhogal, 2017; Kramananda, 1983; Rama et al., 1976; Rishi, 2005).

1.7. Yoga and modern science

Yoga is ancient wisdom, even called "ancient science", however, from a modern scientific point of view, it is an old tradition with various teachings and several practices (Baktay, 1992; Bhavanani, 2011; Broad, 2012). Modern science tries to explore evident effects of yogic practices, underlying mechanisms, as well as there are tendencies to bridge modern scientific and yogic views on life and human functioning which seems quite contradicting at the first sight (Broad, 2012; Hayward & Varela, 2001). Western thinking and science are mainly based upon materialism: since matter exists, aka the human body and brain can exist, in which the human mind and the human consciousness can come alive. The yogic view is just the opposite: consciousness is first. Existence of consciousness makes the creation of the mind possible, and finally matter comes into life. There is always a subtler imprint or "truth" behind the manifested matter or the mental patterns (Baktay, 1992; Kaczvinszky, 1943, 1994). Despite this fundamental difference, some of the scientific outcomes correspond to the ancient yogic views. For example, modern physics, more precisely quantum mechanics, is aligned with ancient Eastern philosophies as it is also presented in the famous book of Fritjof Capra entitled "The Tao of physics" (Baktay, 1992; Cook et al., 2009; Devereux, 1994; Harrington, 2008; Weninger, 1986). Also, psychological studies on altered states of consciousness, hypnosis, suggestibility, or the popular mindfulness and mindsight studies show in that direction, that the yogic views on human consciousness, mind and body have relevance and might be worthy of study even from a scientific point of view (Baktay, 1992; Cook et al., 2009; D. J. Siegel, 2010; R. D. Siegel, 2014). Nevertheless, science also has its limitations, it is only one perspective, or in other words, one way of investigation of life, as various authors said (Baktay, 1992; Broad,

2012; Cook et al., 2009; Harari, 2014; Rama et al., 1976; Wilber, 2011). The aim is, however, not to deeply discuss this topic, only to point out the differences of modern science and yogic views, and the limitations of scientific enquiry of yoga, especially in the fields of consciousness and spirituality (Baktay, 1992; Broad, 2012; Cook et al., 2009; Rama et al., 1976). Yet, modern clinical research and current neuroscience already proved that (ancient) contemplative and spiritual practices can change brain function and there is also clear indication of the relationship between these practices and mental and physical health (Cook et al., 2009; D. J. Siegel, 2010). Concerning mental health, many constructs of yoga and other Eastern philosophies or movement forms (see later) were adapted to modern psychology and investigated scientifically, these are, for example, the above-mentioned mindfulness, or self-compassion, spirituality, and body-awareness (Szabolcs et al., 2021).

Scientific approach to yoga

Scientific enquiry of yoga started at the beginning of the 20th century and expanded greatly during the last couple of centuries and it seems to proliferate even today (Field, 2016; Michelis, 2005; Patwardhan, 2017; Singleton & Byrne, 2008). Positive health benefits of various yoga practices are of main interest both in terms of general health and therapeutic aspects in case of several diseases (Bhavanani, 2013; Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016; Ross & Thomas, 2010; Singleton, 2013). The phrases of "yoga therapy" and "yoga as medicine" are talkative (Bhavanani, 2013; Journal & McCall, 2007). Yoga practice can be a tool for prevention of disease, promotion of health, management of diseases or disorders, and rehabilitation. Yoga teachings provide not only physical practices, but also philosophical principles, lifestyles changes, such as healthy diet or relaxation, and coping skills which are all means of yoga for these potential benefits (Agte & Chiplonkar, 2007; Bhavanani, 2011; Stec, 2020). Nonetheless, majority of scientific research focuses on the health benefits of physical practices in form of asana classes, which is not surprising as it is the most common form of practice today (Elwy et al., 2014; Field, 2016; Groessl et al., 2015; Singleton, 2010, 2013).

From a scientific viewpoint, yoga classes belong to the so-called mind-body exercises (Mehling et al., 2011; Patwardhan, 2017) and to the Eastern movement forms (Boros et al., 2019; D. H. K. Brown, 2013; Lu et al., 2009). Eastern movement forms, such as tai chi, chi kung, kung fu, judo, aikido, or yoga derive from Asian cultures, however, nowadays there are rather cultural hybrids through they long development and spread in the West (D. H. K. Brown,

2013; D. H. K. Brown & Leledaki, 2010; Lu et al., 2009; Theeboom & De Knop, 1999). Despite their intercultural changes and adaptation to Western cultures, they are still distinct from the usual Western sports and physical activities. They are taught as lifelong activities and imply a whole lifestyle. They have a philosophical background and aim not only physical health but a complete self-cultivation, spiritual development, and harmony in life. Mindful presence is a main component during practice which involves both static and dynamic elements, as well as awareness on the relationship between physical and mental-emotional processes has a great importance (Boros et al., 2019; D. H. K. Brown, 2013; D. H. K. Brown & Leledaki, 2010; Lee et al., 2015; Lu et al., 2009). These last aspects are shared by the so-called mind-body exercises (Mehling et al., 2009, 2011, 2012). In mind-body exercises there is a constant non-judgmental awareness on the bodily processes, sensations (called body awareness), and their relation to the mental happenings. Awareness on the body fosters mindful attention on mental and behavioral happenings which can enhance self-regulation and better person-environment interactions resulting in more harmony and the feeling of wholeness. Thus, body awareness is a kind of embodied self-awareness experienced in many layers of reality, at the level of the body, mind, action, and interaction (Mehling et al., 2009, 2011, 2012). Movement forms which belong to these two categories are also parts of CAM (Sirois et al., 2018) and referred to as Meditative Movement Therapies (MMT) which are characterized by (1) some form of movement/body postures, (2) focus on breathing, (3) calm state of mind which aims (4) deep state of relaxation (Langhorst et al., 2013; Larkey et al., 2009).

Based on these categorizations, it can be surmised that modern yoga classes (which are all various forms of hatha yoga) differ from other forms of physical activity in several ways, which are the followings: (1) its specific body postures including relaxation poses, (2) breath regulation, (3) longer/sustained maintenance of the postures and (4) the requirement of constant non-judgmental attention during practice (Govindaraj et al., 2016; Impett et al., 2006; Veda Bharati, 1985; Yesudian & Haich, 1992). Besides these elements, yoga classes often include yogic principles, such as non-violence, which refers to respecting one's own body's limitations, along with ardor and perseverance (Cramer et al., 2014; Deborah, 2009; Park et al., 2018). Furthermore, as also mentioned above, yoga classes might comprise specific pranayama techniques, mudras, bandhas, yogic meditation techniques, or various philosophical or spiritual contents (Cramer, Lauche, et al., 2016; Park et al., 2018; Rama et al., 1976). Classes are diverse concerning physical practice as well, some of them put more emphases on dynamic, some on static exercises, or they might combined the two almost equally (Cramer et al., 2014; Field, 2016; Park et al., 2018). A classical yoga class, however, is based upon the following structure:

1. Inward focus, invocation of interest, mantra or prayer, 2. Slow movements with breathing awareness as a warming up, 3. Various asanas in diverse order, depending on yoga style and participants 4. Optional pranayama and/or meditation, 5. Final relaxation in Savasana, 6. Closing inward focus and/or mantra (Govindaraj et al., 2016).

According to systematic reviews, around 80 % of the studies mentioned asanas as part of yoga practice (Elwy et al., 2014; Field, 2016), however, half of them were minimally or not at all described. Field (2016) found 46 different applied yoga styles in her analyses. Yoga interventions ranged from one session to two years length (Elwy et al., 2014), a median duration was 9 weeks (Field, 2016).

It can be stated that scientific research on yoga mainly focuses on the health effects of yoga postures. Though asanas predominate in most yoga classes making it a type of physical exercise, other elements, such as breathing and mental techniques - though applied in various amount among yoga styles - are also important aspects of yoga practice (Field, 2016; Groessl et al., 2015; Park et al., 2018). In the next chapters there is an overview of the various (and concerning this dissertation, the most relevant) physical, mental, and spiritual effects of modern yoga classes or interventions.

Physical effects[2]

There is already extensive scientific literature on the positive physical health effects of yoga practice (Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016; Field, 2016; Raub, 2002; Roland et al., 2011; Ross & Thomas, 2010). Different forms of hatha yoga seem to be beneficial for improving various measures of general health and for diverse physical health conditions starting from injuries up to e.g., cancer, severe cardiovascular or metabolic diseases (Bhavanani, 2013; Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016; Ross & Thomas, 2010). Yoga can be a great tool for prevention or treatment of lifestyle-related diseases (mainly caused by sedentary lifestyle, alcohol or tobacco consumption, overconsumption and over-weight) (Bhavanani, 2013; S. Dwivedi & Tyagi, 2016), and it is also a natural help for elderly people with various problems (Mooventhan & Nivethitha, 2017; Roland et al., 2011).

[2] This chapter contains exact copies of some segments of the following papers:
Csala, B., Köteles, F., & Boros, S. (2018). Effect of 10-week long hatha yoga practice on BMI, balance, flexibility and core strength among female university participants. *Magyar Sporttudományi Szemle*, *19*(76), 12–18.
Csala, B., Szemerszky, R., Körmendi, J., Köteles, F., & Boros, S. (submitted for publication). Is weekly frequency of yoga practice sufficient? Physiological effects of hatha yoga among healthy novice women.

According to Büssing, Michalsen and colleagues (2012) yoga is proven as practice for improving physical health and an effective adjunct therapy, however, there is no evidence yet that it can be a stand-alone, curative treatment.

Concerning physical fitness and cardiovascular characteristics, review studies report mainly beneficial results with respect to flexibility, balance, strength, weight loss, blood pressure, respiration, heart rate, and overall cardiovascular endurance (Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016; Raub, 2002; Roland et al., 2011; Ross & Thomas, 2010).

Regarding body weight and body mass index (BMI), a randomized controlled pilot study (McDermott et al., 2014) investigated adults with high risk of diabetes. Results showed decreased body weight and BMI in the yoga group when compared to a monitored walking group at the end of the 8-week long (3-6 days/week, 75 minutes/session) intervention (McDermott et al., 2014). Similarly, another study (Chauhan et al., 2017) showed a significant reduction in BMI after a 1-month long daily (1 hour) yoga intervention compared to a no treatment control group in a healthy adult sample. A recent study (Pandit et al., 2019) found significant reductions in body weight, BMI, and body fat percentage after a one-week daily (1.5 hours) yoga practice among overweight adults. However, yoga practice was accompanied by dietary advisement. In contrast, Tran and colleagues (2001) did not find a significant change in body fat among healthy young adults after an 8-week long (2 times/week, 1.5 hours/session) yoga course.

A systematic review (Jeter et al., 2014) studied the effects of yoga practice on balance among healthy populations ranging from school children to elder adults. Out of 15 studies, 11 reported positive outcomes, especially in static balance. A later study (Jin et al., 2016) investigated middle-aged women participating in a 12-week long (3 times/week, 1 hour/session) power yoga program. Following the course, participants showed greater balance both with open and closed eyes, and increased muscle (grip and back muscle) strength. Additionally, positive body composition changes were reported, but no difference in BMI was found (Jin et al., 2016). Another study (Polsgrove et al., 2016) involved male college athletes. Yoga participants attended two yoga classes per week (1 hour/session) before usual sport training over 10 weeks. Results showed a significant improvement in balance (measured by the stork stand test) and flexibility (assessed by the sit and reach test, shoulder flexibility and joint angles measurements) in the yoga group, while no significant changes were found in the control group (Polsgrove et al., 2016).

Concerning further results on flexibility, a significant increase in pliability (measured by the sit and reach test) was reported among middle-aged women after a 6-week long weekly

(1.5 hours/session) Iyengar yoga training (Amin & Goddman, 2014). Similarly, positive changes in flexibility were recorded by modified sit and reach test and trunk and neck extension test in an adult male sample who participated in a 12-week long (6 days/week, 1 hour/session) hatha yoga training (Halder et al., 2015). In addition, results indicated an increased muscle strength (grip and back), and decreased body weight and fat percentage (Halder et al., 2015).

Some of the above-mentioned studies (Büssing, Michalsen, et al., 2012; Halder et al., 2015; Jin et al., 2016) reported beneficial results of yoga practice in muscle strength, although, none of them measured core muscle strength. A comprehensive review of yoga practice and core strength (Modak, 2017) reported that yoga exercise, especially some simple yoga poses, is highly effective in strengthening the core muscles. Kumar and colleagues' results (2016) indicated a significant increase in core strength measured by the plank test after a 21-day long hatha yoga training among healthy adults (Kumar et al., 2016). Similar positive outcomes were reported in two recent studies (Murugan & Durai, 2019; Radhakrishnan, 2019).

Regarding cardiovascular effects such as heart rate (HR) and heart rate variability (HRV) results are various. HR and HRV (variable beat-to-beat fluctuation in HR) are sensitive and easily captured indicators of autonomic regulation and vagal activity. High frequency (HF) components of HRV are considered an index of parasympathetic activity, while low frequency (LF) components of HRV are often related to sympathetic activity. However, interpretation of LF band is controversial (Schmalzl et al., 2015; Tyagi & Cohen, 2016). Bidwell and colleagues (2012) found no significant differences in resting HR and HF and LF components of HRV between the yoga and the control group after a 10-week long (2 times/week, 1 hour/session) hatha yoga intervention among women with asthma (Bidwell et al., 2012). In contrast, a systematic review (Cramer et al., 2014) reported an evidence of decreased HR in both healthy and high risk populations based on studies with yoga interventions of diverse length and intensity. According to a comprehensive review on yoga and HRV (Tyagi & Cohen, 2016), most of the studies investigated the acute effects of yoga practice on HRV, and indicated an increased HRV and vagal dominance (HF components of HRV) during practice. Regular yoga practitioners showed increased vagal tone (HF components of HRV) at rest compared to non-yoga practitioners. However, the authors advised not to draw a final conclusion on the impact of yoga on HRV (Tyagi & Cohen, 2016). Two recent studies (Ganesan et al., 2020; Odynets et al., 2019), nevertheless, also reported positive outcomes. Breast cancer patients showed improved HRV values at end of a 12-month long (3 times/week, 40-60 minutes/session) yoga training. These results were also significantly better than those of a Pilates control group (Odynets et al., 2019). Similarly, patients with rheumatoid arthritis showed improved HRV

values after a 12-week long (3 times/week, 30 minutes/session) yoga practice compared to the control group which received only medical treatment (Ganesan et al., 2020).

As presented above, most of the papers reported favorable outcomes concerning physical fitness and cardiovascular measures. Nevertheless, almost all of these studies involved yoga trainings with at least biweekly frequency, or often with (almost) daily practice. However, we have less accurate knowledge whether weekly frequency of yoga practice can result in improvements of physical fitness and heart rate characteristics among healthy adults. Previous studies involving one yoga class per week for 10 weeks showed significant improvements in mental health, physical and social functioning, and cognitive-behavioral performance among various adult samples (Andysz et al., 2014; Bilderbeck et al., 2013; C. Smith et al., 2007). A recent study (Garner et al., 2019) with the same yoga intervention setting showed an increase in the right hippocampal density in healthy young adults when compared to active and passive controls. An earlier study (Tolnai et al., 2016) applying a Pilates-training on weekly basis for 10 weeks reported improvements in flexibility, balance, and core- and abdominal muscle strength in the intervention group compared to control participants. The authors suggested that a one-time per week training might be sufficient to trigger beneficial outcomes in healthy young women with a sedentary lifestyle.

Comparing yoga to other moderate physical activates, such as exercise therapy, walking, stretching, gentle-nonaerobic exercises, dancing, or stationary bicycling, yoga appears to be equally or sometimes more effective at improving a variety of health-related outcomes have similar benefits (Govindaraj et al., 2016; Park et al., 2014; Ross & Thomas, 2010). Concerning measures of physical fitness, namely muscular strength, flexibility, and balance, yoga seems to have similar benefits when investigated with comparable activities, such as aerobic, Thai Chi, and balance training (Nayek & Chatterjee, 2016; Ni et al., 2014).

Psychological effects[3]

[3] This chapter contains exact copies of some segments of the following paper:
Csala, B., Ferentzi, E., Tihanyi, B. T., Drew, R., & Köteles, F. (2020). Verbal Cuing Is Not the Path to Enlightenment. Psychological Effects of a 10-Session Hatha Yoga Practice. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01375

Similar to physical effects, a great number of studies and reviews showed positive mental health effects of yoga. Yoga practice can reduce the level of mental stress and anger (Mooventhan & Nivethitha, 2017; Sengupta, 2012), and enhance the level of subjective well-being (Hartfiel N et al., 2011; Sharma et al., 2008), positive affect (Meissner et al., 2016; Vadiraja et al., 2009), mindfulness (Brisbon & Lowery, 2011; Curtis et al., 2011), body awareness, body responsiveness (Daubenmier, 2005; Delaney & Anthis, 2010), self-compassion (Crews et al., 2016; Newby, 2014), satisfactions with life, resilience, level of energy, and social relationships (Domingues, 2018; Hendriks et al., 2017; Riley & Park, 2015; Ross et al., 2013). Moreover, yoga practice is shown to reduce symptoms of depression, anxiety, fatigue and can be an effective help or palliative in various psychological or (neuro)psychiatric disorders (Balasubramaniam et al., 2012; Büssing, Michalsen, et al., 2012; Field, 2016; Mooventhan & Nivethitha, 2017; Sengupta, 2012).

Effects of modern postural yoga on positive mental health measures such as affect, mindfulness, and body awareness are of high interest since they are all characteristics of mind-body exercises and Eastern forms of movement (D. H. K. Brown & Leledaki, 2010; Domingues, 2018; Hendriks et al., 2017; Mehling et al., 2011).

Positive and negative affect (Watson et al., 1988) indicate general activation systems which are two relatively independent dimensions of subjective well-being (Gyollai et al., 2011; Watson et al., 1999). Positive affect reflects a person's level of alertness, activeness, and joyfulness, while negative affect denotes the level of subjective distress and unpleasurable feelings (Gyollai et al., 2011; Watson et al., 1988). High levels on these measures represent emotional arousal which means high level of energy, feelings of excitement, happiness, contentment in case of positive affect, and feeling upset, nervous, fearful, or sad concerning negative affect (Watson et al., 1999; Watson & Tellegen, 1985). In contrast, low level of negative affect refers to calmness and quietude, while low level of positive affect indicates sluggishness, dullness, sadness, or loneliness. Both can be measured as momentary mood states or in general as usual states of a person (similar to traits) (Watson et al., 1999; Watson & Tellegen, 1985). Studies investigating the relationship between yoga practice and affect generally report favorable outcomes (Meissner et al., 2016; Tihanyi, Sági, et al., 2016; Vadiraja et al., 2009; West et al., 2004). For example, Meissner and colleagues (2016) investigated healthy female yoga practitioners and found a significant increase in positive affect and decrease in negative affect after a 2-weeks intense yoga intervention (5 times/week, 1.5 hours/session) when compared to those who maintained their original practice intensity. Another intensive yoga training (6 weeks, at least 3 times/week, 1 hour/session) among early

breast cancer patients resulted in similar beneficial results when compared to a supportive counselling group (Vadiraja et al., 2009). A cross-sectional study showed favorable associations between weekly frequency of practice and positive and negative affect among participants of various physical activities including hatha yoga (Tihanyi, Sági, et al., 2016). Another study (Impett et al., 2006) reported similar associations when correlated affect with weekly hours of yoga practice, however, it did not found significant changes in affect after the 2-month yoga immersion program. A systematic review on yoga as a tool for mental health promotion (Domingues, 2018) concluded that results concerning positive and negative affect are equivocal.

Mindfulness is the ability to keep a conscious attention and awareness on the happenings of the present moment in a non-judgmental way (K. W. Brown & Ryan, 2003). An 8-week long yoga intervention (2 times/week, 75 minutes/session) for women with fibromyalgia (Curtis et al., 2011) reported significantly higher levels of mindfulness at the end of the program. A cross-sectional study investigating regular hatha yoga practitioners (Brisbon & Lowery, 2011) showed that advanced yoga practitioners have significantly higher level of mindfulness compared to their beginner fellows. The above-mentioned cross-sectional study involving various physical activities including hatha yoga (Tihanyi, Sági, et al., 2016) did not found significant correlation between weekly frequency of practice and mindfulness. However, mindfulness showed favorable associations with positive and negative affect. Conversely, another cross-sectional study of the authors (Tihanyi, Böőr, et al., 2016) showed significant positive correlation between weekly frequency of yoga practice and mindfulness. Furthermore, mindfulness was found to be a significant mediator between yoga practice and subjective well-being. The previously cited review (Domingues, 2018) denoted that yoga interventions resulted in higher levels of mindfulness in four out of five studies. In contrast, another systematic review (Hendriks et al., 2017) suggest that the positive effect of yoga practice on mindfulness is yet to be proven.

Body awareness means attentiveness to normal bodily processes and sensations. As it is a conscious awareness, an attentional focus on the bodily happenings, it can be considered a sub-category of mindfulness (Hölzel et al., 2011; Mehling et al., 2009, 2011). Similarly to mindfulness, body awareness is positively associated with weekly frequency of yoga practice and mediates the connection between yoga practice and subjective well-being (Tihanyi, Böőr, et al., 2016). A cross-sectional study (Tihanyi, Sági, et al., 2016) examining different kinds of physical activities showed that among advanced participants, yoga students have a significantly higher level of body awareness when compared to kung-fu, ballroom dance, and aerobics

practitioners. In line with this finding, Daubenmier (2005) reported that yoga practitioners show higher level of body awareness than aerobic participants and a comparison group engaging in various movement forms but not yoga and/or aerobic. However, it is important to add, that the three groups did not differ in total months of experience in their practice, but the yoga groups showed higher level of weekly hours of practice compared to the other two groups (Daubenmier, 2005). In contrast, a longitudinal study (Impett et al., 2006) did not find significant changes in body awareness after a 2-month long intensive yoga program (including asana, breathing exercises, meditation and yoga philosophy), and reported only marginal positive correlation between body awareness and weekly hours of yoga practice. Another longitudinal study (Delaney & Anthis, 2010) investigated the effects of different types of yoga classes concerning the extent to which they emphasized the "mind" aspects of yoga (e.g. meditation, mindfulness, chanting, yogic principles and the nonphysical self) or its "body" components (e.g., posture and fitness). Results showed that participants in classes with more emphasis on the mind reported higher levels of body awareness and body satisfaction than those in classes with greater body focus. Also, higher level of self-rated expertise in yoga positively correlated with body awareness (Delaney & Anthis, 2010).

Spiritual effects[4]

The fundamental importance of spirituality in yoga is widely accepted and emphasized (Baktay, 1992; Büssing et al., 2012; Iyengar, 1991). Although extensive literature indicates that spirituality is highly relevant to human functioning and health (Bergin, 1997; MacDonald, 2013), only a few empirical studies have investigated the contribution of spirituality to the positive effects of yoga practice to date (Büssing, Hedtstück, et al., 2012; Groessl et al., 2015; MacDonald, 2013; Sarbacker, 2014).

From a scientific point of view, namely, with a psychological approach, spirituality refers to a broad construct with various facets. In daily life, spirituality appears in form of

[4] This chapter contains exact copies of some segments of the following paper:
Csala, B., Ferentzi, E., Tihanyi, B. T., Drew, R., & Köteles, F. (2020). Verbal Cuing Is Not the Path to Enlightenment. Psychological Effects of a 10-Session Hatha Yoga Practice. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01375
Csala, B., & Köteles, F. (2021). Validation of the Hungarian version of the short form of Spiritual Connection Questionnaire (SCQ-14). *Mentálhigiéné És Pszichoszomatika*, *22*(2), 207–228. https://doi.org/10.1556/0406.22.2021.006

subjective feelings, thoughts, experiences, behaviours, beliefs, and values (Emmons, 2006; Wheeler & Hyland, 2008). It can be described as a motivational process to discover the transcendent, the divine, the ultimate truth (Emmons, 2006; Hill & Pargament, 2003; Piedmont, 1999). Also, spirituality can be captured as a feeling of connectedness, and as an ability to sense the sacredness of everyday experiences, responsibilities, roles and goals (Piedmont, 1999; Wheeler & Hyland, 2008). It can provide a meaning of life which helps people to make decisions and find directions in daily struggles. Thus, it functions as a coping resource or character strength (Hill & Pargament, 2003; Piedmont, 1999; Pikó et al., 2011; Shryack et al., 2010; Tomcsányi et al., 2011). As it can be seen, spirituality is a multilayered concept, and there is no one widely accepted definition of it (but several similar or complementary ones). Similarly, there is no one consented methodology for investigating it, but various established approaches to assess specific aspects of it (Emmons, 2006; MacDonald, 2013; Oman, 2013). Nonetheless, in the past decades, evidence concerning positive physical and mental health outcomes of spirituality has accumulated (Fetzer/NIA Working Group, 1999). Various aspects of spirituality (such as spiritual experiences, spiritual involvement, religious/spiritual support, and spirituality as a search for meaning of life, goals and values) have been associated with lower levels of psychological distress, depressive symptoms, and fewer suicide attempts (Fetzer/NIA Working Group, 1999; Piedmont, 2007), as well as higher levels of subjective well-being, positive affect, self-esteem, personal growth, resilience, vitality, life satisfaction, and quality of life (Bergin, 1997; Emmons, 2006; Fetzer/NIA Working Group, 1999; Geary, 2003; Klein et al., 2016; Komninos, 2009; Piedmont, 2007; Powers et al., 2007; Wheeler & Hyland, 2008). Yet, to date scientific research on yoga rarely incorporates spiritual variables (Büssing, Hedtstück, et al., 2012; MacDonald, 2013).

A cross-sectional study (Dittmann & Freedman, 2009) which investigated women practicing postural yoga regularly found that spiritual readiness (i.e., subjective relevance of ritual elements during yoga, and spiritual seeking and purpose) positively correlated with body awareness, body responsiveness, and body satisfaction. However, it was unclear whether enhanced spirituality among participants was a result of the physical yoga practice, additional activities such as meditation, or other effects. An intervention study (J. A. Smith et al., 2011) investigated students with mild to moderate depression, anxiety, or stress. Participants were divided into three groups: yoga as exercise, integrated yoga (which also included yogic ethical guidelines), and control group. Yoga intervention groups received a 7-week long training (2 times/week, 1 hour/session), however, neither group showed significant changes in spiritual well-being. The authors proposed the inclusion of further measures of spirituality in order to

explore more precisely whether yoga practice impacts this construct. In contrast, Büssing, Hedtstück, and colleagues (2012) reported significant improvements in some aspects of spirituality (e.g., Conscious interactions/compassion, Religious orientation) among yoga teacher training participants after 6-months of intensive and complex yoga practice (including postures, breathing exercises, relaxation, meditation, mantras, and philosophy lectures). Additionally, the authors denoted that the constructs of spirituality, mindfulness, and mood appear to be strongly correlated.

Underlying mechanisms

"Yoga teaches you the techniques and awareness to stay healthy. You gain strong immune, glandular and nervous systems. This foundation gives you energy and lets you deal with the mental and spiritual facets of your life." Yogi Bhajan (Khalsa, 2018, p. 2.)

The underlying mechanisms of the beneficial effects of modern yoga practice which encompasses specific movements, breathing, and attentional process, are analyzed from different points of view. These can be roughly divided into three categories: biological, psychological, and philosophical (Riley & Park, 2015; Schmalzl et al., 2015; Sullivan et al., 2018). Of course, these approaches are complementary ones, mechanisms are analyzed on different levels of human functioning which are naturally interconnected.

Biological mechanisms

From a biological point of view underlying mechanisms involve various aspects, such as musculoskeletal, neurological, neurophysiological, endocrine, and immunological ones (Field, 2016; Govindaraj et al., 2016; Riley & Park, 2015; Schmalzl et al., 2015).

As already mentioned above, physical practice of yoga includes both static and dynamic movements in various sequences. Yoga asanas are specific postures which can increase range of motion, strength, balance, and flexibility. The specific postures can be classified into various groups, such as standing, seated, prone and supine postures, balancing poses, backbands, twists, and inversions; also, they can be divided into two main categories, namely active or restorative poses. Asanas are to be performed with precise alignment and combined with special breathing patterns or breathing techniques. Also, attentional processes including eye gazing and mental attitude during practice have high relevance (Govindaraj et al., 2016; Park et al., 2018; Satyananda Saraswati, 2002; Schmalzl et al., 2015). Consistent with physical activity, active

yoga poses increase heart rate, respiration, metabolic rate, and improve overall exercise capacity. However, resting poses and longer maintenance of Savasana (which concludes most of the yoga classes) foster parasympathetic activation along with relaxation mechanisms. Yoga asanas with head-up and head-down tilts, as well as inverted poses practicing in the long term are particularly beneficial for balancing baroreflex sensitivity and reducing heart rate and blood pressure. Also, improvements in respiratory measures were reported. Specific yoga postures appear to possess positive effects on internal organs and blood circulation as they variously impact the body (Evans et al., 2009; Govindaraj et al., 2016; Raub, 2002; Schmalzl et al., 2015; Sengupta, 2012).

Among neurophysiological effects, one of the most important is the impact of yoga practice on the autonomic nervous system. Both sympathetic and parasympathetic nervous system are affected. Yoga practice was shown to decrease the sympathetic response resulting in lower levels of norepinephrine and epinephrine and thus in reduced systolic and diastolic blood pressure, heart rate, and respiration (Evans et al., 2009; Govindaraj et al., 2016; Riley & Park, 2015; Ross & Thomas, 2010). There is already an evidence that yoga practice has a direct stimulation of the vagal tone which leads to parasympathetic activation. This is shown in increased HRV, reduced LF components of HRV and LF/HF ratio, as well as increased baroreflex sensitivity. Yoga practice seems to lead to increased control over ANS responses providing enhanced self-regulation (Evans et al., 2009; Riley & Park, 2015; Ross & Thomas, 2010; Schmalzl et al., 2015; Sengupta, 2012).

Another pathway related to the sympathetic nervous system is the down-regulating effect of yoga on the hypothalamo–pituitary–adrenal (HPA) axis. This leads to reduced level of cortisol, excitatory catecholamines (e.g., epinephrine), renin–angiotensin, and inflammatory/immunomodulatory cytokines (e.g., interleukin-6) (Govindaraj et al., 2016; Riley & Park, 2015; Ross & Thomas, 2010; Schmalzl et al., 2015; Sengupta, 2012). These effects of yoga belong to general positive health effects of physical exercise. Review studies denote that yoga may be as or more effective compared to exercise, however, future research can reveal potential differences (Govindaraj et al., 2016; Ross & Thomas, 2010).

Partly overlapping with the previously mentioned mechanism, there is an importance of the immunological and endocrine responses through yoga practice. The parasympathetic dominance, as well as the down regulation of stress hormones (e.g., cortisol and epinephrine) and various inflammatory markers (e.g., cytokines such as interleukin-6 and lymphocyte-1B, and C-reactive protein) through the HPA-axis leads to better immune functions (Riley & Park, 2015; Ross & Thomas, 2010; Schmalzl et al., 2015). Besides, yoga practice was shown to

promote red blood cell formation, and to impact the endocrine system as asana practice variously massages the internal organs resulting in better glandular functioning and hormonal balance (Evans et al., 2009; Govindaraj et al., 2016).

Concerning neurological mechanisms, yoga was shown to evoke structural and activation changes in the brain. Increased overall brain wave activity, enhanced alpha, beta, and theta EEG band powers and a reduced delta band power were reported suggesting enhanced cognitive performance (such as memory and concentration) and synchronization of brain activity. Also, increase in gray matter, as well as increased amygdala and frontal cortex activations were found proposing better executive functions (Desai et al., 2015; Field, 2016). Results regarding neuroplasticity are also promising. Biomarkers of neuroplasticity, such as brain derived neurotrophic factor (BDNF), dehydroepiandrosterone sulfate (DHEAS), serotonin (5-hydroxytryptamine, 5-HT), sirtuin 1, and telomerase activity levels were found to increase due to yoga practice, while DNA damage and balancing oxidative stress showed a decrease (Govindaraj et al., 2016; Tolahunase et al., 2018). Besides, yoga practice seems to increase Gamma Amino Butyric Acid (GABA) level which has a main role reducing neuronal excitability thus can induce relaxed states (Govindaraj et al., 2016; Riley & Park, 2015; Schmalzl et al., 2015).

Schmalzl and colleagues (2015) argue that integration of bottom-up and top-down processes in yoga has high relevance. Yoga practice involves complex physiological bottom-up and cognitive top-down processes which interact and influence each other resulting in better regulatory functions, and reduction of physical and mental stress.

Some studies also analyzed the specific components of yoga practice separately. Asana practice in the long term were shown to improve baroreflex sensitivity, insulin sensitivity and to decrease resting blood pressure, heart rate, blood glucose level, cholesterol, cortisol, epinephrine, norepinephrine, waist circumference, and hip-waist ratio. All in all, asana practice leads to enhanced parasympathetic activity, decreased sympathetic activation, and down regulation of adrenalin and renin-angiotensin activity (S. Dwivedi & Tyagi, 2016; Grabara, 2017; Sengupta, 2012). Pranayama practices were associated with enhanced strength of breathing muscles, increased breath volume and availability of oxygen to tissues. After two months of practice, prolonged respiration, enhanced level of energy, relaxation of chest muscles, and physical calmness were shown. Pranayama practice was also found to decrease cortisol and increase HRV and baroreflex sensitivity providing also a preventive tool for cardiovascular diseases (S. Dwivedi & Tyagi, 2016; Schmalzl et al., 2018; Sengupta, 2012). Meditation practices effect similar to beta-blockers, that is they help to reduce blood pressure

and experienced levels of stress and anger. Slow breathing during meditation also enhances HRV and baroreflex sensitivity. Practicing meditation also leads to activation of the parasympathetic nervous system and the vagal nerve inducing cholinergic anti-inflammatory response trough down-regulation of inflammatory cytokines. Using mantras was also shown to slow down respiration, increase HRV and baroreflex sensitivity and decrease sympathetic activation and level of epinephrine and renin-angiotensin resulting in lowering blood pressure (S. Dwivedi & Tyagi, 2016). Also, chanting OM mantra was found to reduce limbic activity suggesting a regulatory role in emotional processes (Govindaraj et al., 2016).

To sum up, there is a growing evidence on the beneficial effects of yoga (including asanas, breathing, and attentional/mental components) on ANS, HPA axis, inflammatory/immunological, and endocrine responses. These processes reduce the allostatic load, that is the cumulative burden of stress, resulting in better health and well-being (Evans et al., 2009; Field, 2016; Riley & Park, 2015; Ross & Thomas, 2010; Schmalzl et al., 2015; Sengupta, 2012).

Psychological mechanisms

From a psychological point of view, beneficial mental effects of yoga lie in the improvement of various factors. One main important aspect is the increased level of mindfulness, self-awareness, metacognitive awareness, and attentional control (Büssing, Michalsen, et al., 2012; Evans et al., 2009; Riley & Park, 2015; Schmalzl et al., 2015). Along with these, enhanced self-efficacy (persistence despite obstacles), strengthened coping mechanism, appraisal of control including pain control, emotional control, and self-regulation seem to occur through yoga practice. It also induces positive mood, positive affect, self-compassion, changes in attitudes towards stress, acceptance, compassion, and calmness. The latter ones are overlapping with spiritual values, and favorable changes in spirituality which is another important domain in holistic well-being and quality of life (Evans et al., 2009; MacDonald, 2013). Yoga practice can lead to positive changes in beliefs, values, expectations, as well as to an increased level of meaning of life and feeling of connectedness (Büssing, Michalsen, et al., 2012; Evans et al., 2009; Riley & Park, 2015). These are in strong intercorrelation with psychological functioning, thus psychological and spiritual effects mostly cannot be completely separated, however, various variables can foster each other. Besides, yoga as practiced in group setting and/or having a strong teacher-disciple relation are means of social support and can promote social well-being (Büssing, Michalsen, et al., 2012; Evans et al., 2009).

Philosophical approach

As presented above, there is a growing scientific proof that yoga practice beneficially impacts various biological and psychological functions. From a philosophical point of view, Patwardhan (2016) investigated the specific pathway through which yoga practice leads to these health effects. He proposed that reductions of frequency of thoughts is a key component which happens through directed attention on the body, breath, or a specific target of meditation. These specific focus points of the mind decrease or suppress the occurring and distracting thoughts resulting in calmness which induce neural, physiological, immunological, endocrine, and psychological changes. Indeed, yoga is referred to as quieting the mind, cessation of thoughts or "stopping of the patterns of the mind" in Patanjali Yoga Sutras, and also in other scriptures such as Kathaka and Maitrayaniya Upanishads (Patwardhan, 2016; Satyananda Saraswati, 2013).

Other authors (Gard et al., 2014) propose that besides posture, breathing, and meditation, philosophical teachings for self-regulation, especially ethical guidelines, such as the yamas and niyamas play an important role in the overall positive effects of yoga. Also, complete lifestyle teachings of yoga provide a comprehensive pathway for better health on the physical, mental, social, and spiritual level (Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016).

Sullivan and colleagues (2018) suggest four main philosophical perspectives, namely phenomenology, eudaimonia, virtue ethics, and first-person ethical inquiry. In their view, phenomenology refers to the philosophical teachings on yoga on the body, mind, environment, and awareness. According to yogic wisdom, all sufferings and pains arise from one's misidentification with the body and the mind, and their tendential habits, intentions, actions. The teachings and practices target to reorient the identity of oneself to pure awareness, thus providing a different view of life. The concept of eudaimonia is understood as an enduring form of happiness which is not a mutable hedonic feeling, but a permanent joy deriving from a well-lived and well-intentioned life. Philosophical teachings of yoga provide a framework for that as well, including the ethical principles. These guidelines help one to find a harmonious interaction with the world and with his/her own being. Summarizing the framework of Sullivan and colleagues (2018), it can be concluded that yogic philosophical teachings on life, including meaning of life, ethics, human body and mind, and consciousness, provide an understanding and practices that can shift the individual from an attitude and experience of pain and sufferings in life to a perspective of alleviation of suffering and eudaimonic well-being.

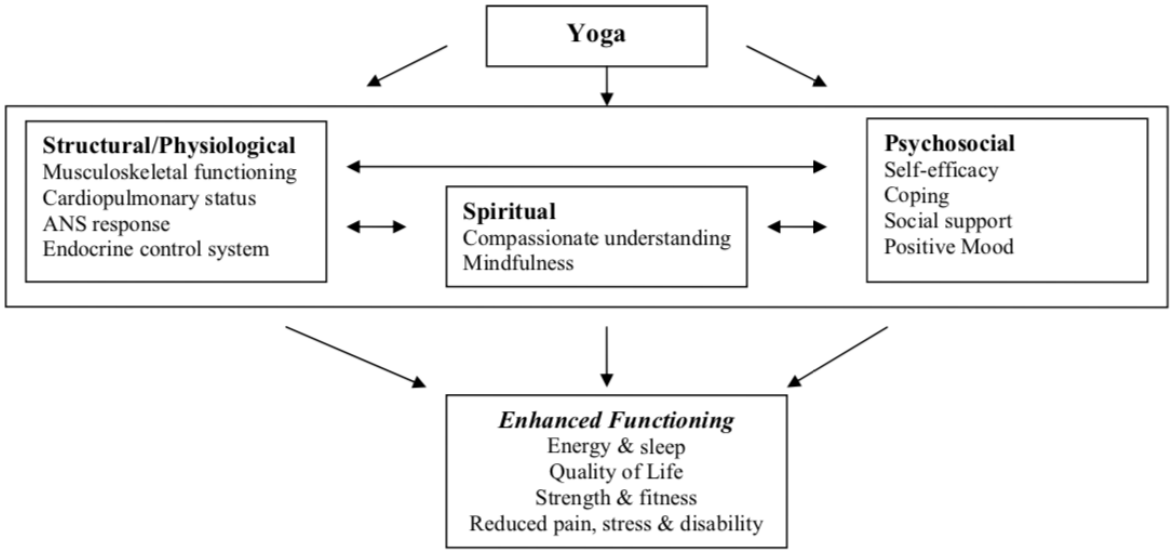
All in all, philosophical perspectives of the underlying benefits of yoga practice emphasize the ancient wisdom of yoga, especially the ethical principles. These teaching can provide a comprehensive theoretical and practical framework of life leading to various positive health outcomes (Gard et al., 2014; Patwardhan, 2016; Sullivan et al., 2018).

Summing up the various biological, psychological, and philosophical perspectives concerning the underlying mechanism of the health outcomes of yoga, it can be stated that yoga gives a comprehensive skillset which impacts synergetic physical and mental processes. Even if heterogeneity among yoga practices and methodological issues of scientific investigations make the proper understanding of the underlying mechanism difficult, it seems to be clear, that both top-down and bottom-up mechanisms are relevant and foster each other through yoga practice which implies an increased self-contemplative mental state. There is also an enhanced self-regulation both on the physical and physiological, and on the mental (cognitive and emotional) levels (Evans et al., 2009; Gard et al., 2014; Riley & Park, 2015; Schmalzl et al., 2015; Sengupta, 2012; Sullivan et al., 2018). The importance of increased inside focus and self-regulation is in line with the traditional aim of yoga concerning self-awareness, conscious control, and freedom (Baktay, 1992; Broad, 2012; Sullivan et al., 2018).

The various mechanism and pathways were analyzed and depicted by many authors (Büssing, Michalsen, et al., 2012; Gard et al., 2014; Patwardhan, 2016; Ross & Thomas, 2010; Sengupta, 2012; Sullivan et al., 2018). As an example, the comprehensive framework of Evans and colleagues (2009) are presented in Figure 7. Of course, this does not include all the above-mentioned pathways, however, the authors used the biopsychosocial model to understand the health benefits of yoga. Their model includes spiritual aspect, thus it can be also interpreted also as a biopsychosocial-spiritual model (Evans et al., 2009; Hatala, 2013; MacDonald, 2013).

Figure 7

"Conceptual Model of the Biopsychosocial Benefits of Yoga" from Evans and colleagues (2009)



1.8. Potential adverse effects, misconceptions and dark side of yoga and spirituality

Although most of the scientific findings indicate that yoga is a safe practice and rarely has adverse effects (Govindaraj et al., 2016; Groessl et al., 2015; Sengupta, 2012), it is highly important to shortly overview the possible dangers of practice, potential misinterpretations of yoga and spirituality, and the so-called dark side of spirituality (Kornfield, 1989; Köteles et al., 2016).

Yoga, as physical practice, compared to other physical activities, is a safe form of exercise under the guidance of a qualified teacher (Govindaraj et al., 2016; Groessl et al., 2015; Sengupta, 2012). Even though there is a low risk of injuries, asana practice might cause some kind of hurts, especially if warm-up is not sufficient, alignment of asana is not proper, or if sequencing, or level of practice is not appropriately chosen. Muscular sprains can occur, or mild to serious ligament injuries might happen mainly in the knees, ankles, and shoulders. Also, there is a risk for meniscus injuries, hurts of the trunk, as well as injuries due to falls (Cramer et al., 2018; Govindaraj et al., 2016; Swain & McGwin, 2016). There is a chance for some kinds of neurological or vascular injuries, mostly due to inverted poses (such as headstand or shoulder stand) (Govindaraj et al., 2016). Pranayama practice, if it is not applied properly in quality or quantity, can cause tremors, agitation, anxiety, or other unpleasant bodily or mental sensations. Nonetheless, pre-cautions and contraindications of the various practices are known by

competent teachers and also presented in yoga books, thus prevention of these risks is possible (Govindaraj et al., 2016; Satyananda Saraswati, 2002). In case of some diseases, physical or mental illnesses or traumas, however, practice of yoga might be not pleasant. Enhanced body-awareness and observation of mental tendencies can increase the possible negative bodily sensations or pains, and enhance mental agitation, frustration, or negative emotions. However, with proper attention, care and guidance of adept teachers, participants can learn to overcome these issues and yoga practice can lead to better mental and physical health. Especially for these cases, the new branch of trauma-sensitive yoga was created (Prescott, 2015).

Also, meditation practices might lead to adverse effects. In vulnerable persons, meditation practice might worsen or provoke unpleasant mental and emotional states or even psychotic symptoms (Govindaraj et al., 2016). In line with precautions of meditative practices, philosophical and spiritual teachings together with various physical and contemplative, meditative practices may lead to adverse effects which are also referred to as "dark sides of spirituality" (Kornfield, 1989; Köteles et al., 2016). One the one hand, through the path of spiritual practice some obstacles and vicissitudes, sometimes blockages or spiritual/transformational crises. These are normal parts of the path, however, these phases go together with distress and also there is a chance for leaving the path (for a while or completely) (Hill & Pargament, 2003; Kornfield, 1989). The challenges can occur interpersonally, such as in forms of conflict with spiritual community, family members or friends, or intrapersonally, as an inside struggle of the person. These can lead to temporary fear, anxiety, depressive symptoms, decrease in quality of life. However, coping with these situations brings one further one the path and results in spiritual growth, open-mindedness, lower levels of prejudice, and enhanced self-actualization (Hill & Pargament, 2003). Nevertheless, there is a chance of adverse coping, such as avoidance and renouncement of actions (Gall et al., 2005; Hill & Pargament, 2003).

On the other hand, spiritual search might lead one to wrong paths, or misinterpretations of the teaching which can also cause severe distress (Crowley & Jenkinson, 2009; Kornfield, 1989). These can occur due to misinterpretations and/or misuse of the teaching through inadequate teachers, gurus, or spiritual groups. The term "pathological spirituality" involves tendencies in practitioners which might lead them to the wrong (i.e., maladaptive) directions. These characteristics and beliefs are for example, submission to authority, inability to develop intimate relationship due to interpretation of God as primary one, failure to deal with interpersonal or sexual needs, or with practical materialistic aspects of life. These make one to be vulnerable to choose a false spiritual teacher or guru, and a harmful group, such as a cult or

sect with noxious teachings, beliefs, values, and rules (Crowley & Jenkinson, 2009). Some authors (Crowley & Jenkinson, 2009) specifically describes key differences between healthy and harmful groups, the dynamics of harmful groups, and give advices for intervention and treatment in case of someone got involved in such relationships. However, it is important to note, that these cases are actually misinterpretations and misguidances. Such as in psychology, the term of "toxic positivity" occurred as an invalid understanding of being positive (Quintero & Long, 2019), distortion of spiritual teachings are also not rare. If spirituality and teachings of yoga are understood correctly, and practitioners are aware of the potential risks, these happenings can be avoided. However, there is also a huge debate of potential abuses of the great yoga gurus of the 20th century. Without going into details, to dissolve these debates various point of views including spiritual, psychological, and cultural ones are needed. Again, the important role of being widely informed and proper preparation can be emphasized (Crowley & Jenkinson, 2009; Falk, 2009). Also, the previously mentioned common misinterpretation of yoga, namely that it is a religious practice, can be noted. Some Christian protesters warn about the dangers of yoga claiming that it is incompatible with Christianity (Jain, 2014). However, yoga is not a religion, but the path of cognizance. Teachings of yoga and other religions can be comparable (Kaczvinszky, 1994; Weninger, 1986, 1987).

Besides the above-mentioned aspects, it is relevant to note, that spirituality is also associated with modern health worries (Dömötör et al., 2019; Köteles & Simor, 2013), and can correlate with lack of facing social problem and failure of coping with social injustice (Peterson & Seligman, 2004). The latter ones are overlapping with the so-called "spiritual bypass" which is a pitfall of the spiritual path. It means that avoidance of facing psychological problems and challenges in material life is rationalized or covered by spiritual beliefs and practices. This is an unhealthy misuse of spiritual life and (if not helped by therapist or counselors) can lead to unsolved difficulties which in turn obstructs spiritual progress (Cashwell et al., 2007, 2010).

Finally, it is important to note, that improper practices or over-practicing specific techniques can cause adverse effects or side effect even among healthy people. In worst case, these can be even severe psychopathological symptoms (Kornfield, 1989; Peterson & Seligman, 2004). Besides, throughout the spiritual path, new and out of the ordinary experiences, or states similar to psychosis can occur also naturally (Cook et al., 2009; Hofmann, 2013). If these are wrongly interpreted, treatment of these states or phases can be incorrect and lead to further damages. This is why it is highly important in psychological and psychiatric settings to include spiritual knowledge. Being aware of similarities and differences between psychiatric disorder or so-called "spiritual emergencies" can provide more appropriate avenues

for professional help or treatment (Cook et al., 2009; Hofmann, 2013). On the other hand, spirituality was shown to increase mental health and well-being among patients with personality disorders, schizophrenia, and other severe mental disorders (Bennett et al., 2013; Cook et al., 2009).

To sum up, yoga, as body-mind practice and complete spiritual path, has potential dangers and adverse effects as presented above. Nonetheless, yoga means still a low-risk practice, and being aware of the possible hazards and having a proper guidance provide a great chance for avoiding problems on both the physical and mental levels. Of course, some difficulties are natural aspects of the path if someone is deeply involved, however, there is high potential to overcome these phases and reach further development (Cook et al., 2009; Govindaraj et al., 2016; Hofmann, 2013; Kornfield, 1989). In case of some physical and mental disorders or traumas, even if there is a higher risk of temporary adverse effects, with professionals, yoga can still provide a tool for managing symptoms and gaining better health (Prescott, 2015; Sengupta, 2012).

1.9. Methodological issues and neglected areas of yoga research

As presented above, there is a growing body of empirical evidence concerning the beneficial physical and mental health effects of yoga practice. However, despite the fact that the original purpose of yoga practice is spiritual evolvement and connection or union with the divine (Groessl et al., 2015; Iyengar, 1991; Rama et al., 1976), spirituality is a neglected area within yoga research (Büssing, Hedtstück, et al., 2012; Groessl et al., 2015). MacDonald (2013) draws attention to the importance of the incorporation of spirituality in the scientific inquiry of yoga in his article entitled „A call for the inclusion of spirituality in yoga research". He suggests to investigate the effect of yoga practice on spirituality and to examine spirituality's potential mediator or moderator factor between yoga practice and other mental health measures (MacDonald, 2013). Similarly, other researcher also proposed to investigate spirituality in yoga research and explore its connection to other psychological variables (Büssing, Hedtstück, et al., 2012; Groessl et al., 2015).

Review studies and metanalyses proposed further future directions for yoga research. On the one hand, two systematic reviews (Domingues, 2018; Hendriks et al., 2017) on yoga and mental health promotion concluded that results are equivocal and current body of research offers only weak evidence. Thus, further replication studies with proper methodology are needed to understand the effects of yoga on positive mental health. On the other hand, there is

an emerging evidence of the positive effects of yoga on e.g., cardiovascular diseases (Cramer et al., 2014), stroke, diabetes mellitus, mental and neuropsychiatric disorders (Balasubramaniam et al., 2012; S. Dwivedi & Tyagi, 2016), brain waves, and structural activation (Desai et al., 2015). Yoga practice seem to be effective in variety of physical and mental health-related measures in both healthy and diseased populations (Ross & Thomas, 2010), and also among elderly persons (Mooventhan & Nivethitha, 2017). Even so, the diversity in research makes generalization and standardization of the reported findings difficult (Park et al., 2018; Patwardhan, 2017). A systematic review involving 465 yoga intervention studies among 30 countries (Elwy et al., 2014) highlights inadequate reporting and limitations of the methodology. Several other authors have reported the same issues, and also the heterogeneity and multidimensionality of yoga interventions which make the comparison of the outcomes and exploration of the efficacy of specific yoga practices and their underlying mechanisms challenging (Elwy et al., 2014; Park et al., 2014, 2018; Sullivan et al., 2018). Thus, many reviews (Büssing, Michalsen, et al., 2012; Elwy et al., 2014; Park et al., 2018; Patwardhan, 2017; Ross & Thomas, 2010; Tyagi & Cohen, 2016) suggest more rigorous methodology with adequate sample size, control group(s), randomized design, and appropriate statistical analyses. Besides, more detailed description of yoga interventions with respect to the type and components of yoga practice, dosage, frequency, duration and location of practice (Büssing, Michalsen, et al., 2012; Elwy et al., 2014; Park et al., 2018; Patwardhan, 2017). Information about yoga instructor, home practice, long-term adherence, and any potential biases are also recommended to report (Elwy et al., 2014; Patwardhan, 2017). Additionally, future studies were proposed in a variety of both healthy and diseased population. Studies that address these methodological issues would result in better comparison and interpretation of outcomes, and increase the likelihood of developing more adequate prevention, intervention, and rehabilitation programs for various populations (Büssing, Michalsen, et al., 2012; Park et al., 2014; Ross & Thomas, 2010).

The multidimensionality of yoga interventions and various components of yoga practice refer to the fact that yoga practice is usually an integrated practice of poses, breathing exercises, meditation, and relaxation. As mentioned above, proper reporting of the specific components (and their dosage) is needed. Even so, there are many different types of yoga, specific branches, or lineage-based styles which can greatly differ (e.g., in intensity, focus of attention, or the content of the instruction), even if the components are similar (Field, 2016; Sullivan et al., 2018). Therefore, investigation and comparison of specific yoga practices, yoga-component analysis, health-aligned functional typology of yoga, or also development of a simple universal

basic prototype of yoga intervention are also proposed for future research (Desai et al., 2015; Field, 2016; Park et al., 2018; Patwardhan, 2017; Ross & Thomas, 2010).

To sum it up, future yoga research needs methodologically sound investigations, possibly with longitudinal design, adequate control groups, and detailed reporting (Field, 2016; Patwardhan, 2017; Tyagi & Cohen, 2016).Various physical and psychological measures need to be further investigated or add to the protocols (Field, 2016; Hendriks et al., 2017), especially there is a call for the inclusion of spirituality in yoga research (Büssing, Hedtstück, et al., 2012; Groessl et al., 2015; MacDonald, 2013). There is a question of how different aspects of yoga practice relate to physical and mental health (Park et al., 2015), thus specific types, components, and aspects of yoga practice, and also potential underlying mechanisms need to be further explored (Büssing, Michalsen, et al., 2012; Field, 2016; Park et al., 2014; Patwardhan, 2017).

II. AIMS

Based on the literature review, current tasks of yoga research incorporate the implementation of methodologically sound, controlled longitudinal studies, and detailed investigation of the specific effects of various components and aspects of yoga practice. Other addressed scientific issues are to explore the underlying mechanisms behind the effects of yoga on physical and mental well-being, and to include the measurement of spirituality in yoga research.

According to these suggestions, aims of the present doctoral work were the followings:

1. The first goal was to investigate the effects of a weekly setting 10-session long beginner level traditional hatha yoga training on different indicators of physical and mental health among healthy female adults. It was specifically aimed to examine whether a weekly (1 session/week) brief yoga training (with an emphasis on asana practice) is sufficient to evoke beneficial physical and psychological health outcomes, including spirituality. A further exact aim was to explore the significance of verbal cuing during yoga practice as a specific component potentially causing changes in the effectiveness of yoga practice. As classes may include detailed verbal information on physical (e.g., precise description of the body posture), psychological (e.g., awareness of different bodily sensations and occurring thoughts), and spiritual (e.g., focusing on pure consciousness or oneness during postures) aspects of yoga, the verbal cues provided by a yoga instructor can facilitate a variety of physical and mental experiences during practice (Emerson et al., 2009). Additionally, potential intercorrelations among the changes in mental health variables, as well as training effect characteristics (HR and used calories during practice) of an average beginner level hatha yoga class were intended to examine. Longitudinal study Part 1 (see in Chapter 3.1.) presents the investigation of the physical health variables, while Longitudinal study Part 2 (see in Chapter 3.2.) demonstrates the psychological health outcomes.

2. A next main aim was to investigate the correlations between yoga practice and the previously measured psychological health variables, whether they correlate with current regularity of yoga practice (weekly hours) and/or with yoga experience (the number of years practicing yoga) among regular hatha yoga practitioners. A further goal was to

explore potential mediating effects between yoga practice and the measured mental health variables. (See Cross-sectional study in Chapter 3.3.)

3. Considering the comparatively neglected status of spirituality in recent yoga research, the final goal of this dissertation was to prepare a systematic review which assesses available empirical research on the relationship between yoga practice and spirituality. Of particular interest was whether empirical findings indicate a positive association between yoga practice and spirituality, furthermore, to explore which aspects of spirituality are associated with yoga practice. The review aimed to provide an overview and summary of the existing empirical literature and highlight future directions for investigating spirituality within yoga research. The systematic review is unfolded in Chapter 3.4.

All in all, it can be stated that the studies mainly investigate healthy adults. The only exception is the systematic review which also incorporates five studies carried out with diseased populations.

III. METHODS

This chapter presents the performed studies in the following order (see Table 2).

Table 2
Logical order of the presented studies

Effects/correlates of yoga	**Mode of investigation**	**Specific topic**
Physical	Longitudinal study Part 1	Physical and physiological effects of a 10-session long beginner hatha yoga training on a weekly basis
Psychological	Longitudinal study Part 2	Psychological effects (including spirituality) of a 10-session long hatha yoga training; potential effects of verbal instruction during practice
	Cross-sectional study	Psychological correlates (including spirituality) of hatha yoga with current regularity of practice and yoga expertise
Spiritual	Systematic review	Relationship between yoga practice and spirituality: specific aspects of spirituality associated with yoga practice

Note. Specific topic is not described in detail.

3.1. PHYSICAL EFFECTS OF HATHA YOGA – LONGITUDINAL STUDY PART 1

This chapter is based upon two articles (Csala et al., 2018; Csala, Szemerszky, et al., submitted for publication); most parts of this chapter are the exact copies of the second paper:

Csala, B., Köteles, F., & Boros, S. (2018). Effect of 10-week long hatha yoga practice on BMI, balance, flexibility and core strength among female university participants. *Magyar Sporttudományi Szemle*, *19*(76), 12–18.

Csala, B., Szemerszky, R., Körmendi, J., Köteles, F., & Boros, S. (submitted for publication). Is weekly frequency of yoga practice sufficient? Physiological effects of hatha yoga among healthy novice women.

Scientific results have already proven various beneficial physical health effects of yoga practice. Concerning physical fitness and cardiovascular characteristics, review studies mostly report positive outcomes with respect to flexibility, balance, strength, weight loss, blood pressure, respiration, heart rate, and overall cardiovascular endurance (Büssing, Michalsen, et al., 2012; S. Dwivedi & Tyagi, 2016; Raub, 2002; Roland et al., 2011; Ross & Thomas, 2010). However, majority of single studies investigate these potential effects of yoga interventions with more than weekly frequency, more precisely at least biweekly trainings or even daily yoga practices. Thus, it is still an open question whether only weekly setting of yoga practice can induce favorable changes in measures of physical fitness and cardiovascular measures. Previous studies using 10-week long yoga interventions consisting of one yoga class per week showed significant improvements in mental health, physical and social functioning, and cognitive-behavioral performance among various adult samples (Andysz et al., 2014; Bilderbeck et al., 2013; C. Smith et al., 2007). Also, an earlier study with the same setting of Pilates-training reported improvements in flexibility, balance, and core- and abdominal muscle strength in the intervention group compared to control participants (Tolnai et al., 2016).

Aims and hypotheses

The present longitudinal study - on the one hand - aimed to investigate the effects of a 10-session long one time/week beginner level traditional hatha yoga training on different indicators of physical fitness and heart rate measures among healthy female adults. The first goal was to examine whether a weekly frequency of yoga course with an emphasis on asana

practice (body postures) consisting of 10 sessions is sufficient to result in significant positive changes in body mass index (BMI), body fat percentage, balance, flexibility, core muscle strength, resting heart rate and heart rate variability. Additionally, we intended to explore the training effect characteristics (HR and used calories during practice) of an average beginner level hatha yoga class.

A further specific aim was to investigate the potential effects of verbal instructions during yoga practice on the above-mentioned physical and physiological variables (according to the scientific quest to assess various aspects of yoga practice to explore potential impacting factors on its health benefits (Büssing, Michalsen, et al., 2012; Field, 2016; Park et al., 2014; Patwardhan, 2017)). It was examined whether differences in verbal cuing, namely whether it emphasizes mainly physical aspects of practice or also includes philosophical and spiritual contents, would lead to different outcomes in the measured variables.

Hypotheses:

According to previous results, it was hypothesized that a 10 session long weekly yoga training evokes improvements in:

- balance (H1), flexibility (H2), and core muscle strength (H3).

No changes in:

- BMI (H4), body fat percentage (H5), resting heart rate (H6), and heart rate variability (H7) were expected.

It was supposed that physical dominance of practice (asana practice) is more important than the impact of verbal instruction concerning physical indices. Thus, hypotheses were as follows. Difference in verbal instructions during physically identical yoga practice do not lead to different outcomes regarding:

- balance (H8), flexibility (H9), core muscle strength (H10), BMI (H11), body fat percentage (H12), resting heart rate (H13), and heart rate variability (H14).

Additionally, we intended to explore the training effect characteristics (HR and used calories during practice) of an average beginner level hatha yoga class.

Methods

Participants

Beginner level hatha yoga courses were announced on the university's online registration platform (max. 14 people per group) for female students at the beginning of three semesters. A course for control group was advertised the same way. Control participants were aware of no intervention, however they received credits for the participation and could become aware of their physical fitness during measurements, similarly to the yoga intervention participants. Applicants who chose to sign up for a yoga course were not aware that two yoga classes with different verbal instructions would be held. Thus, students who signed up for a yoga course were randomly assigned to one of the two intervention groups. Inclusion criteria were as follows for each group: (1) no previous experience with yoga; (2) intention to maintain current regular physical activity level during the study; (3) not starting new body focus related activities beyond the current study (such as relaxation or meditation); (4) avoiding any guided yoga techniques (e.g., recordings or videos) at home to control for the overall amount of practice; (5) no known psychiatric diagnosis. To avoid any potential gender effects, only female participants were eligible. All participants were Hungarian university students, primarily enrolled in human and natural sciences. Overall, 115 students were enrolled in the study, 74 students in the yoga group and 41 participants in the control group. Due to drop-out, missing measurements or missing more than two yoga classes in case of the yoga group, the final sample included 82 participants (mean age: 22.0±3.83 years). The yoga group consisted of 49 participants (mean age: 21.49±2.3 years), the control group encompassed 33 individuals (mean age: 22.75±5.32 years). Average age and degree level (measured by the level of degree of the current studies) of the two groups were statistically comparable (age: d = -1.29; p = .204; degree: yoga: 1.20±0.41, control: 1.36±0.49; d = -1.55; p = .127). Average physical activity level in a 5-point rating scale in the previous 3 months (1 = no regular participation in physical activities, only occasionally; 3 = 2-3 hours per week; 5 = competes in sports or has at least 5 high-intensity workouts per week) was also similar in the two groups (yoga: 1.84±1.2, control: 2.24±1.23 years; d = -1.48; p = .142). (For details regarding the two yoga groups, see the Results section). Students were mostly engaged in running, spinning, aerobic, and fitness training; none of the groups were physically inactive.

Participants signed an informed consent form prior to participation. The research was permitted by the Research Ethics Committee of the Faculty of Education and Psychology at ELTE University.

Procedure

After registering for the course, subjects were informed via e-mail about the conditions of participation and the appointments for physical measurements. Measurements took place one week before and one week after the yoga training at the Institute of Health Promotion & Sport Sciences of the university. Plank test was an exception which was assessed at the beginning of the first and last yoga class, thus, data of control group for this variable is not available.

The yoga course consisted of 10 weekly sessions, 1.5 hours each. Control students took part solely in the baseline and post-intervention measurements, they did not receive any training or alternative intervention. Yoga classes were led by a certified (RYT500) female yoga instructor (BC, the author). Ethnicity and native language of the students and the teacher were the same. Each session focused on asana practice (all types of body postures such as sitting, kneeling, standing, balancing poses, forward and backward bends, supine and prone positions, inversions) and included a short body and breath focus at the beginning, as well as a short relaxation component (approximately 8-10 minutes in Savasana, the lying corpse position) at the end. Class composition was based on two highly regarded yoga books (Iyengar, 1991; Satyananda Saraswati, 2002). Scripts for the sessions were prepared before the start of the intervention and strictly followed by the yoga instructor throughout all groups and all semesters (see Appendix 2 for class plan; anatomical desription and execution of yoga poses for greater scientifical, e.g., sports scientifical understanding can be found in dedicated books (Kaminoff, 2007; Kaminoff & Matthews, 2011)). Physical components of the classes (i.e., exact movements, order of postures) were completely identical for the two yoga groups and the amount of verbal information provided during the sessions was equivalent. There were identical contents in the scripts for the two groups concerning the correct body posture, alignment of the asanas, however, there were also substantial differences in the instructions provided during sessions. Whereas the so-called Sport group received instructions emphasizing the physical aspects of yoga practice, the so-called Spiritual group was provided with more holistic, i.e., philosophical and spiritual descriptions and explanations (for more details, see the Procedure section of the next Chapter).

Measures

BMI was calculated from the measured body weight and height data. Body weight and *body fat percentage* was measured with OMRON BF-511 body composition scale (OMRON Healthcare Group, Kyoto, Japan) using given height, gender and age data.

Static balance was assessed by the *one-leg-stand (stork) test* (Suni et al., 2009) both with open and closed eyes. Participant's task is to stand on one leg while the heel of the opposite

foot is placed at knee against the inner side of the standing leg. Duration of the test was 60 seconds, number of mistakes (i.e., off-balance situations, such as the foot of the free leg loses the contact with the supporting leg or the supporting leg moves) were registered. *Functional reach test* (FRT) (Duncan et al., 1990) measures static balance through maximal safe forward reach from a fixed standing start position. Difference between the maximal forward reach and arm's length was recorded (cm). There were two trials, better result was taken into account.

Flexibility was measured with the *side bend test* and the *modified sit and reach test*. The *side bend test* (Suni et al., 1998) gauges flexibility of the thoracic and lumbar part of the back. The test person stands straight with shoulders, scapulae and head touching the wall. The person bends to one side keeping his/her hands straight at the thighs. Length between the starting and finishing point at the tip of the middle finger is recorded (cm). There was one bend to each side, average of the two sides were calculated as a final variable. The *modified sit and reach test* (Hoeger & Hopkins, 1992) measures the flexibility of hip region, including the lower back and hamstring muscles. This modified version is designed to control for the variable ratio of the lengths of the limbs. The participant sits with back, shoulders and head at the wall, measurement box is placed to his/her feet. Legs are straight with hip apart. To measure the start position, the performer reaches out with hands placed on each other while the back and the head stay in contact with the wall. Thereafter he/she bends forward as much as possible and slides the hands on the top of the box. Difference between the end reach (at the tip of the middle finger) and the starting point is registered (cm).

Plank test (Strand et al., 2014) measures the muscular endurance of core muscles. Subjects were asked to hold a forearm plank position as long as possible with straight body position where only forearms and toes were supported on the floor. Holding time in seconds was registered, maximal length of the measurement was 2 minutes (120 sec).

Heart rate and *heart rate variability* data were collected with Firstbeat Teambelt system from FirstBeat SPORTS Team Pack (Firstbeat Technologies Ltd., Jyväskylä, Finland) (Parak & Korhonen, 2013). A chest belt was attached to the participant ribcage who was asked to sit quietly without any movements. The belt contains two built-in electrodes and a wireless unit that transmits data in real time to a receiver on a computer. The sampling rate is 1024 Hz. Resting heart rate data were collected for 5 minutes and analyzed by the Firstbeat Sports software. Two measures were extracted: resting heart rate, that is *rHR (bpm) and RMSSD (ms),* i.e., the root mean square of successive differences of interval. It is considered an index of parasympathetic activation of heart (Bogdány et al., 2016; Task Force of the European Society

of Cardiology and the North American Society of Pacing and Electrophysiology, 1996; Tyagi & Cohen, 2016).

Firstbeat Teambelt system was also used during yoga practice to measure participants average heart rate (*AvgHR*) and energy consumption (*kcal*) during the 90-minute-long classes. An average from all participated classes was calculated as a final value for both variables.

Data analysis

Statistical analysis was conducted of using the JASP v0.12.2 software (JASP Team, 2019, 2020). First of all, the two yoga groups were compared. Their homogeneity regarding demographic data and baseline measurements was examined with Welch d-test. The possible effect of verbal instruction on the investigated variables was examined by 2 x 2 mixed ANOVA (time x intervention). Average heart rate and energy consumption during yoga classes were compared between the two groups with Student t-test. Since no differences between the two yoga groups were shown, they were merged and analyzed together as yoga intervention group.

Homogeneity of the yoga and control group with respect to baseline measurements was examined with Welch d-test. The effect of the intervention on the investigated variables was estimated using 2 x 2 mixed ANOVA (time x intervention) with the exception of plank test in which case paired sample t-test was applied (as data from the control group was not available). Respective effect sizes were calculated for all tests. The sample size varies across the variables due to lacking or invalid data at particular measures.

Beyond the conventional frequentist analysis, Bayesian tests were also conducted to shed more light on non-significant results. In the Bayesian analysis, probability of an alternative hypothesis compared to the null hypothesis is calculated, this is called Bayes Factor (BF_{10}). A BF_{10} smaller than 0.33 indicates that the null hypothesis is more probable than the alternative hypothesis. BF_{10} between 1 and 3 shows weak or anecdotal support for the alternative hypothesis, whereas a value above 10 is considered a strong support (Jarosz & Wiley, 2014). The use of Bayesian statistics is strongly recommended by many authors, as it is able to overcome the often-mentioned limitations of the frequentist approach (e.g. Type 1 and 2 errors) and can give a more direct answer to research questions than the classic (aka frequentist) analysis (Dienes, 2011; Jarosz & Wiley, 2014; Kline, 2013).

Results

Comparison of the two yoga groups

Concerning demographic data, the two yoga groups (Sport: N=27, Spiritual: N=22) were identical. Mean age (Sport: 21.48±2.08 years, Spiritual: 21.50±2.59 years; d = - .03; p = .979), degree level (Sport: 1.19±0.40, Spiritual: 1.23±0.43; d = - .35; p = .725), and physical activity in the previous 3 months (Sport: 1.78±1.01, Spiritual: 1.91±1.41; d = - .37; p = .716) in the two groups were statistically comparable.

Descriptive data of the measured physical and physiological variables in the two yoga groups, and their baseline comparison are presented in Table 3. There were no differences between the two yoga groups at baseline.

Table 3

Descriptive data of the assessed variables before and after the intervention, and baseline comparison of the two yoga groups

		Baseline			*Baseline comparison (Welch-d)*			*Post-Intervention*	
		N	M	SD	*d*	*df*	*p*	M	SD
BMI (kg/m^2)	Sport	27	21.28	3.16	-.92	45.10	.364	21.27	3.09
	Spiritual	22	21.97	2.07				21.84	2.19
BodyFat%	Sport	26	28.43	7.77	-.22	40.44	.830	29.39	7.49
	Spiritual	22	28.81	4.37				29.85	5.64
One-leg-stand - Open eyes (NoE)	Sport	27	.19	.62	.70	38.62	.490	0	0
	Spiritual	22	.09	.29				0	0
One-leg-stand - Closed eyes (NoE)	Sport	27	4.78	4.30	.26	46.43	.795	3.63	3.09
	Spiritual	22	4.50	3.11				4.05	3.54
FRT (cm)	Sport	25	41.25	5.41	.02	41.23	.982	39.22	4.52
	Spiritual	22	40.86	6.80				41.55	5.86
Side bend (cm)	Sport	27	20.41	4.22	-.33	36.03	.744	21.69	4.05
	Spiritual	22	20.91	6.13				21.73	4.77
Sit and reach (cm)	Sport	26	33.94	6.85	1.53	43.45	.132	36.25	6.14
	Spiritual	20	31.81	6.99				34.07	6.41
Plank (sec)	Sport	20	80.55	24.86	- 0.03	32.80	.973	102.50	19.69
	Spiritual	13	76.69	29.65				94.54	21.32
rHR (bpm)	Sport	26	85.17	11.79	1.41	33.00	.169	86.52	11.37
	Spiritual	16	80.04	11.28				81.93	11.72
	Sport	26	36.46	19.68		25.81	.150	29.83	18.20

RMSSD (ms)	Spiritual	16	47.56	25.64	-1.48		42.44	23.06

Note. Y=Yoga, C=Control. NoE=Number of Errors; FRT=Functional reach test. rHF=resting HR.

Results of the 2 x 2 mixed ANOVAs investigating the potential effects of verbal instruction did not reveal significant interaction in any of the measured physical and physiological variables. Statistical outcomes of the interaction terms are presented in Table 4.

Table 4

Results of the interaction terms of the 2 x 2 ANOVAs comparing the two yoga groups

		F(df)	*p*	η_p^2	BF_{10}
BMI	group * time	.528 (1,47)	.471	.011	.343
BodyFat%	group * time	.004 (1,46)	.947	< .001	.312
One-leg-stand - Open eyes	group * time	.426 (1,47)	.517	.009	.362
One-leg-stand - Closed eyes	group * time	.364(1,47)	.549	.008	.332
FRT	group * time	2.229 (1,45)	.142	.047	.804
Side bend	group * time	.119 (1,47)	.732	.003	.295
Sit and reach	group * time	.002 (1,44)	.961	< .001	.306
Plank	group * time	.339 (1,31)	.565	.011	.396
rHR	group * time	.040(1,40)	.843	< .001	.326
RMSSD	group * time	.052(1,40)	.821	.001	.324

Note. FRT=Functional reach test. rHF=resting HR.

Regarding average HR (Sport (N=27): 93.77±10.11 bpm, Spiritual (N=22): 92.92±9.57 bpm; $t(47) = .29$; $p = .768$) and average energy consumption (Sport (N=27): 193.13±59.29 kcal, Spiritual (N=22): 199.15±65.83 kcal; $t(47) = -.33$; $p = .738$) during 90-minute-long yoga classes, similarly, no differences between the two yoga groups were found.

Effects of the yoga intervention

Descriptive data of the measured physical and physiological variables in the yoga and control group, and the baseline comparison of the groups are presented in Table 5. No significant differences between the groups emerged for any variables at baseline.

Table 5

Descriptive data of the assessed variables before and after the intervention, and baseline comparison of the groups

		Baseline			*Baseline comparison (Welch-d)*			*Post-Intervention*	
		N	M	SD	*d*	*df*	*p*	M	SD
BMI (kg/m^2)	Y	49	21.59	2.72	1.01	63.61	.318	21.53	2.71
	C	33	20.93	3.03				20.96	3.63
BodyFat%	Y	30	30.13	6.47	.87	60.18	.390	29.84	7.11
	C	33	28.73	6.35				28.33	6.35
One-leg-stand - Open eyes (NoE)	Y	49	.14	.50	.99	73.84	.325	0	0
	C	33	.06	.24				.24	.44
One-leg-stand - Closed eyes (NoE)	Y	49	4.65	3.78	.48	74.32	.632	3.82	3.27
	C	33	4.27	3.33				4.15	3.04
FRT (cm)	Y	47	41.07	6.03	-.59	74.00	.555	40.31	5.26
	C	33	41.65	5.48				40.22	5.67
Side bend (cm)	Y	49	20.64	5.11	-.59	76.73	.555	21.71	4.34
	C	33	21.25	4.21				19.02	3.79
Sit and reach (cm)	Y	46	33.01	6.91	- 1.63	66.48	.109	35.30	6.28
	C	33	35.33	7.44				33.43	6.91
Plank (sec)	Y	33	79.03	26.46		-		99.36	20.40
rHR (bpm)	Y	42	83.22	11.74	.44	58.07	.660	84.77	11.58
	C	29	81.92	12.43				81.26	11.88
RMSSD (ms)	Y	42	40.68	22.51	- .001	59.73	.991	34.63	20.85
	C	29	40.75	22.87				36.17	18.67

Note. Y=Yoga, C=Control. NoE=Number of Errors; FRT=Functional reach test. rHF=resting HR.

Results of the 2 x 2 mixed ANOVAs for the physical variables are presented in Table 6.

Table 6

Results of the 2 x 2 ANOVAs (both frequentist and Bayesian) for the physical variables

		F(df)	*p*	η_p^2	BF_{10}
BMI	group	.890 (1,80)	.348	.011	.651
	time	.009 (1,80)	.924	< .001	.170
	group * time	.076 (1,80)	.783	< .001	.288
BodyFat%	group	.790 (1,61)	.378	.013	.794
	time	1.792 (1,61)	.186	.029	.433
	group * time	.041 (1,61)	.839	< .001	.298

One-leg-stand - Open eyes	group	1.930 (1,80)	.169	.024	.407
	time	.127 (1,80)	.723	.002	.168
	group * time	3.35 (1,80)	.004**	.099	17.807
One-leg-stand - Closed eyes	group	.001 (1,80)	.972	< .001	.255
	time	1.397 (1,80)	.241	.017	.417
	group * time	.779(1,80)	.380	.010	.318
FRT	group	.053 (1,78)	. 818	< .001	.249
	time	2.428 (1,78)	.123	.030	.469
	group * time	.229 (1,78)	.633	.003	.251
Side bend	group	1.407 (1,80)	.239	.017	.473
	time	1.351 (1,80)	.249	.017	.191
	group * time	11.121 (1,80)	.001**	.122	22.828
Sit and reach	group	.021 (1,77)	.884	< .001	.415
	time	.179(1,77)	.673	.002	.285
	group * time	20.779 (1,77)	< .001***	.213	1029.277

Note. **: $p < .01$. ***: $p < .001$. FRT=Functional reach test.

There were no significant interactions for BMI, BodyFat%, one-leg-stand with closed eyes and FRT. In fact, Bayesian analysis indicated the superiority of the null model for these variables. However, a significant interaction term emerged for one-leg-stand with open eyes, side bend test and sit and reach test. Values of these three variables improved in the yoga group, while they declined in the control group. These findings were strongly supported by those of the Bayesian analysis with BF_{10} values over 10. In case of sit and reach, BF_{10} over 1000 shows a saliently strong support. Concerning the plank test, paired sample t-test showed a significant result ($t(32) = -5.963$; $p < .001$; Cohen's $d = -1.038$) which was also strongly supported by the Bayesian analysis ($BF_{10} = 14647.622$).

Results of the 2 x 2 mixed ANOVAs for the physiological variables are presented in Table 7.

Table 7

Results of the 2 x 2 ANOVAs (both frequentist and Bayesian) for the cardiovascular variables

		F(df)	*p*	η_p^2	BF_{10}
rHR	group	.888 (1,69)	.349	.013	.455
	time	.118 (1,69)	.732	.002	.200
	group * time	.738 (1,69)	.393	.011	.317
RMSSD	group	.033 (1,69)	.856	< .001	.275
	time	3.859 (1,69)	.054	.053	1.177
	group * time	.074 (1,69)	.787	.001	.264

Note. rHF=resting HR.

No interaction effect emerged in resting HR and RMSSD; BF_{10} values indicated the superiority of the null hypothesis.

Finally, average HR and energy consumption during 90-minute-long yoga classes showed the following results: *AvgHR* = 93.39±9.78 bpm, min-max: 69.40-111.57; *kcal* = 195.83±61.72, min-max: 76.63-348.71 (an average of all classes).

Discussion

The present intervention study indicates that even a 10-session long beginner level hatha yoga training on a weekly basis can result in improvements in balance, flexibility, and core muscle strength. However, it does not impact BMI, body fat percentage, resting heart rate and heart rate variability. Verbal instructions provided during practice do not impact these physical and physiological outcomes.

Verbal information during yoga classes could facilitate a variety of physical and psychological experiences during practice (Emerson et al., 2009), nevertheless, we assumed that the bodily aspects of practice (i.e., performance of various asanas) are more relevant with respect to physical and physiological measures, and differences in verbal cuing do not lead to different outcomes in these variables. All hypotheses (H8-H14) concerning differences in verbal cuing were strengthened by the present results as no differences between the two yoga groups occurred in any of the measured variables, namely balance (H8), flexibility (H9), core muscle strength (H10), BMI (H11), body fat percentage (H12), resting heart rate (H13), and heart rate variability (H14). A similarly designed study (J. A. Smith et al., 2011) reported analogous outcomes: the "integrated yoga" group and the "yoga as exercise" group did not differ from each. Participants of both groups showed improvements in flexibility (measured by the sit and reach test and trunk flexibility test), but no changes in body weight and resting heart rate were found after a 7-week long biweekly hatha yoga training (J. A. Smith et al., 2011). However, as far as we know, no other studies investigated the role of verbal instruction during physically identical asana practice, thus its potential effect on physical and physiological measures needs further exploration. Greater differences in verbal information might lead to measurable differences in these variables.

Hypothesis 4 and 5, namely that no changes in BMI and body fat percentage emerge after a 10 session long weekly yoga training among healthy young adults, were proven by the present findings. Previous studies reporting decrease in BMI comprised more intense yoga

interventions with 1-month long daily yoga practice (Chauhan et al., 2017) or 8-week long 3-6 times/week training (McDermott et al., 2014). In these studies participants' average BMI fell within the category of overweight (26.4 ± 2.5, Chauhan et al., 2017; 28.4 ± 5.3, McDermott et al., 2014). In contrast, participants of present study took part in 10 yoga classes only and showed a normal BMI at the beginning of the study. Thus, we assume that changes in BMI may occur only with more than 10 yoga sessions and presumably among people with higher than normal body weight and BMI. The latter assumption is also strengthened by the results of a systematic review (Lauche et al., 2016). Besides, average energy consumption of a yoga class of the present investigation was 195 kcal (see later). Thus, we can also assume that for measurable changes in BMI greater exercise intensity and energy consumption are needed. Concerning body fat percentage, the present results are in line with the outcomes of Tran and colleagues (2001) who similarly investigated young healthy adults and reported null findings. The above-mentioned review (Lauche et al., 2016) also denotes the lack of effect of hatha yoga practice on body fat percentage compared to usual care, exercise, or lifestyle modification. In contrast, two studies reported a significant decrease in body fat percentage (Halder et al., 2015; Pandit et al., 2019). However, one of those (Pandit et al., 2019) investigated overweight participants, and the other one (Halder et al., 2015) found significant changes in two elder subgroups (30-39 years and 40-49 years) with higher than normal body fat percentage, but not in young participants (20-29 years) with normal body fat percentage. Furthermore, another study reported significant decrease in body fat percentage in healthy middle-aged women after a 12-week long (3 times/week) power yoga program (Jin et al., 2016). In summary, a decrease in body fat percentage might occur among elder and/or overweight participants with more intense yoga practice, but changes in body fat is not probable among healthy young adults after a short and less intense intervention.

Yoga participants of the present study showed a significant improvement in balance measured by the one-leg-stand with open eyes test compared to the control group. No changes measured by the one-leg-stand with closed eyes and FRT were found. Thus, Hypothesis 1 is only partly strengthened by the present outcomes. Former studies using one-leg-stand with open or/and closed eyes (Jin et al., 2016; Kumar et al., 2016; Polsgrove et al., 2016) reported significant improvement in balance, however, they applied longer and/or more intense yoga training. Similarly, most of the investigations summarized by a systematic review (Jeter et al., 2014) reported positive findings, thus it can be concluded that 10 weekly sessions of yoga practice are sufficient to result in improvement of static balance with open eyes. However, for betterment in balance with closed eyes presumably longer or more intense yoga program might

be needed. FRT also measures static balance, though it is an indicator of balance frailty (physical frailty) rather than balance and has moderate to strong negative correlation with age (Weiner et al., 1992). As participants of present investigation were healthy young adults, the differentiation of FRT might not be adequate enough among them to value balance as a form of physical fitness. Nevertheless, it can also be proposed that ten weekly session are not sufficient to register significant improvement in functional reach. Anyhow, improvement in balance through yoga in young ages is not only a sign of physical fitness but it can be a form of prevention of risks concerning falling in elderly ages (Boros et al., 2018).

Hypothesis 2 concerning flexibility is fully accepted according to the results: significant interaction effect in the sit and reach test and the side bend test showed that flexibility of yoga participants increased while it decreased in the control group at the end of the intervention. This is in line with the previous findings of Van Puymbroeck and colleagues (2011) who reported improvements in the same flexibility tests after an 8-week long (2 times/week) hatha yoga intervention compared to a light exercise group (Van Puymbroeck et al., 2011). Other yoga studies investigating flexibility also reported positive changes among different populations, like male college athletes (Polsgrove et al., 2016), preadolescent boys (Nayek & Chatterjee, 2016) and healthy men of various age groups (Halder et al., 2015). However, all of these studies (Halder et al., 2015; Nayek & Chatterjee, 2016; Polsgrove et al., 2016) used more frequent interventions than the present one. According to our results, we can propose that even a weekly setting of yoga practice is sufficient to evoke improvements in flexibility. This is supported by Amin and colleagues (2014) who found significant improvements in pliability with weekly sessions of yoga after 6 weeks. However, in that study (Amin & Goddman, 2014) asanas were purposely selected to improve strength and flexibility.

Hypothesis 3 regarding core muscle strength was also accepted: yoga participants showed an increased core muscle strength measured by the plank test. Data of control participants were not available in this measure, however, the large effect size and the high probability indicated by the Bayes Factor strongly support the significance of this change. Similarly, previous studies showed positive outcomes in core muscle strength after yoga interventions of various intensity (Kumar et al., 2016; Murugan & Durai, 2019; Radhakrishnan, 2019). Review articles (Modak, 2017; Rathore et al., 2017) also suggest that specific yoga postures greatly assist in strengthening core muscles. Thus, we can conclude that weekly regularity of yoga practice leads to enhanced core muscle strength. Furthermore, different yoga poses together with yoga breathing induce various activation magnitudes of core muscles (included diaphragm that regulates intra-abdominal pressure and trunk stabilization), which is

suggested to take into consideration in planning appropriate yoga intervention programs (Akuthota & Nadler, 2004; Key, 2013; Rathore et al., 2017).

Regarding cardiovascular outcomes, the present study did not find significant changes in HR and HRV after the 10-session long intervention which support Hypotheses 6 and 7. As cardiovascular activation caused by the yoga classes was of slight intensity (see below), this finding is not surprising. Also, it is line with the findings of Bidwell and colleagues (2012) who did not report differences in HR and HRV measures between the yoga and the control group after a 10-week long yoga training. In contrast, a systematic review (Cramer et al., 2014) revealed evidence for effects of yoga on HR. However, with one exception of all the 19 included randomized controlled trials investigated longer and/or more frequent yoga programs. Concerning HRV, two recent studies (Ganesan et al., 2020; Odynets et al., 2019) also reported positive outcomes, however both applied longer yoga interventions. Thus, we can assume that although yoga may affect HR and HRV positively, ten weekly sessions are not sufficient to evoke such changes.

According to the descriptive statistics of average heart rate and energy consumption, we can denote, that the average heart rate during beginner level hatha yoga classes (inclusive short body and breath focus, as well as an approximately 8-10 minutes lying relaxation) was 93.39±9.78 bpm (min-max: 69.40-111.57), and average energy consumption was 195.83±61.72 kcal (min-max: 76.63-348.71). Cowen and Adams (2007) investigated heart rate during different styles of yoga classes of 80 minutes. They reported average heart rate during ashtanga yoga 95.18±12.80, hatha yoga 80.17±9.32 and gentle yoga 74.49±7.41 bpm (Cowen & Adams, 2007). Another study (Schubert et al., 2018) reported 131±14 bpm as average heart rate during a 45 minute long power yoga class. A relatively recent study (Sherman et al., 2017) showed that average heart rate of vinyasa yoga participant were 109.6±18.0 bpm during a 60-minutes long class, and energy consumption were 273.8±78.0 kcal. Compared to these previous results, yoga classes of the present intervention although beginner level, were around medium level in intensity among yoga styles.

It can be concluded that results are in line with almost all hypotheses (H2-H14), and Hypothesis 1 is also partly strengthened by the present outcomes. Weekly setting of 10 beginner level traditional hatha yoga classes (1.5 hours each) can result in significant positive changes in balance, flexibility, and core muscle strength among healthy female adults. However, it does not lead to changes in BMI, body fat percentage, and resting HR and HRV. These outcomes are not dependent from verbal instructions provided during yoga practice. Regarding BMI and

body fat percentage, positive changes might be expected only in overweight population or with more intense yoga practices. Changes in resting HR and HRV supposedly occur only with longer and/or more intense yoga intervention. Concerning descriptive data of average heart rate and energy consumption during yoga classes, we can state that beginner level hatha yoga classes show medium intensity among yoga classes, and might be an appropriate form of physical activity to achieve some public health guidelines (Sherman et al., 2017). All in all, we can conclude that a beginner level of hatha yoga training of ten weekly sessions can result in beneficial physical health outcomes.

For future studies, we recommend the inclusion of various population with the same yoga intervention setting to explore whether current results can be generalized across genders, different age and health groups. Concerning the potential effects of verbal instruction during physically identical yoga practice, studies with various differences in verbal cuing can be conducted. For example, for greater differences between Sport and Spiritual group, in case of Sport group terminology of gymnastics could be applied for physical cues and terms and phrases of sport psychology could be included for mental aspects, while Spiritual group could receive instructions for all aspects of practice through the terminology of yoga.

Limitations

The sample of this study was restricted to young female participants. As further limitations we must mention the unbalanced sample size, the relatively large drop-out rate and lack of randomization of the design. However, strict inclusion criteria and controlling of potential confounding variables (e.g., previous physical activity level was measured; participants were not allowed to begin any new physical activities or body focus related activities beyond the current study; practicing yoga at home was not allowed) were applied to improve methodology. There was a control question at the end of the measurement concerning participants' physical activity during the research period, though it was not monitored by more accurate methods. In future studies it worth to inspect this possible influencing effect in a more precise way, i.e., with weekly activity measurements. Furthermore, we have to mention the lack of control data concerning plank test. During measurements, tests for interoception were also applied, among those the waterload test could have interfered with the usage of plank test. Thus, plank test was scheduled for the first and the last yoga classes. Besides, proper measurement of body fat percentage requires specific conditions (e.g., no food and water intake 2 hours before measurement). For comparable data, similar conditions are needed. Participant were instructed to arrive for the measurements with these conditions, however those could not be controlled

which might have influenced the data. Lastly, it is important to note that the control group received no intervention. However, our main focus was not to measure the effectiveness of yoga practice compared to other physical activities, but to investigate whether weekly setting of a short beginner level yoga course can result in beneficial physical and physiological health outcomes. Nevertheless, attention received by the participants may have affected the results, thus present findings are restricted to face-to-face yoga practice, but might not be valid for home practice with recorded teachings. Potential biases during physical measurements before and after the training were minimized. Research assistants who conducted the measurements were blind to the group of the participants. However, motivations and expectations of participants were not monitored, which is suggested to do so in future studies.

Conclusions

Present findings suggest that weekly setting of a beginner level hatha yoga training of ten 1.5 hours long sessions leads to improvements in balance, flexibility and core muscle strength, but does not affect BMI, body fat percentage, resting heart rate and heart rate variability in healthy young women, regardless of verbal instruction during practice. We can conclude that a yoga intervention with a weekly frequency of one session is adequate for positive changes in certain aspects of physical fitness, however, for betterment in physiological, especially cardiovascular markers longer time of training and/or a higher weekly frequency is needed. The relevance of these findings accords with the conclusions of Tolnai and colleagues (2016), that weekly training is beneficial for those who cannot afford more leisure time than this for physical activity. However, engagement in regular physical activity might increase over time as beneficial outcomes occur, and the process might be able to end in a virtuous circle.

3.2. PSYCHOLOGICAL EFFECTS OF HATHA YOGA – LONGITUDINAL STUDY PART 2

This chapter is based upon the following article (Csala et al., 2020), some parts of the chapter are exact copies of it:

Csala, B., Ferentzi, E., Tihanyi, B. T., Drew, R., & Köteles, F. (2020). Verbal Cuing Is Not the Path to Enlightenment. Psychological Effects of a 10-Session Hatha Yoga Practice. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01375

Beneficial effects of yoga practice on various indicators of mental health are suggested by large number of studies and reviews (Büssing, Michalsen, et al., 2012; Domingues, 2018; S. Dwivedi & Tyagi, 2016; Field, 2016; Govindaraj et al., 2016; Hendriks et al., 2017; Ross & Thomas, 2010). Positive outcomes were reported concerning mindfulness (Brisbon & Lowery, 2011; Curtis et al., 2011), body awareness (Daubenmier, 2005; Delaney & Anthis, 2010), affect (Meissner et al., 2016; Vadiraja et al., 2009), and spirituality (Büssing, Hedtstück, et al., 2012) which are characteristics of mind-body exercises and Eastern forms of movement (D. H. K. Brown & Leledaki, 2010; Mehling et al., 2011). However, for more evidences further investigations are proposed (Domingues, 2018; Hendriks et al., 2017). Especially, spirituality is an understudied area within the field of yoga research (Büssing, Hedtstück, et al., 2012; MacDonald, 2013). Also, many reviewers suggest proper methodology, detailed description of yoga interventions, and the investigation of specific components of yoga practice for better understanding and application of yoga (Büssing, Michalsen, et al., 2012; Elwy et al., 2014; Field, 2016; Park et al., 2018; Patwardhan, 2017; Ross & Thomas, 2010).

Aims and hypotheses

The previously presented longitudinal study had a main goal, namely, to investigate the significance of verbal instructions during yoga practice on different measures of mental health, which are correlates of Eastern movement forms and mind-body exercises, such as body awareness, mindfulness, spirituality, and affect among healthy female adults. It was expected that a 10-session weekly hatha yoga training leads to favorable changes in the aforementioned constructs; moreover, participants receiving more holistic or spiritual verbal cuing would show greater improvements than those receiving instructions focused primarily on the physical

aspects of the yoga practice. Additionally, long term effectiveness of yoga practice was investigated on variables which were affected by the training. A further explorative aim of the study was to explore the potential intercorrelations among the changes in outcome variables.

Hypotheses:

First of all, it was hypothesized that a 10-session weekly hatha yoga training leads to favorable changes, namely to an increase in:

- mindfulness (H1), body awareness (H2), spiritual connection (H3), and positive affect (H4), and a decrease in:
- negative affect (H5) compared to no-intervention controls.

Furthermore, it was hypothesized that yoga participants receiving more holistic or spiritual verbal cuing show greater changes in:

- mindfulness (H6), body awareness (H7), spiritual connection (H8), positive affect (H9), and negative affect (H10) compared to yoga participant receiving instructions focused primarily on the physical aspects of practice.

Methods

Participants

A priori calculation (Faul et al., 2007) for a mixed 3x2 ANOVA with within-between interaction and a small effect size ($\alpha = .05$, $\beta = .8$, $f = .2$) indicated a total sample size of 66 (i.e., n = 22 in each group). Overall, 115 participants were enrolled in the study. Due to drop-out or missing more than two yoga classes, the final sample included 84 female university students (mean age: 22.0±3.80 years) with no previous experience in yoga. Participants were divided into three groups: two yoga and one control group. The so-called "Sport group" (see the Procedure section for more details above and below) consisted of 27 participants (mean age: 21.48±2.08 years); size of the "Spiritual group" was n = 23 (mean age: 21.43±2.56 years). The control group encompassed 34 individuals (mean age: 22.79±5.24 years).

As mentioned by the previous Chapter, participants signed an informed consent form prior to participation. The research was permitted by the Research Ethics Committee of the Faculty of Education and Psychology at ELTE University.

Procedure

Procedure of the study is presented in Participants and Procedure of the previous Chapter (see Chapter 3.1., Methods). Here, only additional information concerning the yoga groups and the psychological measurements are described.

After registering for the yoga and control courses, students were informed via e-mail about the conditions of participation. Questionnaires were completed online one week before and after the intervention, and also 6 weeks after the training (follow-up).

As mentioned before, verbal instructions of the two yoga groups were partly different. Whereas the Sport group received instructions emphasizing the physical aspects of yoga practice (e.g., correct alignment of the body, which muscle is strengthened or stretched in the particular asana), the Spiritual group was provided with more holistic, i.e., philosophical and spiritual descriptions and explanations (e.g., what is the energetic body, which chakra is activated by a specific posture and its corresponding mental, emotional characteristics, what is the final aim of yoga practice, "om" mantra chanting at the end of the class). For instance, Pawanmuktasana series (warming up exercises) were introduced in the following ways: Sport group: "*The aim of these practices is to move the joints to open up them and gain better flexibility.*" versus Spiritual group: "*The aim of these practices is to enhance flexibility and release energetical blockages from the body.*". Similarly, in Trikonasana (standing hip opening posture) the instruction was as follows: Sport group: "*Try to stretch your body in all directions, feel the opening of your hip. Feel the work of your side muscles and abdominal muscles.*" versus Spiritual group: "*Stretch from your navel into all directions. Observe Manipura chakra, and quality of fire element, strength, endurance and will-power.*". While holding the pose of Supta Pawanmuktasana (lying on the back with pulled up knees) the instruction was as follows: Sport group: *"Most of the poses have an active effect on the spine, they strengthen or stretch it, like this one. The health of our spine is the foundation for healthy functioning: it provides the correct posture for the body which influences the proper operation of the inner organs. Aside from this, if the spine is healthy, it also keeps the nerves safe and sound."* versus Spiritual group: *"According to the ancient scripts, the aim of asana practice is to prepare the body for meditation. To be strong and flexible enough to hold a stable, comfortable sitting posture with a straight spine for a long time. Aside from this, it prepares the mind to be able to meditate in this pose, to focus and deepen within, and realize who we are in reality.".* Components of the verbal instructions were evaluated using a recently developed questionnaire called the Essential Properties of Yoga Questionnaire (EPYQ) (Park et al., 2018). This assessment indicated that sessions for both yoga groups included the following components: *Breathwork; Physicality; Postures, Active; Postures, Restorative; Body Awareness; Individual Attention; Social Aspects;*

Meditation & Mindfulness; and *Acceptance/Compassion* components. However, only one item on the *Acceptance/Compassion* subscale was included in the Sport group sessions, namely "Acceptance of your body while doing yoga". This item pertains to avoiding over-exertion in order to prevent injury. Other items on this subscale (e.g., "General thoughts of gratitude, love, kindness" and "Self-compassion") were not featured in the Sport group but were incorporated in the Spiritual group sessions. Furthermore, the scripts for both groups mentioned *Health Benefits*, but in the Sport group it referred to physical health while in the Spiritual group emotional, mental, and spiritual aspects of health were emphasized. Instructions for the Sport group acknowledged *Release* of the physical tension, while verbal cues for the Spiritual group also referred to *Mental & Emotional Awareness/Release, Spirituality* and *Yoga Philosophy*. Neither set of instructions made reference to *Body Locks* (specific muscular contractions to induce energetic effects). To summarize, the similarities between the two intervention groups were the fundamental elements of traditional hatha yoga practice, including physicality and some psychological facets (e.g., focusing one's awareness on breath, different physical sensations, and relaxation of the body). The main difference between the two groups was that the Sport group remained focused on these physical aspects of practice, while the Spiritual group received additional information about the philosophical and spiritual facets of yoga practice. Furthermore, social components, like small interactions between students and individual attention (i.e., physical assessment of a student in posture) were also part of the experience in both groups. These inevitable characteristics of a guided physical group activity were equalized by the instructor as much as possible.

Measurements

Demographic data included questions about age, education level, average physical activity level in the previous 3 months (measured by a five-point Likert Scale), and a yes-or-no question concerning previous spiritual experiences (e.g., meditation, relaxation, religious practices, tai chi, reiki).

The *Body Awareness Questionnaire* (BAQ) (Shields et al., 1989) assesses the beliefs about one's sensitivity to normal, non-emotive bodily processes and the ability to anticipate bodily reactions. It has 18 items measuring on a seven-point Likert-scale (from "*not at all true of me"* to "*very true of me"*). Higher scores indicate higher level of attentiveness to normal bodily processes. The scale is characterized by a good convergent and discriminant validity (Mehling et al., 2009; Shields et al., 1989). The Hungarian version of the scale also showed

good validity and reliability (Emanuelsen et al., 2015; Köteles, 2014). In the present study the Cronbach's alpha value was .841 at the first and .865 at the second measurement.

The *Mindful Attention and Awareness Scale* (MAAS) (K. W. Brown & Ryan, 2003) measures the ability to focus on the present moment with an open, non-judgmental attitude. It consists of 15 inversely stated items using a six-point Likert Scale (from "*almost always*" to "*almost never*") assessing the automatic, inattentive actions of the respondent. Higher scores represent higher level of mindfulness. The scale showed a negative correlation with reflective self-consciousness (assessed by the Self-Consciousness Scale, (Fenigstein et al., 1975)), and only small to moderate relations to other dispositional self-awareness instruments meaning that MAAS measures a unique aspect of human consciousness (K. W. Brown & Ryan, 2003). The Hungarian version is in concordance with the original measure, it shows a good validity and has good internal consistency (Simor et al., 2013). In the present study Cronbach's alpha values were .859 and .850.

The *Positive and Negative Affect Schedule* (PANAS) (Watson et al., 1988) consists of two independent scales measured by 10-10 items on a five-point Likert scale (from "*very slightly or not at all*" to "*extremely*"). The Positive Affect scale indicates the extent to which a person feels active, alert and enthusiastic. The Negative Affect scale measures subjective distress and unpleasant mood states like guilt or fear. Higher scores show higher positive or negative affect. The two scales are internally consistent and dispose of ideal convergent and discriminant validity since they showed expected correlations with expansive measures of underlying mood components. The Hungarian version of this scale had acceptable internal consistency (Gyollai et al., 2011). In the present study, Cronbach's alpha coefficients were .843 and .882 for Positive Affect and .849 and .891 for Negative Affect, respectively.

The short version of the *Spiritual Connection Questionnaire* (SCQ-14) (Wheeler & Hyland, 2008) aims to assess spiritual connection as a subjective experience in a religion-independent way. It is a unidimensional measure capturing the feeling of connection with the universe, with others, and the happiness arising from the sense of connection. The 14 items measure on a seven-point Likert scale (from "*definitely not agree*" to "*definitely agree*"), higher scores represent higher level of spiritual connection. It shows negative correlation with self-enhancing values, such as power, security, and hedonism, and a positive correlation with self-transcendence values, like universalism (Wheeler & Hyland, 2008). Thpe scale is freely accessible and usable. The Hungarian version showed good validity and high reliability (Csala & Köteles, 2021), Cronbach's alpha values were .930 and .943 in the present investigation.

Data analysis

Statistical analysis was conducted of using the JASP v0.10.2 and v0.12.2 softwares (JASP Team, 2020). Homogeneity of groups with respect to baseline measurements was examined with one-way analysis of variance (ANOVA) and chi-square test. The effect of the intervention on the investigated variables was estimated using 2 x 3 mixed ANOVA (time x intervention). Since no differences between the two yoga groups were revealed, in the next step the two yoga groups were merged and compared to control group using 2 x 2 mixed ANOVAs. 3 x 2 mixed ANOVAs (to investigate follow-up outcomes) were calculated for variables which showed significant interaction effect in the 2 x 2 ANOVA. *Post hoc* analysis was conducted with Bonferroni correction ($p < .05$) in all cases. Changes with respect to the assessed variables in the merged yoga group were calculated by subtracting the baseline value from the respective post-intervention value for each participant. Associations between changes were estimated using Kendall's tau-b coefficients. For all cases, Bayesian counterparts were also calculated.

Results

Demographic data

There were no significant differences among the three groups with respect to age ($F(2,81) = 1.254$; $p = .291$), education level ($F(2,81) = 1.734$; $p = .183$), average physical activity level in the previous 3 months ($F(2,81) = 1.205$; $p = .305$), and previous spiritual experiences ($\chi^2(2) = .620$; $p = .733$).

Descriptive statistics

Descriptive data of the measured psychological variables among the three groups and the merged yoga group, as well as baseline comparison of the groups are presented in Table 8. There were no significant differences between the three groups for any variable at baseline. Similarly, no significant differences emerged when the merged yoga group was compared to the control group.

Table 8

Descriptive data of the assessed variables before and after the intervention, and baseline comparison of the groups

		Baseline		Baseline ANOVA			Post-intervention	
Group	N	M	SD	*F(df)*	*p*	η_p^2	M	SD

MAAS	Sport	27	55.15	11.76	.855 (81,2)	.429	.021	56.74	12.17
	Spiritual	23	52.13	12.70				55.13	13.57
	Control	34	51.50	9.70				51.85	8.55
	Merged Yoga	50	53.76	12.17	.818 (82,1)	.368	.010	56.00	12.73
BAQ	Sport	27	82.74	17.95	1.095 (81,2)	.339	.026	83.33	14.63
	Spiritual	23	76.39	13.40				77.91	17.60
	Control	34	80.09	13.76				79.38	13.97
	Merged Yoga	50	79.82	16.18	.006 (82,1)	.937	.000	80.84	16.13
SCQ-14	Sport	27	54.11	20.46	1.674 (81,2)	.194	.040	55.59	22.88
	Spiritual	23	63.44	17.39				66.13	17.88
	Control	34	56.62	17.53				53.68	16.64
	Merged Yoga	50	58.40	19.49	.183 (82,1)	.670	.002	60.44	21.20
PA	Sport	27	33.96	6.21	2.351 (81,2)	.102	.055	31.78	7.53
	Spiritual	23	36.87	6.09				33.52	6.57
	Control	34	36.74	4.63				35.18	5.26
	Merged Yoga	50	35.30	6.27	1.299 (82,1)	.258	.016	32.58	7.09
NA	Sport	27	19.00	6.46	.321 (81,2)	.727	.008	15.85	5.01
	Spiritual	23	20.35	5.37				16.87	4.98
	Control	34	19.35	6.31				18.97	6.96
	Merged Yoga	50	19.62	5.96	.039 (82,1)	.844	.000	16.32	4.97

Note. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect.

Results of the 2 x 3 mixed ANOVAs are presented in Table 9. No significant results with respect to mindfulness and body awareness were found. Results of Bayesian analysis were in line with these findings as all BF_{10} indices were less than 1. A significant interaction effect emerged for spirituality ($F(2,81) = 3.35$; $p = .040$; $\eta_p^2 = .076$), but *post hoc* tests failed to reveal significant differences between groups (Sport-Spiritual: $t = -1.911$; $p_{bonf} = .179$; Sport-Control: $t = -.063$; $p_{bonf} = 1.000$; Spiritual-Control: $t = 1.949$; $p_{bonf} = .164$) (Figure 8, left-hand part). Bayesian analysis, however, did not indicate a substantially higher probability for the alternative hypothesis compared to the null hypothesis ($BF_{10} = 1.054$). Concerning positive affect, a significant time effect emerged ($F(2,81) = 15.935$; $p < .001$; $\eta_p^2 = .164$), which was strongly supported by the Bayesian analysis ($BF_{10} = 96.677$), but no group or interaction effects were present. Significant time effect ($F(2,81) = 17.342$; $p < .001$; $\eta_p^2 = .176$) and interaction

effect (F(2,81) = 3.369; p = .039; η_p^2= .077) were found for negative affect, but *post hoc* analyses did not show significant between-group differences (Sport-Spiritual: t = -.767; p_{bonf} = 1.000; Sport-Control: t = -1.239; p_{bonf} = .656; Spiritual-Control: t = -0.377; p_{bonf} = 1.000) (Figure 9, left-hand part). Bayesian results strongly supported the former finding (BF_{10} = 62.154); however, the latter received only weak support (BF_{10} = 1.458).

Table 9

Results of the 2 x 3 ANOVAs (both frequentist and Bayesian) for the measured variables

		F(2, 81)	*p*	η_p^2	BF_{10}
MAAS	group	1.336	.269	.032	.450
	time	2.289	.134	.027	.391
	group * time	.497	.610	.012	.146
BAQ	group	1.276	.285	.031	.346
	time	.076	.784	.000	.189
	group * time	.149	.862	.004	.118
SCQ-14	group	2.377	.099	.055	1.045
	time	.179	.673	.002	.163
	group * time	3.350	.040 *	.076	1.054
PA	group	2.573	.083	.060	1.008
	time	15.935	< .001 ***	.164	96.677
	group * time	.768	.467	.019	.186
NA	group	.781	.461	.019	.284
	time	17.342	< .001 ***	.176	62.154
	group * time	3.369	.039 *	.077	1.458

Note. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect.
*: p < .05. ***: p < .001.

Results of the 2 x 2 ANOVAs with the merged yoga group are presented in Table 10. Significant interaction effect emerged for spirituality (F(1,82) = 6.526; p = .012; η_p^2= .074), weakly supported by the Bayesian analysis (BF_{10} = 1.161). The level of spiritual connection increased in the merged yoga group and decreased in the control group after the intervention (Figure 8, right-hand part). Regarding positive affect, a strong time effect was found (F(1,82) = 12.971; p < .001; η_p^2=.137; BF_{10} = 97.488); level of positive affect decreased in both groups by the second measurement. There was a significant time effect (F(1,82) = 10.774; p = .002; η_p^2= .116; BF_{10} = 62.294) and an interaction effect (F(1,82) = 6.764; p = .011; η_p^2= .076; BF_{10} = 4.635) for negative affect. Level of negative affect decreased in the yoga group while it remained basically the same in the control group at the end of the intervention (Figure 9, right-

hand part). Concerning mindfulness and body awareness, no significant results were found in either analysis.

Table 10

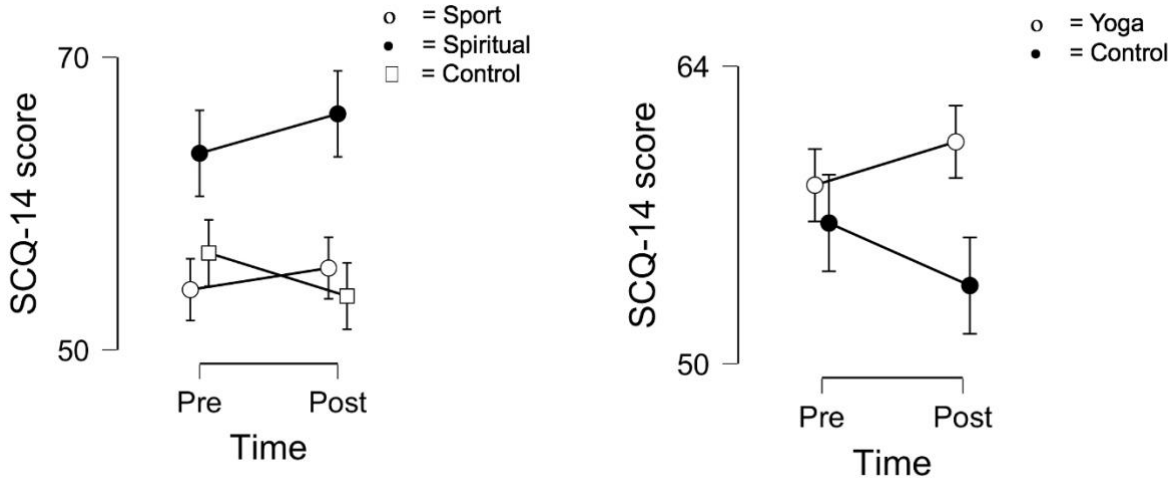
Results of the 2 x 2 ANOVAs (both frequentist and Bayesian) for the measured variables

		F(1, 82)	*p*	η_p^2	BF_{10}
MAAS	group	2.032	.158	.024	.447
	time	1.413	.238	.017	.396
	group * time	.748	.390	.009	.149
BAQ	group	.041	.84	.001	.347
	time	.008	.927	.000	.168
	group * time	.256	.614	.003	.155
SCQ-14	group	1.067	.305	.013	.849
	time	.214	.645	.003	.162
	group * time	6.526	.012 *	.074	1.161
PA	group	2.788	.099	.033	.996
	time	12.971	< .001 ***	.137	97.488
	group * time	.955	.331	.012	.192
NA	group	.979	.325	.012	.451
	time	10.774	.002 **	.116	62.294
	group * time	6.764	.011 *	.076	4.635

Note. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect.
*: $p < .05$. **: $p < .01$. ***: $p < .001$.

Figure 8

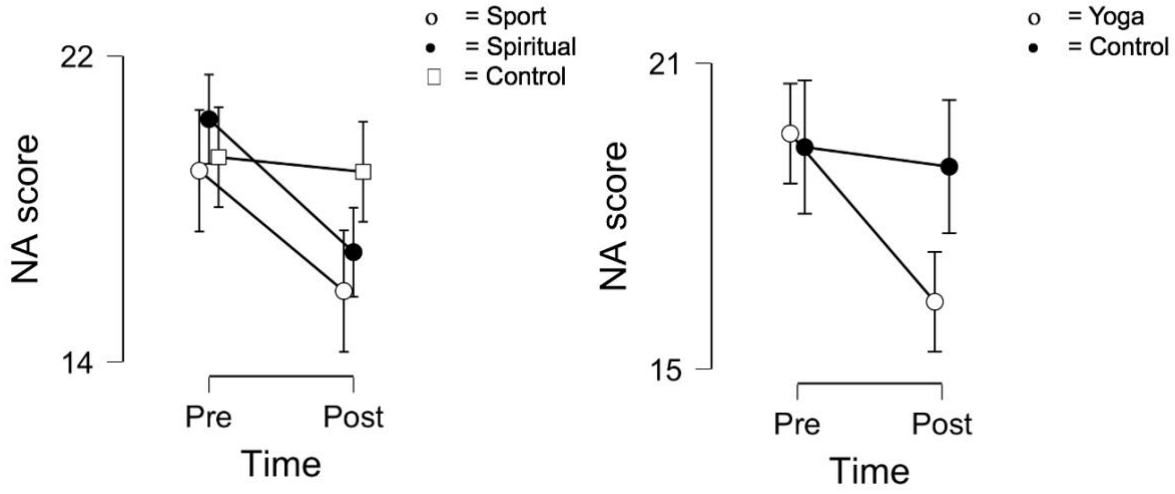
Changes in spirituality in the three groups (left-hand side) and in the merged yoga and control group (right-hand side).



Note. SCQ-14: Spiritual Connection Questionnaire. Error bars indicate 95% confidence intervals

Figure 9

Changes in negative affect in the three groups (left-hand side) and in the merged yoga and control group (right-hand side).

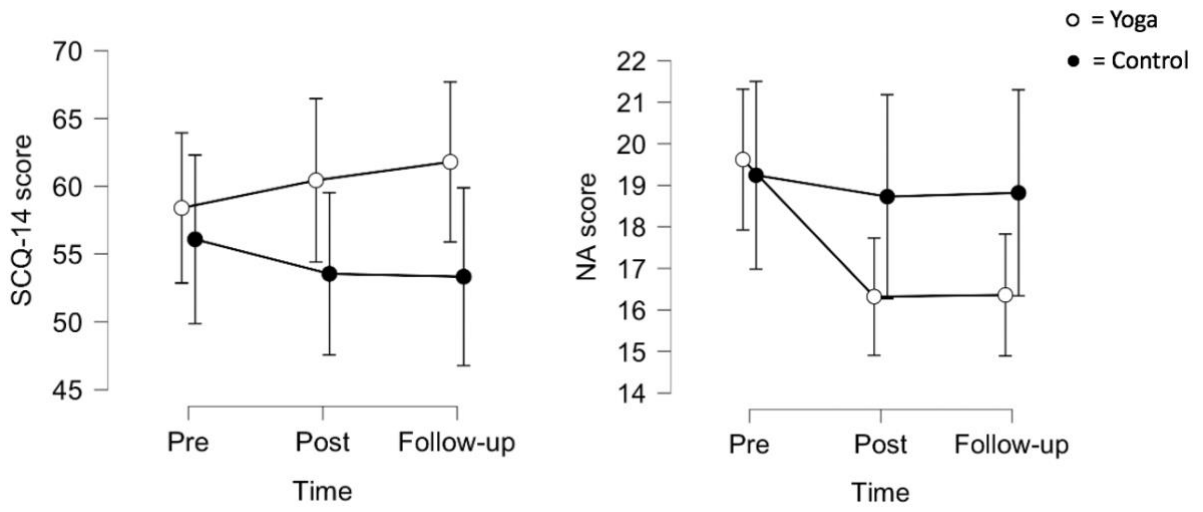


Note. NA: Negative Affect. Error bars indicate 95% confidence intervals.

3 x 2 mixed ANOVAs were calculated for spirituality and negative affect. Significant interaction term emerged for spirituality (Follow up: Merged Yoga = 61.80±20.75, Control = 53.33±18.48; $F(2,162) = 5.33$; $p = .006$; $\eta_p^2 = .062$) which was supported by the Bayesian analysis ($BF_{10} = 7.418$). However, *post hoc* tests failed to reveal significant differences between measurement times or groups. Concerning negative affect, significant time and interaction effect emerged according to both frequentist and Bayesian analyses (Follow up: Merged Yoga = 16.36±5.17, Control = 18.81±6.99; time effect: $F(2,162) = 8.23$; $p < .001$; $\eta_p^2 = .092$, $BF_{10} = 524.433$; interaction effect: $F(2,162) = 4.62$; $p = .011$; $\eta_p^2 = .054$, $BF_{10} = 4.254$). *Post hoc* test showed significant differences between Baseline and Post-intervention and Baseline and Follow up values of the Yoga group (Yoga Baseline – Post-intervention: $t = 4.902$; $p_{bonf} < .001$; Yoga Baseline – Follow up: $t = 4.842$; $p_{bonf} < .001$), however no other significant differences emerged. Results of the follow up analyses are presented in Figure 10.

Figure 10

Changes in spirituality (left-hand side) and negative affect (right-hand side) across the three measurement times in the merged yoga and control group.



Note. SCQ-14: Spiritual Connection Questionnaire, NA: Negative Affect. Error bars indicate 95% confidence intervals.

Correlations between the change in measured variables (between baseline and post-intervention) within the merged yoga group are presented in Table 11.

Table 11
Kendall's tau-b coefficients across the delta variables in the merged yoga group

N = 50	1	2	3	4
1. MAAS	-			
2. BAQ	.014	-		
3. SCQ-14	.074	.283**	-	
4. PA	.033	- .013	.161	-
5. NA	- .257*	- .026	- .037	- .066

Note. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect.
*: $p < .05$. **: $p < .01$

Frequentist and Bayesian results consistently indicate a weak to moderate negative correlation between the change in mindfulness and negative affect (τ_b = -.257; p = .012; BF_{10} = 5.462). Another weak to moderate positive association emerged between body awareness and spirituality (τ_b = .283; p = .004; BF_{10} = 11.174). No other correlation reaching the accepted significance level ($p < .05$) or a BF_{10} higher than 1 were found.

Discussion

Results of the present study indicate that different types of verbal instructions during physically identical beginner level hatha yoga sessions do not result in different outcomes with

respect to spirituality, body awareness, mindfulness, and affect among healthy female university participants. However, when data were merged across intervention groups, yoga participants showed a significant increase in spirituality and decrease in negative affect when compared to the no treatment control group at the end of the 10-session long weekly yoga training. No significant interaction effect for mindfulness, body awareness, and positive affect was found.

To our knowledge, this is the first study that investigates the role of verbal cuing in the overall effect of a yoga intervention. We expected that more holistic (i.e., referring to philosophical and spiritual aspects of yoga practice) verbal information would lead to greater improvements in mindfulness, body awareness, spirituality, and affect than instructions that focused predominantly on the physical aspects of yoga practice. These hypotheses (H6-H10) were not supported by the data. Regardless of the instructions provided in the sessions, yoga practice led to favorable outcomes, i.e., an improvement in spirituality and a decrease in negative affect (approving Hypothesis 3 and 5), and did not lead to changes concerning mindfulness, body awareness and positive affect (refusing Hypothesis 1, 2, and 4).

These results are partially in accordance with those of a similarly designed intervention study (J. A. Smith et al., 2011). At the end of a 7 week-long training, participants in both the "yoga as exercise" and "integrated yoga" groups showed decreased levels of depression and stress and an increased sense of hope, effects which were not found in the control group. Only anxiety decreased exclusively in the integrated yoga group. In the present study, the decrease in negative affect experienced by both intervention groups is in line with these findings (Gyollai et al., 2011; Watson et al., 1988). However, unlike the present study, Smith and colleagues (2011) found no significant changes in spirituality (i.e., spiritual well-being) in any of the groups. Inconsistencies in the definition, operationalization, and assessment of spirituality across studies can make it hard to compare outcomes in related papers. Studies assessing single aspects of spirituality, such as spiritual readiness or conscious interactions/compassion (Büssing, Hedtstück, et al., 2012; Csala et al., 2017; Dittmann & Freedman, 2009) reported a favorable relationship between yoga and spirituality. However, Smith and colleagues (2011) used a more complex scale with two interrelated yet distinct aspects of spirituality (i.e., religious and existential well-being) and found no changes in spirituality following the yoga intervention. To capture changes in more complex measures of spirituality a longer, more integrative yoga practice may be required.

Yoga practice has special physical and mental characteristics; it integrates sustained muscular activity with inward focus, breath-awareness, and synchronization of breath and

movement (Govindaraj et al., 2016; Impett et al., 2006; Mehling et al., 2011). These components are expected to result in a mental stillness, self-contemplative state, and reduction of stress and anxiety (Collins, 1998; Iyengar, 1991; Rama et al., 1976; Sengupta, 2012) possibly through their regulating effect on the autonomic nervous system (Evans et al., 2009; Govindaraj et al., 2016; Riley & Park, 2015; Ross & Thomas, 2010). The decrease in negative affect found among yoga participants in the current study accords with this, since the instructions provided for both intervention groups included components of *Mindfulness*, *Body awareness* and *Breathwork* (i.e., focusing on breathing, deep breathing, and linking breathing with movement). Additionally, awareness of breath can facilitate deeper levels of self-awareness (Rama et al., 1976), thus providing a potential explanation for the improvement in spirituality that both of the intervention groups experienced.

A further explanation for our findings may be that yoga can impact psychological functioning "through the body", regardless of verbal cuing. It has been proposed that postural yoga differs from other purely physical activities because it possesses a distinct contemplative or spiritual dimension (Sarbacker, 2014). Sarbacker (2014) proposes that the physical discipline of yoga has mental and spiritual effects regardless of the practitioner's motivation. In fact, the original purpose of yoga practice was spiritual liberation (Baktay, 1992; Iyengar, 1991; Rama et al., 1976; Sarbacker, 2014). Yogis developed and utilized physical practices like asana, pranayama, or other techniques to embody psychological and spiritual elements through exercise. In yoga, training and transformation of the body is aligned with psychological and spiritual features or changes (Jois, 2002; Sarbacker, 2014). According to the yogic understanding of the body, namely the *pancha kosha* system, the physical, energetical, and mental layers are in accordance and affect each other (Bhavanani, 2013; Rishi, 2005). A person's physical posture is considered a reflection of his or her state of mind, thus specific poses can also provoke particular feelings and mental content (Rama et al., 1976). Concerning spirituality and negative affect, results of the present study support this view.

An alternative explanation for the comparable change in the two interventional groups pertains to the attitude of the yoga teacher towards the students. Similarly to psychotherapy (Client-centered therapy), the authentic, empathetic, and unconditional positive attitude of the instructor offers emotional support and models how to accept and understand oneself and feel connected to others (Rogers, 1951). These 'therapeutic' qualities in yoga instructors can be strengthened through the moral principles of yoga (e.g. nonviolence, truthfulness, patience, compassion, sincerity) (Deborah, 2009; Iyengar, 1991).

In contrast to our results, a previous study (Delaney & Anthis, 2010) reported that participants in yoga classes which emphasized the "mind" components of practice (e.g. meditation, chanting, yogic principles and understanding the nonphysical self) reported higher levels of body awareness and satisfaction than those in classes with greater "body" focus. However, that study investigated advanced practitioners (average yoga practice was 3.93 hours/week for an average of 4.53 years in their most-frequented class) through questionnaires and did not include any other variables measured in the present study. It is possible that differences in verbal instructions provided during physically identical yoga classes was not enough to generate measurable differences between groups due to the effects of novelty in any beginner level course. However, different verbal cues might lead to significant group-level differences during later phases of yoga practice, at an intermediate or advanced level, once the novelty of yoga practice has diminished.

Follow up outcomes concerning spirituality and negative affect revealed also significant interaction effects for both variables. For spirituality, however, post hoc results failed to prove any significant outcomes. According to descriptive data, level of spirituality slightly further increased in the yoga group for follow up measurement. Post hoc analyses for negative affect showed significant differences between baseline and post-intervention, and between baseline and follow up values in the yoga group. However, no significant group differences were found. In line with the Hypothesis 3 and 5, we might conclude that a 10-session long yoga training on a weekly basis is sufficient to evoke favorable changes in spirituality and negative affect compared to a no treatment control group. However, differences between yoga and control participants are not evident six weeks after the intervention, even if values of spirituality and negative affect are maintained in the yoga group at that time after the training. For concrete maintenance of the beneficial outcomes or further improvements, probably continued and regular practice is required.

We did not find significant changes in mindfulness and body awareness, thus Hypothesis 1 and 2 need to be rejected. Intervention studies (Curtis et al., 2011; Mathad et al., 2017) that used more intense yoga programs than the present study reported significant improvement in mindfulness. Regarding body awareness, studies with favorable outcomes (Daubenmier, 2005; Impett et al., 2006; Tihanyi, Sági, et al., 2016) investigated participants either with previous yoga experience (i.e., on average 6 years and 2 months; 3 years 6 months; namely they were not beginners) with more frequent yoga practice (i.e., 4.96 hours/week; 2.4 times/week), or more intense intervention (4.4 hours/week for 2 months). As mindfulness and body awareness are positively associated with the weekly frequency of yoga practice among

advanced students (Tihanyi, Böőr, et al., 2016), we can assume that once-per-week commitment, the short duration, and beginner level of the present intervention were not sufficient to evoke such changes. Differential effects among novice and experienced yoga practitioners may also explain why Delaney and Anthis (2010) found group-level differences in body awareness depending on the focus (mind vs. body) of yoga classes among experienced yoga practitioners, while no group-level differences emerged among inexperienced students in the present study.

Regarding positive affect, a significant time effect occurred in that levels of positive affect decreased in all groups towards the end of the intervention. We interpret this result as being due to the university's academic calendar. At the end of the semester, students have more requirements to complete, thus levels of positive affect are known to decrease (Greene & Maggs, 2017). Anyhow, there was no significant interaction effect between the yoga and control group, thus Hypothesis 4 is refused. As several previous studies (Csala et al., 2017; Meissner et al., 2016; Tihanyi, Sági, et al., 2016; Vadiraja et al., 2009; West et al., 2004) denoted a beneficial impact of yoga practice on positive affect, we can suppose that academic responsibilities obscured any favorable effects of yoga practice on positive affect. On the other hand, we can also assume that since yoga practice endeavors to quiet the mind (Baktay, 1992; Iyengar, 1991), it may lead to a decrease in negative affect (i.e., being calm, placid, relaxed), without having a notable influence on positive affect (i.e., making one enthusiastic, alert, excited).

The explorative correlation analysis of changes in the psychological variables within the merged yoga group showed promising results. The moderate negative correlation between mindfulness and negative affect can be explained in different ways. Mindful attention can positively impact affect (Hölzel et al., 2011; Tihanyi, Böőr, et al., 2016); however, high levels of negative affect can also diminish mindfulness. In line with the latter case, a decrease in negative affect through yoga practice facilitates mindfulness. As Büssing, Hedtstück and their colleagues (2012) reported that mindfulness, mood, and spirituality are strongly correlated, effects in both directions simultaneously are also feasible. The moderate positive correlation between body awareness and spirituality in the present study supports Dittmann and Freedman's (2009) finding that spiritual readiness correlates with body awareness, body responsiveness and body satisfaction. We can assume that a growing focus on the body leads to different levels of self-experience and activates the innate endeavor of wholeness (Mehling et al., 2011), hence, it fosters spirituality. Nevertheless, it is also possible that spirituality drives the relationship between these variables. Exploration of the associations among these

constructs, all of which underlie healthy mental functioning, could result in more appropriate design for mental health interventions (Büssing, Michalsen, et al., 2012, 2012; Hendriks et al., 2017; Mehling et al., 2011).

It can be concluded that even a brief beginner level yoga practice on a weekly basis results in significant positive changes in spirituality and negative affect regardless of verbal instruction, but does not lead to improvements in mindfulness, body awareness, and positive affect. However, for a more detailed understanding of the possible effects of different verbal instructions and different components of yoga practice, further empirical studies are needed (Delaney & Anthis, 2010; Park et al., 2018). For future studies, we recommend the inclusion of more intense or longer-term practices to reveal the impact of duration, level, or intensity of exercise, as well as investigating other specific aspects of verbal information during practice (e.g., terms and phrases of sport psychology versus yoga philosophy and spirituality). Further exploration of the relationship between the above-mentioned variables, especially spirituality, is also proposed. Generally speaking, spirituality is under-researched area in psychology, although many authors argue that it is an essential part of healthy functioning as the term "biopsychosocial-spiritual model" suggests (Elias et al., 2015; Hatala, 2013; MacDonald, 2013; Taylor et al., 2013). A better understanding of the distinct effects of specific components of yoga practice can increase the likelihood of developing adequate intervention programs for various health aims.

Limitations

The present study has limitations with respect to the specific differences between two scripts for giving the verbal instructions. This study focused primarily on the effects of receiving philosophical, and spiritual cues versus more body related information. However, the two groups had important commonalities, such as body and breath awareness, as well as meeting regularly with the same group and the same instructor. Personal characteristics of the teacher, and the interaction between the students and the teacher might have influenced the findings. Moreover, as participants were aware of participating in a study investigating yoga, expectations could also influence the results, and experimenter bias cannot be excluded either. Additionally, we did not intend to investigate the effects of common accessories to yoga practice, such as candles, incense and music; thus, no accessories were used during the yoga sessions. We must mention the relatively large drop-out rate and lack of randomization between the control and intervention groups. However, the two yoga groups were randomized, and strict inclusion criteria and controlling of potential confounding variables (e.g., previous physical

activity level; practicing at home was not allowed) were applied to improve methodology. Students were asked to avoid home practice, though we did not control for this variable. This missing information is especially relevant by the interpretation of the follow up outcomes.

Furthermore, it is important to note that the control group received no intervention, i.e., the participants of this group did not attend regular weekly meetings. This might have an impact on the differences between the yoga and the control group. However, our main focus was not to measure the effectiveness of yoga practice, but to explore the potential effect of verbal cuing during yoga practice.

Finally, the sample size might have limited the results of the study. Post-hoc comparisons of the significant 2 x 3 ANOVAs did not reveal any significant group differences, however, with more participants these comparisons may have reached significance.

Conclusions

More holistic and spiritual verbal instructions during the physically identical yoga sessions did not result in different outcomes with respect to spirituality, body awareness, mindfulness, and affect. Regardless of verbal cues, however, even a brief beginner level traditional hatha yoga intervention led to a significant increase in spirituality and decrease in negative effect. Practicing yoga might influence psychological functioning through its physical components, at least among novice practitioners. It seems to have beneficial effects even when only the physical elements of yoga practice are emphasized in class.

3.3. PSYCHOLOGICAL EFFECTS OF HATHA YOGA – CROSS-SECTIONAL STUDY

This chapter is based upon the following article (Csala et al., 2017):

Csala, B., Tihanyi, B. T., Boros, S., Selmeczi, J. C., & Köteles, F. (2017). A jógagyakorlás és az affektivitás kapcsolatának potenciális mediátorai: tudatos jelenlét, testiválaszkészség, önegyüttérzés, spiritualitás. *Magyar Sporttudományi Szemle, 18*(71.), 19–24.

As mentioned earlier, yoga practice is associated with favorable outcomes concerning characteristics of mind-body exercises and Eastern forms of movement (D. H. K. Brown & Leledaki, 2010; Büssing, Michalsen, et al., 2012; Domingues, 2018; Mehling et al., 2011). However, it needs to be still explored how different aspects of yoga practice relate to mental health variables (Park et al., 2015), furthermore, potential underlying mechanisms need further investigation (Büssing, Michalsen, et al., 2012; Field, 2016; Park et al., 2014; Patwardhan, 2017).

Aims and hypotheses

The aim of this cross-sectional study was to investigate the correlations between two aspects yoga practice (more precisely, regularity and yoga experience) and the previously examined psychological variables, namely mindfulness, body awareness, spirituality, and affect, among regular hatha yoga practitioners. We aimed to explore whether these associations – if they are manifest – are stronger with current regularity of yoga practice (weekly hours) or with yoga experience (the number of years practicing yoga). A further goal was to examine the potential mediating effects between yoga practice and these mental health variables.

<u>Hypotheses:</u>

It was hypothesized that regularity of yoga practice (weekly hours) positively correlates with:

- mindfulness (H1), body awareness (H2), spirituality (H3), and positive affect (H4),

and negatively correlates with:

- negative affect (H5) among regular yoga practitioners.

Similarly, we hypothesized that yoga experience (the number of years practicing yoga) positively correlates with:

- mindfulness (H6), body awareness (H7), spirituality (H8), and positive affect (H9),

and negatively correlates with:

- negative affect (H10) among regular yoga practitioners.

Concerning mediations, according to our and other previous results (Büssing, Hedtstück, et al., 2012; Tihanyi, Böőr, et al., 2016), we hypothesized that (if correlations are manifest):

- correlation between yoga practice and negative affect is mediated by mindfulness (H11),
- correlation between yoga practice and spiritualty is mediated by body awareness (H12).
- correlation between yoga practice and positive affect is mediated by mindfulness (H13), body awareness (H14), and spirituality (H15).

Methods

Participants

The sample consisted of 85 adult yoga practitioners (13 males, 15.3 % and 72 females, 84.7 %). Mean age of the sample was 43.85 years (SD = 10.77; min-max: 22-66 years), educational qualification was measured on three-point scale: 1.2 % was characterized by elementary school (N = 1), 27.1. % by high school (N = 23), and 71.8 % by university degree (N = 61). Participants have practiced yoga in average for 7.70 years (SD = 8.37; min-max: 0-42 years), 13 of them were yoga teachers (15.3 %). Average weekly yoga practice in the previous four weeks of the attendants was 4.92 hours/week (SD = 5.21; min-max: 0-30 hours/week).

Procedure

Participants were recruited through the e-mail address list of the Hungarian Yoga Association (Magyar Jóga Társaság). Questionnaires were completed anonymously online in Hungarian. The research was conducted by the approval of the Research Ethics Committee of the Faculty of Education and Psychology, Eötvös Loránd University, Hungary. All participants signed an online informed consent form before the completion of the questionnaires.

Measurements

Yoga practice was measured as yoga experience, namely the number of years practicing yoga, and current regularity of yoga practice in form of weekly hours of yoga practice in the previous four weeks.

The completed questionnaires are presented in detail in Chapter 3.2., Methods. In case of *Positive and Negative Affect Schedule* (PANAS) (Watson et al., 1988) the short form of the questionnaire was used with 5-5 items on each scale. In the present study, Cronbach's alpha coefficient was .813 for Positive Affect and .526 for Negative Affect, respectively. Cronbach's alpha values for the other measures were the followings: 0.863 for *Body Awareness Questionnaire* (BAQ) (Shields et al., 1989), 0.825 for *Mindful Attention and Awareness Scale* (MAAS) (K. W. Brown & Ryan, 2003), and 0.935 for the short version of the *Spiritual Connection Questionnaire* (SCQ-14) (Wheeler & Hyland, 2008).

Statistical analysis

Most of data analysis was conducted using the SPSS v25 software (IBM Corp, 2017) and for Bayesian analyses and mediation analyses the JASP v0.14.2 software was applied (JASP Team, 2020). Associations were estimated using Spearman correlation due to violation of normality for the majority of variables. Bayesian counterparts with Kendall's tau-b coefficients were also calculated. For partial correlations and mediation analyses, the variable of education was decoded into the following variables: educational qualification 1: elementary school (0) or higher (1), educational qualification 2: high school (0) or higher (1). Since only one participant was characterized by elementary school, only the second variable could be entered into the analyses. Partial correlations were conducted for the association between current regularity of yoga practice (hours/week) and the measured variables controlled for gender, age, educational qualification, and yoga experience (number of years practicing yoga). Mediation analyses for testing indirect effects were done via the "Bootstrap" method with thousand random replications to show whether there is a significant change in the regression coefficient between the independent and the dependent variable after including one or more potential mediator(s) (Preacher & Hayes, 2008). The confidence intervals were computed using the bias-corrected percentile method as suggested by Biesanz and colleagues (2010). As criterion, intercorrelations between the psychological variables were calculated both by Bayesian and frequentist (Kendall's tau-b coefficients and partial correlations) analyses. Three mediation tests were conducted with current regularity of yoga practice (hours/week) as independent variable: (1) negative affect as dependent variable with mindfulness and

spirituality as potential mediators, (2) spirituality as dependent variable and body awareness as potential mediator, (3) positive affect as dependent variable with mindfulness, spirituality, and body awareness as potential mediators.

Results

Descriptive data of the measured variables and results of the Kolmogorov-Smirnov normality test are presented in Table 12.

Table 12

Descriptive statistics and the results of the Kolmogorov-Smirnov test of the measured variables

	M	SD	Min	Max	Kolmogorov-Smirnov Z
Current regularity of yoga practice (hours/week)	4.92	5.21	0	30	.182 ***
Yoga experience (number of years)	7.70	8.37	.3	42	.204 ***
MAAS	65.11	9.23	38	86	.075
BAQ	90.91	14.30	34	126	.091
SCQ-14	80.58	15.78	26	98	.135 **
PA	19.99	3.16	10	25	.130 **
NA	8.02	2.25	5	15	.158 ***

Note. N = 85. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect. **: $p < .01$; ***: $p < .001$.

Results of the Spearman correlations between yoga practice and the measured variables and their Bayesian counterparts are presented in Table 13. According to both the frequentist and Bayesian results, weekly hours of yoga practice showed a weak to moderate positive correlation with mindfulness, body awareness, spirituality, and positive affect, and a weak to medium negative correlation with negative affect which was strongly supported by the Bayesian factor (BF_{10} = 25.274). Yoga experience showed a weak to medium positive correlation with mindfulness which received a strong support of the Bayesian outcome (BF_{10} = 21.294). However, no correlation between yoga experiences and body awareness, spirituality, and negative affect were found. Concerning positive affect, the small value of Spearman's rho and BF_{10} indicate a very weak positive association.

Table 13

Frequentist and Bayesian correlations between yoga practice and the investigated variables

	1		2	
	Spearman's rho	τ_b BF_{10}	Spearman's rho	τ_b BF_{10}
1. Current regularity of yoga practice (hours/week)	-	-		
2. Yoga experience (number of years)	.202	.154 1.228	-	-
3. MAAS	.279*	.198 4.938	.335**	.235 21.294
4. BAQ	.255*	.182 2.804	.108	.077 .244
5. SCQ-14	.292**	.201 5.512	.173	.115 .466
6. PA	.277*	.191 4.891	.231*	.170 1.937
7. NA	- .319*	- .239 25.274	- .207	- .148 1.039

Note. N = 85. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect. *: $p < .05$; **: $p < .01$; ***: $p < .001$.

Partial correlations between current regularity of yoga practice and the measured variables stayed significant after controlling for age, gender, education, and yoga experience. Weekly yoga practice showed a weak positive correlation with mindfulness ($r_p = .242$; $p = .030$), body awareness ($r_p = .271$; $p = .015$), spirituality ($r_p = .241$; $p = .031$), and positive affect ($r_p = .226$; $p = .043$), and a weak negative correlation with negative affect ($r_p = - .231$; $p = .039$).

Bayesian intercorrelations with the frequentist Kendall's tau-b coefficients and partial correlations (controlled for gender, age, education, and yoga experience) across the measured psychological variables are presented in Table 14. Mindfulness showed a weak to moderate positive correlation and partial correlation with body awareness, spirituality and positive affect, and a moderate to strong negative correlation and partial correlation with negative affect. All these results were strongly supported by the BF_{10} value. Also, body awareness showed a moderate positive correlation and partial correlation with spirituality and positive affect which were strongly supported by the Bayesian analyses. A weak to moderate positive correlation and partial correlation revealed between spirituality and positive affect, similarly, a weak to moderate negative correlation and partial correlation revealed between spirituality and negative affect according to both frequentist and Bayesian analyses. Positive and negative affect showed

only weak to moderate negative correlation and partial correlation which was strengthened by the weak support of the Bayesian analysis. No correlation was found between negative affect and body awareness in any analyses.

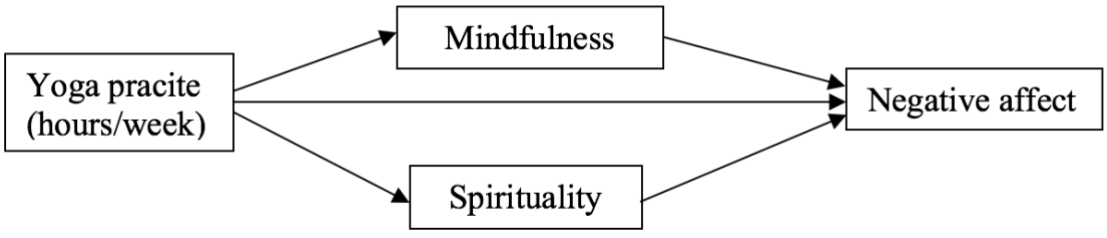
Table 14
Bayesian factors, Kendall's tau-b coefficients and partial correlations across the measured variables

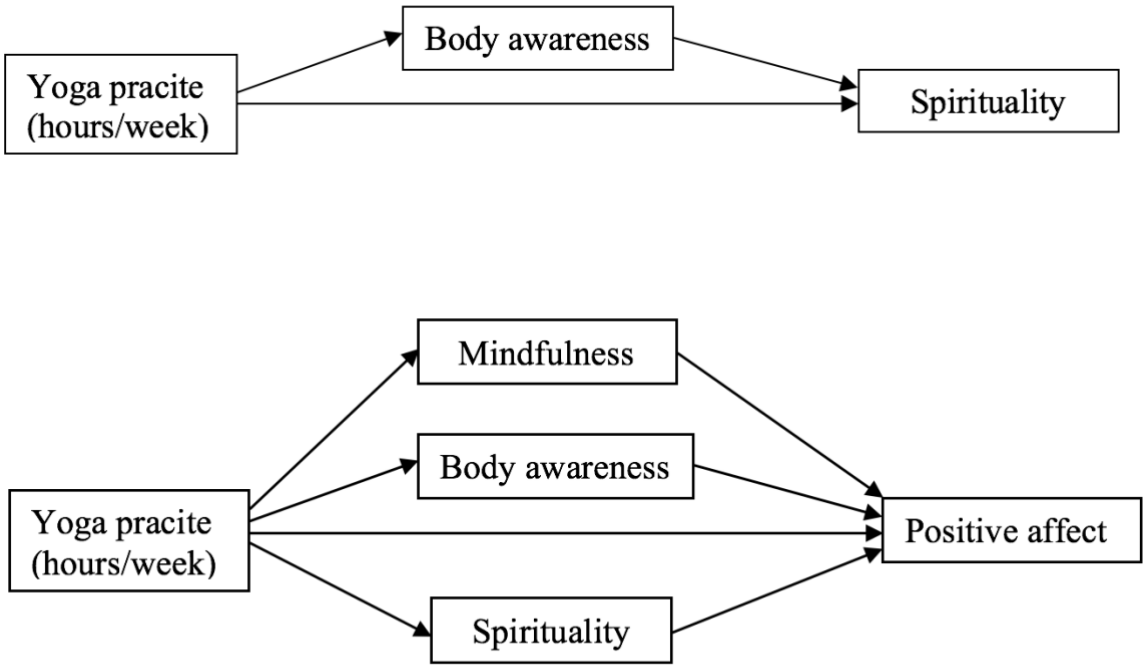
	1		2		3		4	
	τ_b BF_{10}	r_p	τ_b BF_{10}	r_p	τ_b BF_{10}	r_p	τ_b BF_{10}	r_p
1. MAAS	-	-						
2. BAQ	.275 130.696	.286*	-	-				
3. SCQ-14	.349 8487.038	.387***	.339 4550.476	.385***	-	-		
4. PA	.362 20439.455	.391***	.296 390.194	.421***	.272 113.799	.254*	-	-
5. NA	- .359 16416.218	- .513***	- .114 .455	- .129	- .254 48.944	- .226*	- .214 8.995	- 2.76 *

Note. N = 85. Partial correlations were controlled for gender, age, education, and yoga experience. MAAS: Mindful Attention and Awareness Scale; BAQ: Body Awareness Questionnaire; SCQ-14: Spiritual Connection Questionnaire; PA: Positive Affect; NA: Negative Affect. *: $p < .05$; **: $p < .01$; ***: $p < .001$.

Mediation analyses were conducted taking into account the intercorrelations between the independent, dependent, and potential mediating variables. As body awareness did not show a significant correlation with negative affect, it was excluded from the planned analysis. Illustration of the conducted three mediation analyses are presented in Figure 11.

Figure 11
Illustration of the three mediation analyses





Note. Mediation analyses were controlled for gender, age, education, and yoga experience.

The first mediation analysis revealed significant outcome (total effect: - .09±.04; z = - 2.17; p = .030/direct effect: - .05±.04; z = - 1.14; p = .253) with the mediating effect of mindfulness (indirect effect of MAAS: - .05±.02; z = - 2.06; p = .039; 95 % CI: - .112 – - .008) between weekly hours of yoga practice and negative affect. Spirituality was not shown as a significant mediator. The second analysis showed a significant mediation (total effect: .76± .33; z = 2.28; p = .023/direct effect: .46±.32; z = 1.43; p = .153), body awareness revealed to be mediator between weekly hours of yoga practice and spirituality (indirect effect of BAQ: .29±.14; z = 2.04; p = .041; 95 % CI: .096 – .673). Also, significant result was found in the last mediation analysis (total effect: .14±.07; z = 2.13; p = .033/direct effect: .04±.06; z = .71; p = .477). Body awareness showed a significant mediating effect between weekly hours of yoga practice and positive affect (indirect effect of BAQ: .05±.08; z = 1.97; p = .049; 95 % CI: - .002 – .146), however 95 % confidential interval values involved 0. Spirituality and mindfulness did not appear as significant mediators. If only body awareness was entered in the analysis, the significance of its mediating effect was strengthened both by p value and 95 % CI values (p = .033; 95 % CI: .011 – .149).

Discussion

Present results showed that current regularity of yoga practice (hours/week) shows a favorable significant correlation with mindfulness, body awareness, spirituality, and positive and negative affect even after controlling for age, gender, education, and yoga experience (number of years practicing yoga). In contrast, yoga experience correlated only with mindfulness and positive affect. The measured psychological variables showed remarkable intercorrelations. Mediation analyses revealed that mindfulness mediates the correlation between weekly hours of yoga practice on negative affect, and body awareness revealed to be a significant mediator between both current regularity of yoga practice and spirituality, and current regularity of yoga practice and positive affect.

Present findings are in line with previous studies which showed positive connection between yoga practice and mindfulness, body awareness, spirituality and affect (Brisbon & Lowery, 2011; Büssing, Hedtstück, et al., 2012; Daubenmier, 2005; Impett et al., 2006; Tihanyi, Böőr, et al., 2016; Tihanyi, Sági, et al., 2016). Some reviews, however, still denote that positive mental health effects of yoga are equivocal and need further support (Domingues, 2018; Hendriks et al., 2017). Our results stand as another strengthening indication of the positive associations of yoga and positive psychological health variables. Concerning yoga practice, results showed that these correlations mostly occur with current regularity of yoga practice. Weekly hours of yoga practice showed significant positive correlation with mindfulness, body awareness, spirituality, and positive affect and a negative correlation with negative affect approving Hypotheses 1-5. In contrast, yoga experience, namely the number of years practicing yoga, showed a positive correlation only with mindfulness and positive affect approving Hypothesis 6 and 9, but rejecting Hypothesis 7, 8, and 10. Previous studies are mixed in terms whether they investigated regularity/frequency of yoga practice (hours or times per week), experience in yoga (number of months or years practicing yoga) or compared beginner or advanced practitioners. For example, one study (Brisbon & Lowery, 2011) compared beginner and advanced yoga practitioners (under or above of 5 years of yoga practice) and found higher level of mindfulness and lower level of perceived stress in the advanced compared to the beginner yoga group. Tihanyi, Böőr, and colleagues (2016) reported a positive correlation between weekly frequency of yoga practice and mindfulness, body awareness, and well-being. Another study (Impett et al., 2006) showed that more frequent yoga practice (hours/week) is associated with increased level of body awareness, positive affect, and satisfaction with life, and decreased level of negative affect. Interestingly, Daubenmier (2005) found that more frequent yoga practice (hours/week) was negatively related to self-objectification, and yoga

experience (number of years) was positively related to body satisfaction. A study investigating yoga, Pilates, kung fu, ballroom dance, and aerobic practitioners together (Tihanyi, Sági, et al., 2016) found that positive and negative affect were not associated with experience of practice (number of months spent in practice), but they were correlated with weekly frequency of practice. According to the previous miscellaneous outcomes and the present results, we can assume that in case of some variables, namely body awareness, affect, and spirituality regular frequency of yoga practice is more important than expertise in yoga. Also, teachings of many Eastern movement practices generally emphasize the importance of regular practice (Ueshiba, 1984). However, for example in the present study, level of mindfulness showed a stronger correlation with yoga experience than with frequency of yoga practice. It is also possible that body awareness, negative affect, and spirituality is indeed associated with yoga experience, but these relationships are not linear correlations. As yoga practitioners of the present investigation showed high standard deviation and wide range of yoga experience (M=7.70; SD=8.37; min-max: 0.3-42 years), it is feasible that these associations vary depending on periods of practice (e.g., the associations might be different at the first years of practice than 10 years later). Thus, the investigation of the aforementioned assumption and nonlinear relationships between yoga experience and body awareness, affect, and spirituality are suggested for future studies.

Among the measured variables, only mindfulness showed stronger correlation with yoga experience (τ_b = .235; BF_{10} = 21.294; r_p = .335) than with current regularity of yoga practice (τ_b = .198; BF_{10} = 4.938; r_p = .279). However, correlation with current regularity of yoga practice stayed significant even after controlling for yoga experience. In line with this, results of a national survey of yoga practitioners (Ross et al., 2012) showed that frequency of yoga practice and years of yoga practice independently predicted mindfulness. We can denote that in the level of mindfulness both yoga experience and current regularity of yoga practice play a similarly important role (Brisbon & Lowery, 2011; Tihanyi, Böőr, et al., 2016). In the mediation analyses, mindfulness appeared to be a significant mediator between regularity of yoga practice and negative affect approving Hypothesis 11. However, it did not mediate the link between regularity of yoga practice and positive affect, thus Hypothesis 13 is refused. In our previous study (Longitudinal study Part 2) the moderate negative correlation between mindfulness and negative affect was explained in both ways. Higher level of mindfulness might impact affect (Hölzel et al., 2011; Tihanyi, Böőr, et al., 2016), aka leads to a decrease in negative affect, namely in the levels of distress and unpleasant emotions, such as being afraid, sad, or upset, and contribute to calmness and quietude (Watson et al., 1999; Watson & Tellegen, 1985). It is also possible that decrease in negative affect facilitates mindfulness, or even, effects

in both directions simultaneously are also feasible (Büssing, Hedtstück, et al., 2012). Present finding supports the first proposal, namely that increase in mindfulness through yoga practice facilitates the decrease in negative affect. This is in line with previous findings in which mindfulness mediated the positive effect of yoga practice on psychological well-being (Tihanyi, Böőr, et al., 2016) and quality of life (Gard et al., 2012). However, additional effect in the opposite direction cannot be excluded. The lack of mediating effect of mindfulness between yoga practice and positive affect can be explained due to the fact that positive affect refers to activeness and alertness. Higher level of positive affect implies elated, enthusiastic and excited states or traits (Watson & Tellegen, 1985), in contrast, mindful attention is an open, non-judgmental attitude (K. W. Brown & Ryan, 2003). Even if the two constructs share common variance, possibly, mindfulness does not mediate the connection between yoga practice and positive affect. Nevertheless, as a correlational study, we cannot detect concrete effects, thus, for proper exploration of the impacts of these variables on each other through yoga, further longitudinal studies are suggested, especially with frequent practice.

The moderate positive correlation between body awareness and spirituality among yoga practitioners corresponds to the findings of other studies (Dittmann & Freedman, 2009; Longitudinal study Part 2). According to the mediation analysis, body awareness plays a significant mediator role between the link of regularity of yoga practice and spirituality which approves Hypothesis 12. We can suppose that deepening focus on the body leads to new levels of self-experience, activates a sense of wholeness and enhances spirituality (Jois, 2002; Mehling et al., 2011; Sarbacker, 2014). Nevertheless, effects of spirituality on body awareness cannot be totally excluded. Hence, these connections thus are suggested for further investigation.

In the last mediation analysis, body awareness revealed to have a mediating effect also between regularity of yoga practice and positive affect which approves Hypothesis 14. However, spirituality and mindfulness – as partly mentioned before - did not appear as mediator variable rejecting Hypothesis 13 and 15. In case of body awareness, the 95 % confidential interval values involved 0, and that the *p* value was close to 0.05 which could indicate a marginal effect. However, if only body awareness was entered in the analysis, the significance of its mediating effect was strengthened. This is in agreement with the study which found that body awareness mediates the connection between weekly frequency of yoga practice (times/week) and well-being (Tihanyi, Böőr, et al., 2016). Practice of yoga probably enhances body awareness and this sensitivity to bodily processes and ability to anticipate bodily reactions can lead to higher level of alertness, activeness and pleasant feelings. In contrast, similar to

mindfulness, spiritual connection probably does not mediate the connection between yoga practice and positive affect. Even though the two constructs share common variance, spiritual connection can provide a supreme form of happiness (Wheeler & Hyland, 2008) which can be a more serene and peaceful experience in contrast to enthusiasm and excitement of positive affect (Watson & Tellegen, 1985). Anyhow, for further support, the mediating effect of spiritual connection between yoga practice and positive affect can be examined in future studies.

To sum up, present finding indicate that current regularity of yoga practice (hours/week) shows favorable correlation with mindfulness, body awareness, spirituality, and positive and negative affect even after controlling for age, gender, education, and yoga experience. In contrast, yoga experience (number of years practicing yoga) was only associated with mindfulness and positive affect. These results might show – if we assume that yoga practice effects the measured variables and the causality of these associations is not the opposite way around - that even beginner practitioners can expect beneficial mental effects once they engage in a regular yoga practice. This beginning motivation could lead to further deepening of practice and foster further positive outcomes. Also, it is important to note that probably even for advance practitioners it is relevant to keep up a regular practice to maintain positive mental health effects. This is in line with the traditional yoga philosophy that yoga requires constant and persistent practice, and it means actually a lifestyle (Baktay, 1992; Iyengar, 2014). An interesting future research question is, however, the optimum amount of weekly practice for the most beneficial outcomes. This would help for various health services to plan optimal and cost-effective intervention. Our results also revealed the mediating effect of mindfulness between current regularity of yoga practice and negative affect, in addition, the mediating effect of body awareness between current regularity of yoga practice and spirituality, and current regularity of yoga practice and positive affect. Thus, mindfulness and body awareness seem to have high relevance in the overall positive associations between yoga practice and mental health.

Limitations

As the present study is a cross-sectional investigation, we cannot make any conclusion on the causality of the correlational and mediation analyses. Cause and effect are also probable in the opposite manner, people with higher level of mindfulness, body awareness, spirituality, and positive affect, and lower level of negative affect might be more prone to choose yoga. To properly explore the causality of these interconnections, longitudinal studies with further precise research questions are needed. Additional limitation of the study is, that our sample is

not representative. Also, the sample is very diverse concerning yoga experience (the number of years practicing yoga varies between .3-42), correlations might have been different if beginner, medium, and advanced level students are separately examined. Furthermore, even if we investigated hatha yoga practitioners, we do not have proper information about participants' yoga practice whether (and if, in which amount) they practice asana, pranayama, meditation, relaxation, and/or any other techniques. Also, we have no information whether they attend yoga classes or do home practice or are engaged in both of these. Similarly, we did not investigate the possible effects of participant engagement in other physical activities, relaxation or meditation techniques, or commitment to alternative lifestyles (e.g., healthy lifestyle, living in/close to nature, being part of a community), which is an important limitation of the study. Influence of these variables on the results cannot be excluded. Thus, future studies should be aware of and control for these potential confounding factors.

Conclusions

We can conclude that current regularity of yoga practice (hours/week) shows a positive correlation with mindfulness, body awareness, spirituality, and positive affect and a negative correlation with negative affect even after controlling for age, gender, education, and yoga experience (number of years practicing yoga). In contrast, yoga experience was associated only with mindfulness and positive affect. Mediation analyses revealed that mindfulness mediates the connection between yoga practice and negative affect, and body awareness was shown as a significant mediator between both yoga practice and spirituality, and yoga practice and positive affect. Our results strengthen the evidence of the associations between yoga practice and positive mental health and suggest the importance of the current regularity of practice.

3.4. SPIRITUAL EFFECTS OF YOGA PRACTICE – SYSTEMATIC REVIEW

This chapter is based upon, namely it is mostly the exact copy of the following article (Csala et al., 2021):

Csala, B., Springinsfeld, C. M., & Köteles, F. (2021). The Relationship Between Yoga and Spirituality: A Systematic Review of Empirical Research. *Frontiers in Psychology, 12*, 3052. https://doi.org/10.3389/fpsyg.2021.695939

Empirical findings corroborate the favorable impact of many aspects of spirituality on physical and mental health (Fetzer/NIA Working Group, 1999; MacDonald, 2013). Nonetheless, scientific research on yoga rarely incorporates spiritual variables (Büssing, Hedtstück, et al., 2012; Csala et al., 2020; MacDonald, 2013). MacDonald (2013) draws attention to the importance of including spirituality in the scientific research of yoga. On the one hand, he suggests investigating the effects of yoga practice on spirituality and, on the other hand, examining spirituality's potential mediator or moderator role in the relationship between yoga practice and other positive mental health measures.

Aims and hypothesis

To foster the abovementioned proposal, aim of the present systematic review was to assess the available empirical research on the relationship between yoga and spirituality in order to provide an overview of existing findings and highlight future directions for investigating this topic. Of particular interest was whether empirical findings indicate a positive association between yoga practice and spirituality. It was hypothesized that yoga practice is positively associated with spirituality. Further aim was to explore which aspects of spirituality are associated with yoga practice (besides the one that was investigated in the previous two studies).

Methods

Protocol

We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline (Liberati et al., 2009). The protocol was registered in the PROSPERO

international prospective registry of systematic reviews (registration number: CRD42020155043, date of registration: November 1, 2019).

Literature search

A systematic literature search was completed in November 2019. The searched databases were Google Scholar, PsycINFO, and Science Direct (incl. PsycARTICLES). Included were all articles which contained the terms "yoga, spirituality", "yoga, spiritual", or "yoga, spirit" in the title or abstract. The search was not restricted in terms of publication period. Additional articles from other sources were identified by examining the references of the studies obtained through the database search. Moreover, studies known by the authors from other sources and one previous article of the authors (BC and FK) were included.

Inclusion and exclusion criteria

Empirical studies (cross-sectional and longitudinal/intervention studies) with sound methodology (that is, with clear methodological descriptions and adequate statistical or qualitative analyses; for quantitative studies, in best cases randomized, controlled studies) published in peer-reviewed scientific journals in either English, German, or Hungarian language were included. Reviews, meta-analyses, conference papers, books, book chapters, theses, and dissertations were excluded. No restriction was made to gender, nationality, or health status of the studied sample. Concerning age, we considered studies with individuals over 16 years, however, all of the full-text original articles included adult samples.

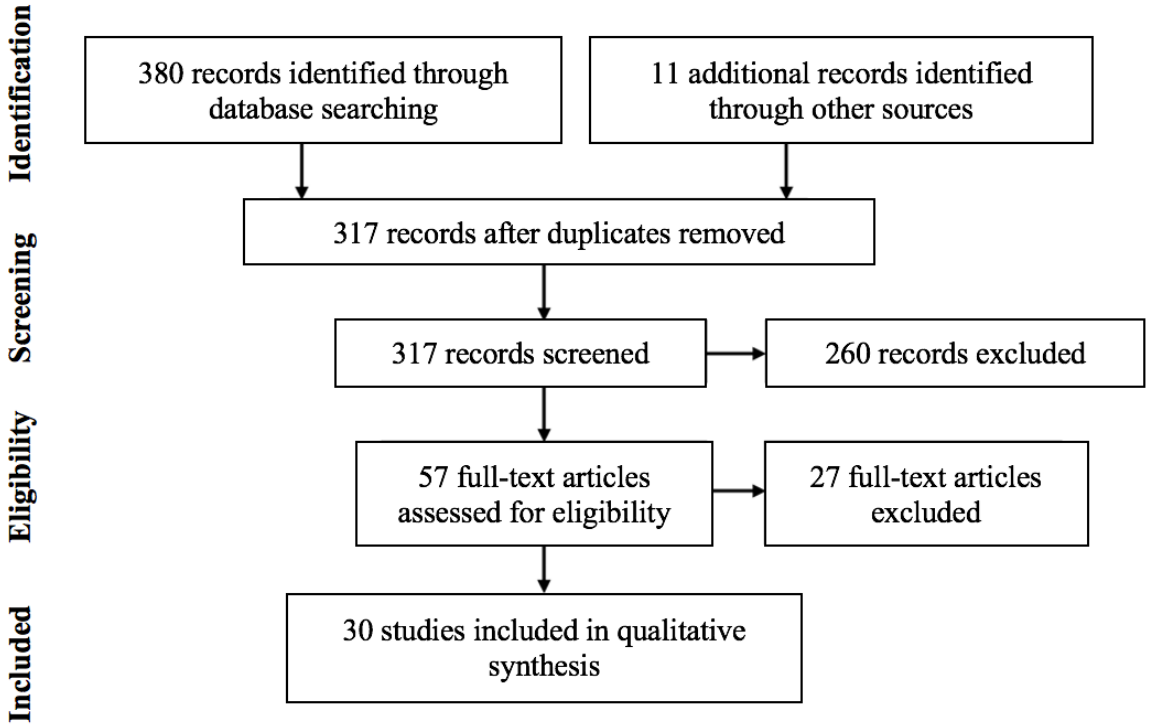
Study selection

The literature search yielded 380 records from the three databases and 11 records through other resources. After removing duplicates, the remaining 317 titles and abstracts were pre-screened by two independent reviewers (BC and CMS). 260 records were removed because they were not original papers and/or they were written in other languages. The remaining 57 full-text articles were assessed for eligibility by the same two independent reviewers (BC and CMS). From these, 27 full-text articles were excluded for one or more of the following reasons: they were not empirical studies, due to methodological issues or because the intervention and/or the data analysis were delineated extremely poorly or not at all with regard to spirituality. Disagreements between evaluations were resolved by consensus, further problematic issues were resolved by consulting the third author (FK). According to the final screening, 30 articles met the inclusion criteria of the review (for details, see Figure 12).

Data extraction

Data of quantitative and qualitative studies were annotated into separate databases. Pre-specified data were collected for each study. These included general classifiable information about the objectives, design, sample, spirituality measures, type of yoga practice/intervention, frequency of practice/intervention, the participants' previous experience with yoga, major findings, and the origin of the study. The databases were verified by the third author (FK).

Figure 12
Selection of studies based on the PRISMA method



Risk of bias assessment

Risk of bias was evaluated for randomized controlled studies and cross-sectional studies with quantitative approach. RCTs were assessed with the Revised Cochrane risk-of-bias tool for randomized trials (RoB 2.0) (Higgins et al., 2011; Sterne et al., 2019). Five different domains are investigated with this measure: (1) randomization process, (2) deviations from the intended intervention, (3) missing outcome data, (4) measurement of the outcome data, and (5) selective reporting of the results. Within each domain a different number of questions is answered with either "Yes", "Probably yes", "Probably no", "No", or "No information". The

outcome of the algorithm results in "Low risk", "Some concern", or "High risk" of bias for each domain and overall. For cross-sectional studies the Joanna Briggs Institute (JBI) critical appraisal checklist for analytical cross-sectional studies was used (Ma et al., 2020; Moola et al., 2020). It consists of eight questions concerning sample, setting, measurement, confounding factors, and statistics. For each item the answer indicates to what degree it is presented: either "Yes", "No", "Unclear", or "Not applicable". Both measures were not used as selection criteria for this review, but to assess possible risk of bias. Thus, percentages of the specific answers to the (JBI) critical appraisal checklist were calculated.

Results

General data

All in all, 30 studies were included in the analysis. As shown in Appendix 4.3 and 4.4, 25 of them applied quantitative methods and seven qualitative ones (that is, two studies applied both). 15 studies had a cross-sectional and 15 a longitudinal design encompassing a yoga intervention. Out of the 25 quantitative studies, nine included a control group. Among those, three papers had a cross-sectional design, and six of them were intervention studies applying a randomization (RCT studies). One of the qualitative studies had a randomized design as well, involving two different control groups. All study samples consisted of participants above the age of 16 years, except for one, all consisted of only adults. None of the samples can be considered representative of the respective population. The majority of them investigated participants without a common reported health problem, whereas seven studies focused on diseased populations: five of them on cancer patients, one on veterans with severe mental illness, and one on patients with symptomatic paroxysmal atrial fibrillation. There were two other unique samples: one a group of prisoners and the other a group of Zen hospice volunteers.

Concerning risk of bias, assessment of RCTs (N=6) indicated overall some concerns for three studies and high risk of bias for three others. High or some concerns occurred due to the randomization process or missing outcome data (large % of dropouts). Measurement of the outcome and selection of reported results showed some concerns for all studies. Deviations from intended intervention showed low risk for each case (See Appendix 4.1 for details). Risk of bias assessment of cross-sectional studies with quantitative approach (N=12) resulted in 4 articles with 50% or less than 50% of "Yes" answers indicating high risk with insufficient sample and setting reporting, and lack of identification of confounding factors. No answers with

"Not clear" or "Not applicable" occurred for any of the studies. Five further papers were characterized by 70% or 62.5% of "Yes" answers and therefore by some concerns. The main insufficiency in these studies was the omission of confounding factors. Three studies, in turn, stated and investigated confounding factors resulting in 75% or 100% of "Yes" answers which indicates low risk of bias. Furthermore, all studies used objective, standard criteria for measurement of the condition, measured outcomes in a valid and reliable way, and used appropriate statistical analyses (See Appendix 4.2). Summing up, RCT studies show some to high risk of bias, whereas cross-sectional studies in total raise some concerns. Because the measurement tools we applied detected risks of bias the outcomes of the respective RCTs and cross-sectional studies must be taken with caution.

In line with some of the above-mentioned shortcomings, not all studies explicitly stated the participants' previous experience with yoga. However, 18 characterized them as regular yoga practitioners and three as beginners. Some of the studies do not provide very detailed information on the type of yoga practice, five of them do not report the exact type at all. We can nonetheless assume that they investigated some type of postural yoga (hatha yoga). Including these five articles, 21 studies investigated different types of hatha yoga, making it the prevailing type of researched yoga practice. Amongst them, two papers specifically examined Iyengar yoga, and one paper reported on the views of vinyasa yoga practitioners. Moreover, 4 studies applied hatha yoga based restorative classes (postural yoga designed for diseased populations). In total, only 5 studies included an intensive holistic (integral) yoga practice. It can be concluded that most of the studies, more precisely 25 out of 30, investigated a form of hatha yoga. This indicates that in empirical research, yoga is mainly studied as a form of mind-body exercise (Mehling et al., 2011; Park et al., 2018).

In the next paragraph we discuss the relevance of the reviewed studies' origin. Thereafter, outcomes are presented by thematic topics (Aspects of spirituality, Regularity of practice, Intention pf practice, Meaning of spirituality for yoga practitioners, Other important aspects of yoga and spirituality) delineating firstly quantitative and then qualitative findings for each topic. This is often followed by a general discussion of the investigated topic. In the last paragraph of this section, we describe the spirituality questionnaires applied by the reviewed papers.

Origin of the study

Research on yoga and spirituality among Western scholars very likely differs from research in more traditional settings. This can be attributed to the fact that yoga practice is less spiritually rooted in Western societies than, for instance, in India (Ness & Briles, 2016; Singleton, 2010). Among the reviewed studies, six were conducted in India and 22 in Western countries (Europe or USA). The two remaining studies were conducted in Iran and Japan. Out of the six Indian studies, three were conducted by the same author and involved very intense holistic yoga programs, however, not each of them was described in detail (Pandya, 2017, 2018, 2019). Among the remaining three, two other Indian studies' scope and theoretical background were only vaguely established, and the type of the investigated yoga practice was not reported (Ahmad & Imtiaz, 2016; Nandeesh et al., 2016). In comparison, the Western studies provided more detailed accounts of their methodologies. However, only two (Büssing, Hedtstück, et al., 2012; Griera, 2017) out of the 20 Western studies investigated holistic yoga programs including philosophical and spiritual teachings. One Western study (Smith et al., 2011) compared two types of yoga groups: one group included yogic ethical guidelines, while the other was yoga as exercise. Also, in two other studies (Danhauer et al., 2008, 2009) yoga practice included one yogic ethical principal (namely ahimsa, that is, non-violence). This confirms the previously made statement that yoga practice in the West often misses spiritual teachings and is characterized as a mere form of physical activity or a mind-body exercise (Cramer et al., 2016; Park et al., 2018; Rama et al., 1976). According to in-depth, semi-structured interviews with yoga instructors, westernized yoga lacks spirituality, that is, most classes are devoid of spiritual teachings. This is mostly due to cultural barriers, lack of knowledge, loss of holistic perspective, and a requirement of being religiously or culturally neutral and devoid of spiritual contents (Ness & Briles, 2016). Even so, it is important to note that spiritual experiences or interest can be evoked by purely physical yoga practice (Gaiswinkler & Unterrainer, 2016; Ness & Briles, 2016).

Aspects of spirituality

As mentioned above, even yoga practice without explicit spiritual teachings can affect spirituality (Ness & Briles, 2016). The vast majority of the reviewed studies reported positive results concerning the connection between yoga and spirituality. Out of 30, there was only one study which did not report such an association (Danhauer et al., 2008) and there were two studies which reported only very minor positive outcomes (Lötzke et al., 2016; Moadel et al., 2007). Most of the studies found favorable outcomes, some reported partially positive, partially null findings. Longitudinal studies reported an increase of different aspects of spirituality, such

as conscious interactions and compassion, prayer or trust in God, and search for insight/wisdom after 6 months of yoga practice (Büssing, Hedtstück, et al., 2012). Improved levels of spiritual well-being characterized by sense of meaning and peace (Danhauer et al., 2009), faith (Nakau et al., 2013), and hope (Smith et al., 2011) were found after several weeks of yoga interventions. Pandya (2017) also reported an enhanced level of spiritual well-being, as well as increased levels of spiritual experiences (such as the feeling of deep inner peace and harmony, and proximity to the divine) aspirations, existential thinking, a development of an integrative worldview (i.e., the view that the reality is complex, namely both scientific and spiritual at the same time) (Pandya, 2018, 2019), and a decreased level of existential anxieties (Pandya, 2018) after intense and holistic yoga programs. Another longitudinal study (Safara & Ghasemi, 2017) found that yoga positively affected all aspects of spiritual intelligence (a construct that involves spiritual and intelligence structures (Emmons, 2000)), namely critical existential thinking, production of personal meaning, transcendental consciousness, and expanded state of consciousness. This result is supported by a cross-sectional study (Seena et al., 2017) showing higher levels of spiritual intelligence in all dimensions among yoga practitioners compared to controls. Yoga practitioners were also found to have lower fear of death (Scherwitz et al., 2006), enhanced spiritual health, a more positive outlook on life, as well as more faith and happiness within (Monk-Turner & Turner, 2010). In accordance with those, qualitative studies reported positive changes in the sense of spirituality among yoga practitioners indicating that yoga is a method to achieve spiritual growth and an integrative worldview (Dittmann & Freedman, 2009; Pandya, 2018). Regular female yoga practitioners reported a more holistic and positive relation to their body due to yoga practice. They became more self-explorative and aware of many aspects of life, more tolerant, compassionate, and less judgmental (Dittmann & Freedman, 2009). One participant explained her experiences as "Being in contact with the breath is my time to be with the divine and experience myself in my body as I am" (Dittmann & Freedman, 2009, p. 285). The improved sense of spirituality among the residents of an integral yoga community consisted in feeling God's presence, experiencing a connection with the divine and nature, and being spiritually touched by the beauty of creation. Sustainable development and a harmonious relationship with nature are highly important to them, since it is a way to reach the divine and self-transcendence (Pandya, 2018).

In contrast, three quantitative papers did not report considerable changes in spirituality (Danhauer et al., 2008; Lötzke et al., 2016; Moadel et al., 2007). It is important to note that all of them investigated women with cancer and involved 10-12 weeks long yoga interventions. One of them found no changes in spiritual well-being measured by sense of meaning/peace and

faith (Danhauer et al., 2008). Although the second study (Lötzke et al., 2016) showed an increase in reflection, that is positive interpretation of disease, such an increase was also shown in the physical exercise control group. Moreover, it decreased back to initial level after three months. The third of these studies (Moadel et al., 2007) found that a subsample of patients not receiving chemotherapy showed a deterioration of spiritual well-being in the control compared to the yoga group. These results are not in accordance with two of the above-mentioned studies (Danhauer et al., 2009; Nakau et al., 2013) which also investigated cancer patients. Even though they applied similar intervention types and settings, they reported positive changes in spiritual well-being. The contradictory results might be explained by the severe health problem of the participants. Percentage of patients actively undergoing medical treatment during the intervention was higher in the three studies with null or minor outcomes (61%, 100%, 48%) than in those with favorable results (34%, 0%). Thus, it is required that future research includes comparison studies of diseased populations at various stages of treatment and disease, as well as comparisons of healthy and diseased populations. Moreover, the contradictory results could indicate that the positive effects of such yoga interventions on spirituality arise after around 10-12 weeks of weekly practice. Thus, further studies with varying length, and intensity of practice are needed to shed more light on this association.

Comparing and summing up the results of studies which included yoga as a physical exercise versus the ones which involved it as a holistic practice, no obvious differences can be revealed, partly due to the heterogeneity of the investigations. However, it can be said, that most of the studies including hatha yoga as a physical exercise showed promising outcomes concerning various aspects of spirituality. Importantly, Smith and colleagues (2011) found no difference between the integrated yoga group and the yoga as exercise group: both of the yoga groups showed an increased level of hope compared to the no intervention control. Overviewing randomized controlled interventions, three papers reported almost null or partially positive findings (Danhauer et al., 2009; Lötzke et al., 2016; Moadel et al., 2007), while four studies reported clear beneficial outcomes concerning spiritual experiences, spiritual intelligence, level of hope, sense of existence, presence, and awareness of body-mind connectedness (Pandya, 2019; Safara & Ghasemi, 2017; Smith et al., 2011; Wahlström et al., 2018).

Regularity of practice

An interesting factor for the relationship between yoga and spirituality is the regularity of practice. On the one hand, perceived benefits of yoga and aspects of spirituality, such as meaning of life, gratitude or transcendence are associated with yoga experience (namely the

number of years and the total lifetime hours practicing yoga) (Baker et al., 2015; Ivtzan & Papantoniou, 2014; Moliver et al., 2013). On the other hand, spirituality is most strongly associated with the frequency of current yoga practice (Csala et al., 2017; Gaiswinkler & Unterrainer, 2016; Moliver et al., 2013). Levels of spirituality, as well as perceived benefits of yoga are higher among practitioners with more current practice (including class duration and frequency) (Baker et al., 2015; Gaiswinkler & Unterrainer, 2016). Pandya (2019) also states that the strongest predictor of positive outcomes in spirituality is regular (self-)practice. The results of a study with follow-up (Lötzke et al., 2016) also support the importance of regularity of practice. Yoga participants' level of reflection (i.e., positive spiritual interpretation of disease) increased at the end of a 12-week long yoga intervention, but decreased back to the initial level after three months (Lötzke et al., 2016). In addition, results of a qualitative analysis (Ness & Briles, 2016) show that regular practice is a key component for yoga spirituality, and that going deeper into yoga practice (i.e., committed practice resulting in experiences of healing, connectedness, synchronicity and more control) brings more benefits (Ness & Briles, 2016). Summarizing these outcomes, we can conclude that the regularity of yoga practice plays a highly important role in spirituality. According to a recent study (Szabolcs et al., 2021), the regularity of yoga practice is also positively associated with mindfulness, body awareness, and self-compassion. These empirical findings are in accordance with the experience and teaching of many Eastern movement practices that generally emphasize the importance of regular (often daily) practice (Tihanyi et al., 2016; Ueshiba, 1984).

Intention of practice

Six papers mentioned the intention of yoga practice in relation to spirituality. Two of them (Ivtzan & Jegatheeswaran, 2015; Park et al., 2016) explicitly focused on this topic. Regular hatha yoga practitioners in the UK reported greater initial and continued physical intentions (yoga as a form of physical exercise) than spiritual ones (spiritual development). However, their spiritual intentions increased over time suggesting that hatha yoga practiced in the West can cultivate spirituality. Additionally, practitioners with spiritual intentions reported higher levels of both eudaimonic and hedonic psychological well-being (Ivtzan & Jegatheeswaran, 2015). Similarly, regular hatha yoga practitioners (both students and yoga teachers) in the USA reported that their primary reasons for adopting yoga practice were exercise, flexibility, and stress relief. However, for 23.5% of the yoga students and for 50.4% of the yoga teachers, spirituality became the primary reason for maintaining practice. Thus, spirituality was the top changed reason and also the most frequent reason among the newly

acquired primary ones. Moreover, spirituality was an additional reason for maintaining practice for further 48% of the students and 49.6% of the teachers (Park et al., 2016). Another study (Quilty et al., 2013) conducted in the USA (more precisely, in Texas) with respondents who were enrolled in a 4-week beginner yoga program found that reasons to start or return to yoga practice were primarily general wellness (81%), physical exercise (80%), and stress management (73%), followed by seeking spiritual experiences (37%). 73% of them endorsed yoga as a spiritual activity. A further cross-sectional study (Dittmann & Freedman, 2009) found that the level of spirituality is higher in women practicing with psycho-spiritual reasons compared to those who practiced primarily for physical or appearance reasons. Psycho-spiritual reasons encompassed self-knowledge, awareness and management of feelings, increase of mindfulness and interest in spiritual and philosophical foundations of yoga. Physical or appearance reasons were physical exercise, strength, stretching/flexibility, and improving physical appearance. According to a qualitative study among a large sample of regular Iyengar yoga practitioners in the UK (Hasselle-Newcombe, 2005), 60% of the participants began their practice as an alternative form of exercise. Moreover, it was an important reason for continued practice in 85% of the total sample. Interestingly, flexibility gained the highest percentage (94%) as a reason to continue yoga practice. In contrast, only 48% of the participants began their yoga practice with an idea of spiritual development, and 47% reported that spiritual aspects played an important role for continuing practice. Consequently, long-term practitioners of this sample are no more likely to have a spiritual interest than beginners. Therefore, it is possible that practitioners with a pre-existing orientation towards spirituality feel that their yoga practice is spiritual (Hasselle-Newcombe, 2005). However, this contradicts the abovementioned findings of Ivtzan and Jegatheeswaran (2015), as well as the outcomes of the loosely structured interviews with vinyasa yoga practitioners which specifically focused on the motivation for practicing yoga (Lewis, 2008). According to these interviews, motivation of practice changes over time. The initial aim is often to achieve the “perfect yoga body”, but subsequently more profound mental and spiritual intentions appear. There are enmeshed social, psychological, physical and spiritual meanings and motivations to continue yoga practice (Lewis, 2008). We can conclude that some of the beginner yoga practitioners have a pre-existing spiritual orientation and that continued hatha yoga practice appears to enhance spiritual interest and motivations. The lack of this latter result in the study of Hasselle-Newcombe (2005) may be explained by the fact that, among modern hatha yoga styles, Iyengar yoga is the most asana-centered with detailed work on individual poses. Iyengar yoga teachers generally avoid metaphysical comments and remain enigmatic on any explicit questions about spirituality.

Nevertheless, the study found that physical practice facilitates spiritual experiences by providing an inward looking, conscious personal experience of the practitioner's own body, breath, and mind resulting in glimpses of the infinite or holiness, and providing a sense of meaning of life (Hasselle-Newcombe, 2005).

All in all, it seems that physical intentions to practice yoga are more frequent than spiritual ones. Even so, spiritual motivations can increase over time and are associated with greater levels of spiritual and psychological well-being. These outcomes are, however, limited to Western societies since all of the studies which investigated the topic were conducted in Western countries. The intentions to practice might be different in India or other Eastern societies.

Meaning of spirituality for yoga practitioners

The results of three qualitative studies (Griera, 2017; Hasselle-Newcombe, 2005; Wahlström et al., 2018) give a deeper insight into what yoga and spirituality mean to practitioners. As reported by prisoners taking part in an intense yoga program, yoga is different from other forms of movement and sports (Griera, 2017). Yoga practice can evoke divine and transcendent experiences; it offers them a possibility to transcend the here and now which elicits the feeling of freedom. Exhausting the body with intense exercise in conjunction with stretching, breathing techniques, and focused awareness can lead to silence of the mind. Participants described experiences of "collective energy", "connectedness", "self-awareness", "flow", and "inner state of consciousness". Furthermore, yoga provided them with an expansive spiritual semantic framework of life. It became a means of self-improvement and self-transformation, and offered a transcendent layer of reality (Griera, 2017). Regular Iyengar yoga practitioners consider spirituality an alternative value to materialism. Spirituality, namely what they sense/perceive primarily through physical practice, is an experience of "imminence", i.e., an inward looking, a mundane but very personal experience of holiness. 85% of the practitioners stated that yoga gives sense of meaning to their life, and 83% of the responders reported to have a spiritual life compared to 45% of the general UK population (Hasselle-Newcombe, 2005). According to the participants of a 12-week long intervention, yoga practice gives a sense of existence and presence which leads to more inner peace. Moreover, it increases the awareness of the connection between physical and mental processes (Wahlström et al., 2018).

It is also important to note that yoga practitioners describe themselves as either spiritual or spiritual and religious, but very unlikely as religious and not spiritual (Emmons, 2006;

Hasselle-Newcombe, 2005). In contrast to institutionalized religion, yoga emphasizes the direct conscious experience of the practitioner. In consequence, it enables a personal understanding of the divine and God (Hasselle-Newcombe, 2005). The ultimate goal of yoga is to unite (or reunite) with the divine, i.e., the unchanging essence of life, through individual practice (Hasselle-Newcombe, 2005; Iyengar, 1994). In line with this view, Ahmad & Imtiaz (2016) found that spirituality is not associated with avoidant and anxious attachment to God among yoga practitioners. Other reviewed studies which applied questionnaires containing the term religious (e.g., religious orientation: prayer/trust in God, religious commitment, or religious/spiritual well-being) (Büssing, Hedtstück, et al., 2012; Gaiswinkler & Unterrainer, 2016; Pandya, 2019) presumably had a permissive interpretation of it, namely one akin to spirituality. All of them reported favorable outcomes.

In summary, it can be said that among yoga practitioners, spirituality predominantly means an individual search for and an experience of the divine which can give a feeling of inner silence, freedom, and connectedness. Spirituality also gives a meaning or framework of life leading to increased awareness, self-improvement and self-transformation.

Other important aspects of yoga and spirituality

As mentioned in the introduction, both yoga and various aspects of spirituality are associated with beneficial mental health effects (Büssing, Michalsen, et al., 2012; Domingues, 2018; Emmons, 2006; Fetzer/NIA Working Group, 1999). Some of the reviewed studies reported positive associations of spirituality and psychological health outcomes specifically among yoga practitioners. Spirituality (more precisely, spiritual readiness) was positively associated with body awareness ($r = .29$, $p < 0.01$), body responsiveness ($r = .31$, $p < 0.01$), and body satisfaction ($r = .297$, $p < 0.01$) (Dittmann & Freedman, 2009). Moreover, spiritual well-being was negatively associated with depression ($r = - .47$, $p < 0.01$), anxiety ($r = - .28$, $p < 0.01$) and stress ($r = - .54$, $p < 0.01$) (Nandeesh et al., 2016). Although these two studies are the only ones included in this review which investigated such associations, their results may support the idea that spirituality could be a strategy to increase well-being (Henry, 2006). In order to increase spirituality, a regular and in-depth practice is fundamental. Incorporation of yoga philosophy, meditation, consecration (dedication of practice for the sake of something good, a higher aim, or for someone), prayer, as well as the support of the community (teachers and fellow practitioners) are essential for spiritual growth (Ness & Briles, 2016; Pandya, 2018).

We can assume that yoga practice can affect psychological health in at least two ways: either directly or through enhancing spirituality. However, further specific studies are needed to explore the relationship of yoga, spirituality and mental health (MacDonald, 2013).

Spirituality questionnaires

The analyzed studies used various questionnaires to measure spirituality. These could be roughly categorized into four groups: questionnaires measuring (1) spirituality among diseased populations, (2) spiritual experience(s), (3) thinking style or worldview, and (4) spirituality as a construct including various (sometimes a myriad of) facets. Two measures were designed for diseased populations, namely the Functional Assessment of Chronic Illness Therapy - Spiritual Well-Being Scale (FACIT-Sp) (Peterman et al., 2002), and the Spiritual Attitudes and Coping with Illness (SpREUK) scale (Büssing et al., 2005). Spiritual experiences were assessed as self-transcendence, spiritual connection, gratitude, or hope. The respective measures were, e.g., the Daily Spiritual Experiences Scale (Underwood & Teresi, 2002) and the Spiritual Connection Questionnaire (SCQ-14) (Wheeler & Hyland, 2008). Spiritual thinking style or worldview were measured using, for instance, the Scale for Existential Thinking (SET) (Allan & Shearer, 2012) and the Worldview Scale (De Witt, 2013). Furthermore, several studies applied questionnaires to measure spirituality as a complex construct, such as the Spiritual Intelligence Self-Report Inventory (SISRI) (King & DeCicco, 2009), the Aspects of Spirituality (ASP) scale (Büssing et al., 2010), or the Multidimensional Inventory for Religious/Spiritual Well-Being (MI-RSWB) (Unterrainer et al., 2012). (For the full list of spirituality questionnaires used by the analyzed studies, see the Appendix 5.) Overall, the divergence of the questionnaires and their underlying concepts is obvious. There are a variety of instruments but a lack of consensus on how to best assess spirituality (MacDonald, 2013). The results of this review are nonetheless, by and large, positive. The applied measures captured predominantly positive outcomes. Even so, in future research it is important to consider appropriate measures of spirituality in yoga. A wide range of instruments seem to be promising, and recommendations are available (MacDonald, 2013; MacDonald & Friedman, 2009).

Discussion

According to the quantitative and qualitative findings, although most of the studies showed risk of bias, it can be concluded that yoga practice seems to be positively associated with spirituality. Thus, our hypothesis can be accepted. While this association is most likely

dependent on the exact nature of the practice and the practitioner's background, intention and preexisting relationship with spirituality, yoga interventions appear to have the potential to enhance different aspects of spirituality. These aspects include spiritual aspirations, search for insight/wisdom, existential thinking, sense of meaning and peace, as well as the feeling of faith, hope, and compassion. In summary, yoga practice may improve ~~s~~ various aspects of spiritual well-being and spiritual intelligence. Yoga practice may also be associated with increased levels of spiritual health, a more positive outlook on life, happiness within, and lower levels of existential anxieties. Accordingly, yoga can be a method that facilitates spiritual well-being and health, spiritual growth and the development of an integrative worldview. To achieve these benefits, regular yoga practice is essential. Consequently, the practice itself is a key component for spiritual growth. Concerning the intention to practice, physical and appearance motivations seem to be more prevalent than spiritual ones which holds for both beginner and advanced Western practitioners. Even so, spiritual intentions may increase over time and with a more in-depth practice, which suggests that hatha yoga can cultivate spirituality. According to the studies included in this review, for yoga practitioners, spirituality provides a meaning and framework of life and is a way of gaining more self-awareness and improving oneself. Incorporation of yoga philosophy, meditation, consecration and prayer may foster experiences of inner peace, freedom and connectedness.

Outcomes of recent studies

For further evidence on the investigated topic, we also inspected the most recent articles which meet the inclusion criteria of the present review. For this purpose, we conducted the same literature search as registered in Prospero in 2019 for the time interval between the end of 2019 and 2021 (May/June). This second search resulted in three new articles (Bringmann et al., 2021; Bryan et al., 2021; Park et al., 2020). We moreover identified three additional recent papers (Büssing et al., 2021; Cartwright et al., 2020; Csala et al., 2020). Summaries of these articles are presented in Appendix 4.5. All six studies used a quantitative approach, two of them had a cross-sectional design and four papers applied an intervention (one with a control group). All of them were conducted in Western countries (either Europe or the USA). The results of the six recent articles are in general in accordance with the outcomes of this review and support its findings. In addition, they provide further insights into the relationship between yoga and spirituality. The results of two studies investigating diseased populations (Bringmann et al., 2021; Bryan et al., 2021) are in line with previous inconclusive outcomes. Patients with a current diagnosis of a mild or moderate depressive episode showed a higher level of search for

insight/wisdom, but no changes in the other three measured aspects of spirituality (religious orientation, conscious interactions, and transcendence conviction) after an 8-week long complex intervention (Bringmann et al., 2021). Cancer survivors reported an increased overall spiritual well-being after a 10-week long gentle yoga and mindfulness meditation program (Bryan et al., 2021). Concerning the motivations to practice, one study (Cartwright et al., 2020) supported that initial reasons to practice are mostly connected to physicality and health (that is, general wellness, fitness, and flexibility), whilst the most notable change in motivations over time concerns spirituality. Initially 2.5% of participants reported to have spiritual motivations whereas this number rose to 21%. Still the highest current motivation was general well-being with 28%. Among regular yoga practitioners (with an average of 13 years of yoga practice), 78% considered yoga a spiritual path, while only 26% considered it gymnastics (Büssing et al., 2021). Participants perceiving yoga as a spiritual path show higher levels of devotion/self-reflection/contentment, restrain/truthfulness/self-discipline, and non-possessiveness (measured by the Yama/Niyama Questionnaire) compared to those who see yoga as gymnastics (Büssing et al., 2021). A 10-week long intervention study (Csala et al., 2020) investigated the role of verbal instruction during physically identical hatha yoga practice among beginner students compared to no-intervention controls. One yoga group received cuing which focused on physical aspects of practice, while in the other yoga group it included philosophical and spiritual contents (the amount of instruction was equal). No differences between the three groups emerged, however, the two yoga groups merged showed an increased level of spiritual connection compared to controls at the end of the intervention. This indicates that yoga practice can enhance spiritual connection regardless of verbal information. Another study (Park et al., 2020) examined the acute effects of various types of hatha yoga on psychological resources and emotional well-being among regular yoga practitioners (with an average of 13 years of yoga practice). Increased levels of self-transcendence and spiritual peace were reported after a 60-minutes long yoga class independently of style. Both changes in self-transcendence and spiritual peace favorably correlated with changes in emotions. Additionally, warmth and friendliness of the yoga teacher positively correlated with self-transcendence. According to these two studies (Csala et al., 2020; Park et al., 2020) even exercise based hatha yoga practice may be able to evoke aspects of spirituality, both for beginners and regular practitioners. Attitude or characteristics of the yoga teacher may also play a role in this process. Summarizing the outcomes of the systematic review and the recent findings, it can be said that motivations to practice yoga may change over time: initial physical intentions may gradually be complemented by spiritual ones. A potential explanation might be that the practice of hatha

yoga as a form of exercise may trigger the experience of aspects of spirituality. In doing so, it may evoke interest in aspects of yoga which go beyond mere exercise (e.g., meditation and philosophical studies) which in turn can enhance spirituality.

So far, only a few studies have investigated the relationship between yoga and spirituality, with holistic yoga practices being a particularly poorly studied area. In line with previous authors (Büssing, Hedtstück, et al., 2012; MacDonald, 2013), we suggest further exploration of this topic. First of all, aspects of spirituality most strongly associated with yoga practice could be revealed. For that, complex questionnaires or simultaneous application of more one-facet measures assessing spirituality in a non-religious form are suggested. For measurement of yoga experience the Yoga Immersion Scale (YI-S) (Gaiswinkler & Unterrainer, 2016) and for measurement of type and components of yoga practice The Essential Properties of Yoga Questionnaire (EPYQ) (Park et al., 2018) are, for instance, recommended. Secondly, potential diverse effects or different levels of impact of exercise-based or holistic yoga programs need future investigation. In addition, we propose a comparison of Eastern and Western approaches to yoga. Underlying mechanisms of the positive effects of yoga practice on spirituality also require deeper understanding. For that, intervention studies with randomized control design are necessary to avoid potential biases. Lastly, it is worthwhile to explore the intercorrelation of spirituality and other positive mental health measures affected by yoga.

Limitations

The present systematic review has a few limitations. First of all, it does not discuss how spirituality and religiosity relate to each other. Thus, the search terms were narrowed down to "spirituality", "spiritual", and "spirit". Consequently, studies using the terms "religiosity" or "religious" but capturing aspects of spirituality are not included in this review. Similarly, other overlapping terms, such as "transcendence", "transcendental", "self-transcendence", "mystic", "mystical", "mysticism", "sacred", "divine", or "philosophical" were excluded from the literature search as well. Secondly, the present review is restricted to empirical studies published in peer-reviewed scientific journals. Theses, dissertations, and other writings were not eligible, limiting the number of included papers profoundly. For a methodologically sound analysis, however, the strict delimitations were necessary. Aim of the restriction was to gain an overview and synthesize the outcomes of the presumably most robust and reliable studies in this field. However, we mostly did not report on the effect sizes. Nevertheless, methodologies (including approach, design, sample, intervention and measures) of the analyzed studies are

heterogeneous, and it is not possible to draw statistical evidence on the topic which presents a further limitation of the review. Also, the majority of the studies did not include a control group which makes it difficult to determine whether similar outcomes could have been achieved through other practices. Risks of bias assessment of RCTs and cross-sectional studies also showed some to high risk of bias. This suggests the cautious interpretation of the outcomes and further exploration of the topic with proper randomization processes, preregistered study design, and proper data analysis. Furthermore, most of the studies did not report on the participants' motivations to practice yoga which is another important potential bias of the results. We do not know whether attendants are prone to or interested in spirituality and whether this is why yoga practice facilitates spiritual expression for them, or in turn, whether yoga kindles and enhances spirituality for people who are originally not open to it. Of course, these options are not mutually exclusive. Lastly, it is important to note, that some of the measured aspects of spirituality (e.g., hope, conscious interaction, integrative worldview) are not 'spiritual' per se. They could also be understood as separate concepts or even as outcomes of spirituality. Even so, the present review aimed to explore which aspects of spirituality are in fact measured in yoga research and not to determine or delimit the definition of spirituality. Similarly, terms such as spiritual well-being or spiritual health and their respective measures share aspects with general mental health and should therefore be interpreted cautiously. However, they do encompass aspects which go beyond general mental health or well-being (Bredle et al., 2011; Unterrainer et al., 2012; Vader, 2006).

Conclusions

Based upon the 30 reviewed studies and six additional recent studies, yoga practice seems to be positively associated with various aspects of spirituality and may be a valid method to evoke spiritual interest and foster spiritual well-being and health. For most benefits, regular yoga practice is essential. Even though physical fitness appears to be the most important aspect of yoga practice in Western society, spiritual benefits are still manifest. For more evidence and a deeper exploration of the specific effects of yoga on spirituality, future research is encouraged.

IV. GENERAL DISCUSSION AND CONCLUSIONS

Scientific inquiry of yoga already started in the beginning of the 20th century and gained momentum around in the last three decades (Field, 2016; McCall, 2014; Singleton, 2010; Singleton & Byrne, 2008). During this period of time, modern yoga went through major alterations, developments and became more adapted to modern society. Both philosophical and practical teachings of yoga became available internationally, and for today, yoga is accessible almost all around the globe (Michelis, 2005; Singleton & Byrne, 2008). There are various yoga traditions, schools, and yoga styles. In Western society, yoga is often interpreted purely as a form of physical activity, however, physical aspect of yoga is only a single one among its holistic teachings (Baktay, 1992; Iyengar, 2014; MacDonald, 2013; Park et al., 2018). Vast literature investigates various perspectives on yoga including its philosophical background, roots and history, its alteration throughout the time, as well as the several effects of different yoga practices (Field, 2016; Groessl et al., 2015; Hauser, 2013; Mallinson & Singleton, 2017; Singleton & Byrne, 2008; Sullivan et al., 2018; Vivekananda, 2005).

Scientific research mainly focuses on the promising health benefits of the predominant modern yoga practice of hatha yoga which includes physical postures (asana), breathing exercises (pranayama), relaxation, and meditation techniques (Devereux, 1994; Govindaraj et al., 2016; Impett et al., 2006). Performing the specific postures which are often sustainedly maintained goes along with breath awareness and breath regulation as well as constant non-judgmental awareness. According to these characteristics, yoga practice belongs to the so-called mind-body exercises (Mehling et al., 2011; Park et al., 2018; Patwardhan, 2017). Yoga classes may include spiritual teachings; indeed, yoga can be understood as an Eastern movement form which implies that the practice has a philosophical background, and connotes a whole lifestyle (Boros et al., 2019; D. H. K. Brown, 2013; Lu et al., 2009). The relationship of physical and mental processes are emphasized, mindful presence, self-cultivation and spiritual development is part of the practice (Boros et al., 2019; D. H. K. Brown, 2013; D. H. K. Brown & Leledaki, 2010; Lee et al., 2015; Lu et al., 2009).

By now, there are already scientific evidences concerning the various physical and mental health benefits of hatha yoga (Büssing, Michalsen, et al., 2012; Domingues, 2018; S. Dwivedi & Tyagi, 2016; Field, 2016; Govindaraj et al., 2016; Hendriks et al., 2017; Ross & Thomas, 2010), nevertheless, due to high diversity of investigations and variability of yoga practices, there are still remaining questions (Büssing, Michalsen, et al., 2012; Field, 2016; Hendriks et al., 2017; MacDonald, 2013; Park et al., 2014, 2015, 2018; Patwardhan, 2017).

Aim of the present dissertation was to investigate some specific issues mainly in healthy adults. The first inquiry was whether weekly frequency of a short, more precisely, a 10-session long beginner level traditional hatha yoga intervention (with an emphasis on asana practice) is sufficient to evoke beneficial physical and mental health outcomes (including spirituality) in healthy young adults. Secondly, it was investigated whether verbal instruction during practice influences these potential outcomes. Additionally, potential intercorrelations among the changes in mental health variables, and the training effects, namely mean heart rate and used calories of an average beginner level hatha yoga class were examined. Another specific aim was to explore whether yoga practice is associated with positive mental health measures among regular practitioners. Correlations with yoga experience (the number of years practicing yoga) and with regularity of yoga practice (weekly hours) were investigated, in addition, potential mediating effects between yoga practice and the measured mental health variables were explored. The final aim of the present work was to systematically review the available empirical literature on the relationship between yoga practice and spirituality and provide future directions to unfold this under-researched area within the scientific inquiry of yoga.

4.1. Physical and psychological effects of a 10-session long weekly yoga practice

The first investigation was divided into two sections based on the physical and psychological effects of yoga practice (Longitudinal study Part 1 & 2, Chapter 3.1. and 3.2., respectively). Here, these effects (aspects) are discussed together according to the specific question whether a 10-session long hatha yoga intervention applying a weekly frequency is sufficient to result in beneficial physical and mental health changes in healthy young adults.

Concerning physical health measures, the findings indicated that even a 10-session long beginner level hatha yoga training on a weekly basis results in improvements in balance, flexibility, and core muscle strength. However, it does not impact BMI, body fat percentage, resting heart rate and heart rate variability. Regarding balance, flexibility and core muscle strength previous studies mostly reported positive outcomes, however, they used more frequent yoga trainings with biweekly to daily practices (Amin & Goddman, 2014; Halder et al., 2015; Jin et al., 2016; Kumar et al., 2016; Murugan & Durai, 2019; Polsgrove et al., 2016; Radhakrishnan, 2019). According to the present results, even weekly frequency of yoga practice is sufficient for beneficial changes in balance, flexibility and core muscle strength.

Among measures of balance, however, significant improvement occurred in yoga participants compared to the control group only when measured by the one-leg-stand with open

eyes test. No changes measured by the one-leg-stand with closed eyes test and FRT were found. Thus, we can conclude, that static balance with open eyes can improve with weekly frequency of yoga after 10 weeks of practice among healthy individuals, however, for improvements of static balance with closed eyes longer or more frequent practice is required (Jin et al., 2016; Kumar et al., 2016; Polsgrove et al., 2016). FRT, as an indicator of balance frailty (physical frailty), however, might not be adequate enough to test healthy people, but it might be a good choice for elderly (Boros et al., 2018; Weiner et al., 1992). Concerning flexibility, both side bend test and sit and reach test showed increased flexibility in the yoga group compared to the control group suggesting that yoga practice on a weekly basis is sufficient to enhance pliability. However, these significant changes might occur even before 10 sessions, as for example a previous study investigating healthy adults reported increased flexibility after six weeks of weekly yoga practice (Amin & Goddman, 2014). Core muscle strength as measured by the plank test also showed significant outcomes. Although, there was a lack of control data in this measure, the strong effect size value and the high BF value indicate that weekly setting of yoga significantly improves core muscle strength in healthy people. These three measures of physical fitness, namely balance, flexibility, and core muscle strength are highly relevant in preforming everyday tasks, support of good posture, injury prevention, and performance enhancement in physical activities (Amin & Goddman, 2014; Boros et al., 2018; Modak, 2017; Rathore et al., 2017). Strengthening core muscles also stands as a prevention and rehabilitation for lower back pain and musculoskeletal disorders. According to other studies, specific yoga postures for this aim can be selected (Modak, 2017; Rathore et al., 2017). Besides the abovementioned ones, flexibility also helps muscle relaxation. For betterment in flexibility, there are also advised selected yoga poses available (Amin & Goddman, 2014). Improved balance is not only important to keep healthy physical fitness, but to avoid impaired balance, fear of falling, and risk of falling in elderly ages (Boros et al., 2018). Of course, variety of yoga postures can be effective for this specific aim not even among healthy individuals, but also in various populations at risk (de Oliveira et al., 2016; Jeter et al., 2014; Ni et al., 2014; Youkhana et al., 2016).

The present investigation did not find changes in BMI, body fat percentage, resting HR and HRV. It can be argued, that since participants of the intervention were healthy adults with healthy BMI and body fat percentage, changes in these measures might not be expectable, at least after a short period of time or with low frequency of practice. Majority of the previous findings indicate beneficial changes in BMI and body fat percentage only in obese samples and reported null findings in healthy adults (Chauhan et al., 2017; Halder et al., 2015; Lauche et al.,

2016; McDermott et al., 2014; Pandit et al., 2019; Tran et al., 2001). Nonetheless, decrease in BMI and body fat percentage with more intense practice cannot be excluded even among healthy adults (Jin et al., 2016), however, for that, weekly practice of beginner level hatha yoga for 10 sessions is not sufficient. Lack of changes in resting heart rate and heart rate variability can be explained similarly. Even if based on previous literature we can assume that yoga affects HR and HRV positively (Cramer et al., 2014; Ganesan et al., 2020; Odynets et al., 2019), ten weekly sessions are not sufficient to evoke such changes in healthy adults.

Concerning psychological outcomes, 10-session long weekly yoga training results in increase in spirituality and decrease in negative affect, however it does not impact positive affect, mindfulness, and body awareness among healthy adults. As only a few empirical studies have investigated the effects of yoga practice on spirituality, the present result has a great importance. According to the outcomes, weekly practice of yoga for only 10 weeks can be sufficient to positively affect spirituality. According to the Systematic review (Chapter 3.4.), most of the previous intervention studies included diseased samples, and findings were miscellaneous (Baker et al., 2015; Bringmann et al., 2021; Bryan et al., 2021; Danhauer et al., 2008, 2009; Lötzke et al., 2016; Moadel et al., 2007; Nakau et al., 2013; Wahlström et al., 2018). Three studies reported partially positive outcome after weekly setting of yoga after 10-12 weeks (Danhauer et al., 2009; Nakau et al., 2013; Wahlström et al., 2018). Other longitudinal studies which investigated healthy adults reported beneficial changes in spirituality, however, they used much longer and more intense yoga programs (Büssing, Hedtstück, et al., 2012; Pandya, 2017, 2018, 2019). One paper reported improved spiritual intelligence in healthy men after an 8-week long yoga intervention which included biweekly 2.5 hours long sessions and also daily home practice (Safara & Ghasemi, 2017). Another study found increased level of hope, but no changes in spiritual well-being after a 7-week long biweekly (1 hour/session) yoga program (J. A. Smith et al., 2011). Improvements in spirituality in healthy people can occur even with weekly setting of yoga practice after 10 weeks. Nevertheless, applied measure of spirituality might play an important role in the results, thus future investigations should consider their choice or apply various measures simultaneously. Concerning negative affect, previous investigation found beneficial outcomes even after shorter period of time, however they applied 2-5 times/week interventions (Meissner et al., 2016; Vadiraja et al., 2009). It can be concluded that weekly frequency is also sufficient for decrease in negative affect, however, it is not sure whether for this, 10 sessions are needed, or it is feasible even earlier. Future studies might

investigate the minimal amount (frequency and length) of training that can evoke decrease in negative affect.

In contrast, present results did not show beneficial changes in positive affect, mindfulness and body awareness in the yoga group compared to the control group. Previous findings mostly reported increased level of positive affect (Meissner et al., 2016; Vadiraja et al., 2009), mindfulness (Curtis et al., 2011; Evans et al., 2010; Mathad et al., 2017), however, they applied more intense yoga programs. It can be assumed that for changes in these measures weekly frequency of practice is not sufficient, at least when applied only for 10 weeks. Studies on body awareness showed positive association between yoga practice and body awareness (Daubenmier, 2005; Impett et al., 2006; Tihanyi, Sági, et al., 2016), however, one of them (Impett et al., 2006) did not found significant change in body awareness even after a 2-month long intense yoga program. Both mindfulness and body awareness were in a study (Tihanyi, Böőr, et al., 2016) positively associated with weekly frequency of yoga practice (and were shown as significant mediators between yoga practice and subjective well-being) among advanced yoga students. It can be surmised that once-per-week commitment, at least for short duration and at beginner level, is not sufficient to evoke changes in these measures. For positive affect, mindfulness and body awareness, favorable outcomes presumably occur with more intense and/or longer practices.

Besides these findings, follow up outcomes of spirituality and negative affect show in the direction that for maintenance and further improvement of these measures sustained practice is required. Concerning intercorrelations among the changes in the measured variables, moderate negative correlation between mindfulness and negative affect, and moderate positive correlation between body awareness and spirituality were found. It can be supposed that changes in null finding measures might started, however, did not reach evincible level. According to these results, it is suggested to investigate weekly frequency of yoga practice for longer period of time in order to explore whether or when beneficial changes in mindfulness, body awareness, positive affect occur.

Descriptive statistics of average heart rate and energy consumption during yoga classes revealed that the average heart rate of a beginner level hatha yoga class (with an emphasis on asana practice but including short body and breath focus, as well as an approximately 8-10 minutes lying relaxation) is 93.39 bpm, and average energy consumption is 195.83 kcal which represents medium level in intensity among yoga styles (Cowen & Adams, 2005; Schubert et al., 2018; Sherman et al., 2017). Nevertheless, for changes in BMI, body fat percentage, resting

heart rate and heart rate variability during a short period of time, yoga practice with higher intensity is needed.

To sum up, beginner level hatha yoga on a weekly basis seems to be an appropriate form of physical activity to achieve some public health guidelines (Sherman et al., 2017). Such a short training can be an appropriate decision for designing an effective prevention or intervention in healthy populations for maintaining or improving holistic health. From economic, medical and psychological point of views, prevention of diseases is not only cost-effective, but relevant to nourish well-being and satisfaction with life (Hatala, 2013; Taylor et al., 2013; Vos et al., 2010).

4.2. The role of verbal instruction during practice

A further specific aim of the longitudinal study (Longitudinal study Part 1 & 2) was to explore the significance of verbal cuing during yoga practice as a potential influencing component in the effects of yoga practice. Since classes mostly include detailed information on practice, verbal instructions might have a significance in the effectiveness of yoga and can facilitate a variety of physical and mental experiences. Verbal information can cover physical, psychological, and philosophical and spiritual aspects of yoga practice, however, classes vary across whether and in which extent they include these aspects (Emerson et al., 2009; Field, 2016; Groessl et al., 2015; Park et al., 2018). In the present longitudinal study, the two yoga groups received the same physical practice which was accompanied by either dominantly physical cues or with instruction that also included mental and spiritual contents.

According to the outcomes, verbal cuing does not have an effect neither on physical nor on psychological measures. The lack of differences concerning the physical and cardiovascular measures is not surprising. Physical dominance of practice is more important in these measures than the impact of verbal instruction. Of course, both in modern psychology and ancient yogic practices the power of suggestion and the power of the mind is well-known even for physical purposes (Coué, 2010; Kaczvinszky, 1943), however, verbal cuing was not applied as a suggestion in this sense, but as an ordinary instruction of the class. The instruction might own an important influencing role for psychological measures, but supposedly its impact is – at least in this intervention - not strong enough to evoke differences in physical measures. However, it cannot be completely excluded that differences in verbal cuing for longer period of time or at advanced level might lead to different outcomes, or greater disparity in instructions has an impact on the outcomes.

The two types of verbal instruction did not result in different outcomes concerning the psychological measures, either. As argued before, the extent of disparity in the cuing, the length or the level of the intervention might not have been sufficient to evoke differences between the two yoga groups. On the other hand, the absence of the influencing role of verbal cuing might lies in the yoga practice itself. Yoga practice owns particular physical and mental characteristics (Govindaraj et al., 2016; Impett et al., 2006; Iyengar, 1991; Mehling et al., 2011; Rama et al., 1976), that is on the one hand, that conscious focus on the body and breath is always part of the practice regardless of yoga styles or class types. On the other hand, yoga asanas might impact not only the physical body but also psychological functioning through bodily aspects, regardless of verbal instruction and even practitioner's motivation whether they started yoga e.g., only for physical benefits (Sarbacker, 2014). This is in line with the yogic understanding of the body, namely the *pancha kosha* system, which does not only refer to the physical body, but also to further four body layers, such as the energetic body, two mental bodies, and the bliss body layer (Bhavanani, 2013; Rishi, 2005; Swartz, 2015). Performing asanas together with mental focus possibly effects all body layers or phrased in scientific language, it impacts both on the physical and mental levels. The original purpose of yoga was spiritual and early methods did not emphasize physical practices in such extent as later on (Baktay, 1992; Iyengar, 1991; Rama et al., 1976; Sarbacker, 2014). However, as a preparation for higher practices, such as meditation, for some aspirants, the body and the mind needed to be trained thus the path of hatha yoga was unfolded. Various physical practices were emphasized in order to prepare the body and the mind which was accompanied by physical and mental effects and health benefits. Based on this original purpose, physical practices of yoga can inhere psychological and spiritual elements, or in other words, physical exercises not only form the body but transform the mind and prepare one for spiritual experiences (Jois, 2002; Sarbacker, 2014). Specific poses and breathings (as well as mudras and bandhas) in yoga can provoke particular feelings, mental and spiritual contents (Rama et al., 1976; Satyananda Saraswati, 2002).

Already modern science has investigated the effects of specific yoga postures. Shapiro and Cline (2008) investigated the acute effects of 1.5 hours Iyengar-yoga classes which focused on standing poses, back bends, or forward bends. All three class types, independently of the specific poses, induced increased positive mood, energy-related mood, and decreased negative mood which lasted for two hours after class. However, back bends were associated with greater increase in positive mood, especially in participants who showed higher level of depressed emotions at beginning. The authors suggested further exploration of the specific mood and

psychological effects of various posture types. Indeed, specific effects of yoga poses were mainly investigated concerning physical and physiological measures so far (Amin & Goddman, 2014; Govindaraj et al., 2016; Modak, 2017). A recent study (Park et al., 2020) (included in the Systematic review) investigated the acute effects of specific components of yoga practice such as meditation, active and restorative postures, breathwork, exertion, and teacher warmth using 11 different hatha yoga classes. Results showed that yoga classes, independently of style, evoked enhanced psychological resources (mindfulness, body consciousness, self-transcendence, spirituality, and social connectedness) and emotions, such as positive engagement, revitalizations, tranquility and exhaustion. A review study (Cramer, Lauche, et al., 2016) examined whether the probability of positive outcomes of yoga practice varies across different yoga styles. The review included 306 randomized controlled trials with 53 different yoga styles (various types of hatha yoga classes, pranayama, integrated yoga therapy) and concluded that proportion of positive results concerning the respective expectations did not differ between yoga styles. Thus, personal preferences can be considered when choosing a yoga class. Summing up the outcomes of these studies, it can be concluded, that various yoga postures and other practices, such as pranayama have specific effects. Yoga styles or class types might not differ in terms of positive outcomes, since they include combination of these practices. However, they possibly differ in the level of beneficial changes based on their emphasized practices (Delaney & Anthis, 2010). As the present intervention study applied exactly the same physical practices, the impact of verbal cuing was probably negligible.

The null finding of the influence of verbal cuing can be further explained by the role of the group setting and the yoga teacher. On the one hand, the attitude of the yoga teacher towards the students, which was the same in both yoga groups, could impact the outcomes. As also in psychotherapy, the positive attitude of the instructor can provide an emotional support (Rogers, 1951), as it was shown in the above-mentioned recent study; namely, higher level of warmth and friendliness of the yoga teacher was correlated with self-transcendence (Park et al., 2020). Although, in the present study, to minimize this effect, the yoga teacher was asked to keep personal connection in the same extent and at minimum level by both groups. Nevertheless, the present outcomes are in line with this recent finding. The effects of the yoga teacher might be enhanced through yogic philosophy and ethical guidelines (such as nonviolence, truthfulness, patience, compassion) which might be felt by the student even if there are or are not expressed explicitly (Deborah, 2009; Iyengar, 1991; Sullivan et al., 2018). One study (J. A. Smith et al., 2011) which investigated the impacts of some yogic ethical guidelines during practice, found miscellaneous results. The relevance of explicit inclusion of ethical principles, or other

philosophical teachings should be explored in future studies. Additionally, group setting of yoga practice might also have an important impact for psychological measures. Positive changes in social connectedness through yoga class showed modest association with greater beneficial changes in positive engagement, revitalizations, tranquility and exhaustion (Park et al., 2020). Hence, potential adding effect of the social group in the decrease of negative affect in both yoga groups of the present study cannot be excluded.

To sum up, differences in verbal instruction during yoga practice did not lead to different outcomes neither in physical nor in the psychological measures in the present study. However, as far as it is known, no other studies explicitly investigated the role of verbal instruction during the physically identical asana practice. Thus, the role of verbal cuing is proposed to be explored with greater diversity in content, for longer period of time and at advanced level.

4.3. Yoga expertise and regularity of practice

The third study of the dissertation (Cross-sectional study, Chapter 3.3.) investigated whether the above-mentioned psychological variables are associated with yoga practice among regular yoga practitioners, more precisely, whether they correlate with regularity of yoga practice (weekly hours) and/or with yoga experience (the number of years practicing yoga).

Participants of the study practiced yoga for 7.7 years and 4.92 hours/week on average. According to the outcomes, all the measured variables correlated with current regularity of practice (weekly hours of yoga practice), more precisely mindfulness, body awareness, spirituality, and positive affect showed weak to moderate positive correlation and negative affect showed weak to medium negative correlation with weekly hours of yoga practice. These correlations stayed significant even after controlling for age, gender, education, and yoga experience, however, partial correlation coefficients decreased to weak level. In contrast, yoga expertise was associated only with mindfulness and positive affect, more precisely it showed weak to medium positive correlation with mindfulness and weak positive association with positive affect. No correlations between yoga experiences and body awareness, spirituality, and negative affect were found.

Concerning positive affect, it can be stated that both regularity of yoga practice and yoga experience show weak positive correlation with this measure. Correlation coefficient (or effect size) was slightly higher for regularity of yoga practice. Previous correlational studies (Impett et al., 2006; Tihanyi, Sági, et al., 2016) also reported positive association between positive affect and weekly hours/frequency of yoga practice. Other longitudinal studies which reported

significant increase in positive affect used yoga interventions with 3-5 weekly frequency meaning 3-7.5 hours/week practice (U. Dwivedi et al., 2015; Meissner et al., 2016; Vadiraja et al., 2009). Also, considering the results of Longitudinal study Part 2 of the present doctoral thesis, we might conclude, that for improvement of positive affect, regularity of practice - referring to more than one per week or 1.5 hours/week training - is highly important. Positive affect, however, possibly improves over time of practice, aka yoga expertise. As this study had cross-sectional design, causality of association cannot be revealed, thus it is also possible that people with higher level of positive affect are prone to stay engaged in yoga.

In contrast to positive affect, negative affect correlated only with regularity of yoga practice among regular practitioners. This is in line with previous findings (Impett et al., 2006; Tihanyi, Sági, et al., 2016). As Longitudinal study Part 2 also reported beneficial changes in negative affect among beginner students after 10 sessions with only weekly frequency, we might conclude that for salutary changes in negative affect regularity of practice is important regardless of expertise in yoga. For that, already weekly 1.5 hours training seem to be sufficient.

Similar to negative affect, spirituality and body awareness were associated with regularity of yoga practice but did not show correlation with yoga expertise. In previous studies body awareness is positively associated with weekly frequency of yoga (Tihanyi, Böőr, et al., 2016) and showed marginal positive correlation with weekly hours of yoga practice (Impett et al., 2006). Taking into account the null finding in body awareness in Longitudinal study Part 2, for beneficial changes in this measure, weekly frequency (or weekly hours) of yoga practice has an importance which must be possibly over one session and 1.5 hours/week. However, for proper understanding of the role of expertise in yoga in body awareness future investigations are proposed.

Concerning spirituality, according to the results of the Systematic review, outcomes of previous cross-sectional studies among regular yoga practitioners are mixed. Spiritual well-being was positively associated with current yoga practice (including class duration and frequency) (Gaiswinkler & Unterrainer, 2016); transcendence was most strongly associated with frequency of yoga practice, but also with expertise in yoga (Moliver et al., 2013); two specific aspects of spirituality, namely meaning in life and gratitude correlated with expertise in yoga (however, in this study minimum amount of yoga practice was 2 times/week) (Ivtzan & Papantoniou, 2014). Considering these findings together with the positive outcome in spirituality of Longitudinal study Part 2, we might conclude that for improvements in spirituality current regularity of practice is more important than expertise in yoga. For favorable

changes already weekly frequency or 1.5 hours/week of practice seems to be sufficient, however, more weekly practice of yoga probably results in greater improvements.

Mindfulness was the only measure which showed weak to moderate positive correlation both with regularity of yoga practice and yoga experience having slightly higher correlation coefficient (or effect size) with the latter one. In line with this finding, results of a national survey of yoga practitioners (Ross et al., 2012) reported that frequency of yoga practice and number of years practicing yoga independently predicted mindfulness. It can be concluded that in the level of mindfulness both yoga experience and current regularity of yoga practice play a similarly important role (Brisbon & Lowery, 2011; Gaiswinkler & Unterrainer, 2016; Tihanyi, Böőr, et al., 2016). This is in agreement with the null finding of Longitudinal study Part 2; for improvement in mindfulness probably more time or more regular practices is needed. However, future studies can explore the minimum frequency and length of practice which already induce detectable changes.

To sum up, it can be concluded that for beneficial mental health effects of yoga practice, regular practice is required. Nevertheless, as this study of the dissertation was a cross-sectional investigation, no conclusions on effects can be drawn, thus for more support, longitudinal studies, also among advanced practitioners, are needed.

4.4. Interrelations and mediating effects of the psychological variables in yoga

In the Cross-sectional study, intercorrelations between the measured psychological variables among regular yoga practitioners were explored, too. Almost all the measured variables favorably correlated with each other even after controlling for gender, age, education, and yoga experience. The only exception was the null finding between body awareness and negative affect. The strongest correlations appeared between mindfulness and negative and positive affect, followed by mindfulness and spirituality, spirituality and body awareness, body awareness and positive affect. Moderate correlations between mindfulness and negative affect, as well as spirituality and body awareness were present also among the changes in the measured variables in the previous longitudinal study (Longitudinal study Part 2). Further correlations (in the Cross-sectional study) between mindfulness and body awareness, spirituality and positive and negative affect, and between negative affect and positive affect were not that prominent.

As a result of three mediation analyses, mindfulness appeared to be a significant mediator between regularity of yoga practice and negative affect. In addition, body awareness

revealed to be a significant mediator between regularity of yoga practice and spirituality, and also between regularity of yoga practice and positive affect.

As also presented earlier, the first mediation accords with previous outcomes which showed the mediating role of mindfulness between yoga practice and psychological well-being and quality of life (Gard et al., 2012; Tihanyi, Böőr, et al., 2016). Mindfulness might foster decreased negative affect, nonetheless, the opposite direction cannot be excluded. Concerning the second finding, that body awareness is mediating factor between yoga practice and spirituality, it can be presumed that deepening focus on the body can result in new levels of self-experience, and induce a sense of wholeness and enhancement of spirituality (Jois, 2002; Mehling et al., 2011; Sarbacker, 2014). However, similarly, effects in the opposite direction cannot be completely excluded.

According to the last mediation analysis, body awareness has a mediating effect between regularity of yoga practice and positive affect, which is in line with the results of a previous study (Tihanyi, Böőr, et al., 2016) reporting that body awareness mediates the connection between weekly frequency of yoga practice and well-being. Yoga practice with conscious focus on the body possibly increases body awareness including the ability to anticipate and adequately response bodily reactions which can result in higher level of positive affect, namely in increased levels of alertness, activeness, and pleasant feelings.

It is also important to note the lack of mediating effect of mindfulness between regularity of yoga practice and positive affect, and the lack of mediating effect of spirituality between regularity of yoga practice and positive and negative affect. Spiritualty might not mediate the correlation between yoga practice and affect, since affect indicates a general activation system; however, spirituality might have a mediator role between yoga practice and other well-being measures. Similarly, mindfulness does not mediate the association between yoga practice and positive affect, which is a measure of activeness and excitement; in contrast, mindfulness means an open, non-judgmental awareness (K. W. Brown & Ryan, 2003).

Summarizing the outcomes of the intercorrelations and mediation analyses, it can be stated that interrelations of the measured psychological variables are in line with previous findings. Yoga practice correlates with, and presumably impacts mindfulness, self-awareness, affect and spirituality, and supposedly, these variables can foster each other (Büssing, Michalsen, et al., 2012; Evans et al., 2009; Riley & Park, 2015; Schmalzl et al., 2015). However, as present outcomes cannot reveal effects, future investigations are suggested for more support.

4.5. Further exploration of the relationship between yoga practice and spirituality

The last investigation of the present doctoral dissertation aimed to systematically review the relationship between yoga practice and spirituality as shown in available empirical studies conducted so far, and to provide meaningful directions for future research on this topic (Systematic review, Chapter 3.4.).

All in all, 30 full-text original articles with adult samples were included. Additionally, outcomes of six recent studies (implying Longitudinal study Part 2) were incorporated. Concerning type of yoga practices, majority of the studies investigated a form of hatha yoga, and only 5 studies included an intensive holistic (integral) yoga practice. This strengthens the conception that hatha yoga is the most prominent yoga practice today and also empirical research mainly focuses on this type of yoga (Field, 2016; Park et al., 2018). However, research trends between Western countries and India seem to be different. Yoga practice is less spiritually rooted and holistically understood in Western societies than in India (Ness & Briles, 2016; Singleton, 2010). According to interviews with yoga instructors in the USA, westernized yoga mostly lacks spirituality (Ness & Briles, 2016), which is in line with other reports (Groessl et al., 2015; Park et al., 2018). Indeed, out of the five studies that included a holistic/integral yoga program with philosophical teachings and lifestyle advices, three were conducted in India (Pandya, 2017, 2018, 2019). On the other hand, concerning methodology, Western studies mostly provided more detailed descriptions and proper statistics compared to Indian studies. According to a systematic review (Cramer et al., 2015), Indian RCT studies on yoga have around 25 times the probability to reach positive outcomes compared to those which were conducted elsewhere. Truly, all the six Indian studies of the present review reported beneficial outcomes. Nevertheless, it is important to note, that out of all the included studies there was only one paper which did not report any positive outcome (Danhauer et al., 2008). Concluding, majority of the overviewed studies reported at least minor positive results concerning the relationship between yoga and spirituality regardless of origin of study and type of yoga practice (whether they involved hatha yoga or holistic yoga program). This shows that even if yoga practice is not explicitly related to spiritual teachings, spiritual experiences or interest can be evoked by physical yoga practices as well (Csala et al., 2020; Gaiswinkler & Unterrainer, 2016; Ness & Briles, 2016).

Positive associations between yoga practice and spirituality covered wide aspects of spirituality. According to longitudinal studies, yoga practice can enhance spiritual aspirations, search for insight/wisdom, existential thinking, conscious interactions, sense of meaning and

peace, as well as the feeling of faith, hope, trust, and compassion (Büssing, Hedtstück, et al., 2012; Danhauer et al., 2009; Nakau et al., 2013; Pandya, 2017, 2018, 2019; J. A. Smith et al., 2011). Furthermore, yoga practice can increase spiritual intelligence (Safara & Ghasemi, 2017). Yoga practice is also associated with increased level of spiritual health, a more positive outlook on life, happiness within, as well as lower levels of existential anxieties and fear of death (Dittmann & Freedman, 2009; Monk-Turner & Turner, 2010; Scherwitz et al., 2006). Accordingly, yoga seems to be a valid method to facilitate spiritual well-being and health, spiritual growth and integrative worldview. This in line also with the findings of Longitudinal study Part 2 and Cross-sectional study of the present dissertation, in which spiritual connection was enhanced through and associated with yoga practice, respectively.

Majority of yoga practitioners describe themselves as either spiritual or spiritual and religious, but very unlikely as religious and not spiritual (Emmons, 2006; Hasselle-Newcombe, 2005) which is in line with the original understanding of yoga (Baktay, 1992; Kaczvinszky, 1994; Satyananda Saraswati, 2013). Spirituality for yoga practitioners predominantly means an individual search for and an experience of the divine which can give a feeling of inner silence, freedom, and connectedness. Spiritual teachings or experiences through practice can provide a meaning or framework of life leading to increased awareness, self-improvement and self-transformation. This is also an important aspect why yoga practice differs from many other forms of movement and sports (Griera, 2017).

Concerning intention of yoga practice, the review revealed that physical intentions are greatly higher than spiritual ones, especially at beginning (Cartwright et al., 2020; Hasselle-Newcombe, 2005; Ivtzan & Jegatheeswaran, 2015). Physical purposes involve engaging in physical exercise to improve strength and flexibility and appearance reasons. Motivations of yoga practice seem to change over time, namely spiritual intentions get increased, and play an important role for continuing practice. Additionally, spiritual intentions are associated with higher levels of psychological well-being. Even if it is probable, that there are beginner yoga practitioners with a pre-existing orientation towards spirituality, maintained hatha yoga practice appears to evoke and enhance spiritual interest and motivations (Cartwright et al., 2020; Dittmann & Freedman, 2009; Ivtzan & Jegatheeswaran, 2015; Lewis, 2008). These results are, however, restricted to Western societies, intention of practice might be different in India or other Eastern countries, which needs to be further investigated in future studies.

For evolvement of spirituality through yoga, regularity of practice appears to be the most essential, namely current regularity of (self-)practice is a key component for spiritual benefits (Gaiswinkler & Unterrainer, 2016; Lötzke et al., 2016; Moliver et al., 2013; Ness &

Briles, 2016; Pandya, 2019). Findings of the present Cross-sectional study and Longitudinal study Part 2 accord with these results. It can be also added, as discussed in detail above, that for spiritual benefits, already one time per week (1.5 hours/week) practice can be a sufficient regularity.

Relevance of spirituality within yoga

Both yoga and spirituality are associated with positive mental health effects (Büssing, Michalsen, et al., 2012; Domingues, 2018; Emmons, 2006; Fetzer/NIA Working Group, 1999), yet, there is a paucity of research investigating spiritual aspects of yoga practice (Gaiswinkler & Unterrainer, 2016). According to the few studies of the review, however, there are positive associations between spirituality and positive mental health measures among yoga practitioners. Beneficial associations with body awareness, body responsiveness, body satisfaction, intuitive eating, depression, anxiety, and stress were reported (Dittmann & Freedman, 2009; Nandeesh et al., 2016). Correlational results of Longitudinal study Part 2 and Cross-sectional study are in line with these findings. Accordingly, yoga practice and its spiritual dimension seem to be effective means to increase psychological well-being (Gaiswinkler & Unterrainer, 2016; Henry, 2006). Besides, spirituality and other mental health variables possibly beneficially foster each other's effect. Thus, the relevance of spirituality within yoga is not disputable. As described by many, spirituality is known as an important ingredient for holistic health and holistic treatment of diseases (Bhavanani, 2013; Gaiswinkler & Unterrainer, 2016; Hatala, 2013). As phrased by Bergin *„If we omit spiritual realities from our account of human behavior, it won't matter much what we keep in, because we will have omitted the most fundamental aspect of human behavior"* (Bergin, 1997, p. xi.). Even if it seems to be clear by now, that physical yoga practice can evoke and foster spirituality, incorporation of yoga philosophy, meditation, consecration, or prayer can further facilitate experiences of various aspects of spirituality. Furthermore, support of community (teachers and fellow practitioners) can be essential for spiritual growth (Ness & Briles, 2016; Pandya, 2018).

4.6. Yoga for holistic health: physical, psychological, and spiritual benefits

Summarizing all results of the present doctoral work with other existing literature, it can stated that yoga practice is a great tool for holistic well-being and its characteristics suit the biopsychosocial-spiritual model of health and therapy (Elias et al., 2015; Hatala, 2013; MacDonald, 2013; Taylor et al., 2013).

Concerning physical benefits, Longitudinal study Part 1 added to the field in such, that it revealed that for beneficial physical fitness outcomes, more precisely for improvements in balance, flexibility, and core muscle strength already one time per week practice (1.5 hours) for 10 weeks is sufficient among healthy young women. However, for improvements in BMI, body fat percentage, HR and HRV more regular practice or longer training period is needed. Beneficial effects of weekly practice are relevant for those who cannot afford more training per week due to other commitments. However, positive reward of practice might enhance motivation over time and results in favorable life-time changes including more time for physical activates.

Regarding psychological benefits, results of Longitudinal study Part 2 revealed that weekly setting of beginner level of yoga practice is sufficient to evoke beneficial changes in negative affect and spirituality among healthy young women. For positive changes in positive affect, mindfulness, and body awareness, probably more frequent or longer yoga practice is needed, at least at beginner level. However, both Longitudinal study Part 1 and the Cross-sectional study showed positive associations between these measures. Furthermore, the Cross-sectional study strengthened that relevance of current regularity of yoga over expertise in yoga (excluding mindfulness). Summing up the importance of these results, yoga practice can evoke favorable psychological changes even for novice practitioners. Some advantages can occur even with weekly practice after 10 sessions, and for some other benefits more regular or longer maintenance of practice is needed. Concerning mindfulness, both regular and advanced yoga practice seem to be essential. In today's psychology, mindfulness plays a highly important element, especially in positive psychology and cognitive behavioral therapies (Hamilton et al., 2006). It is shown to strengthen metacognitive skills and change schemas related to emotional responses, health, and illness (Hamilton et al., 2006), and impact psychological well-being and quality of life (K. W. Brown & Ryan, 2003; Gard et al., 2012). Mindfulness practices are specifically suggested for mental health professionals (Richards et al., 2010).

A new investigation and finding of the doctoral dissertation were that differences in verbal instruction during practice did not result in different outcomes. This might be explained through the characteristics of yoga practice itself, namely the possible direct effects of the various postures and the maintained inner focus, conscious awareness and breath regulation during practice. Potential impacting factor can be the social aspects of yoga practice. In a recent study (Park et al., 2020), the feeling of social connectedness was shown to increase via yoga class and was positively associated with positive emotions, as well as with mindfulness, self-transcendence, and spirituality.

Respecting spiritual benefits of yoga practice, which can be understood as an aspect of psychological health but also as an additional dimension of holistic health, the longitudinal and the cross-sectional studies investigating spiritual connection (a religious-free aspect of spiritualty) aimed to answer the call for the inclusion of spirituality in yoga research. As presented above, findings were positive. The Systematic review of empirical studies of this topic revealed that yoga practice is positively associated with various aspects spirituality and is great method to evoke spiritual interest and improve spiritual well-being and health. From a psychological point of view, spirituality is highly relevant to human functioning and health (Bergin, 1997; MacDonald, 2013), and it can be understood, for example, as an effective strategy to increase well-being (Henry, 2006), a character strength (Pikó et al., 2011; Shryack et al., 2010), a coping tool (Gall et al., 2005), or a form of intelligence (SQ) (Emmons, 2006; Wigglesworth & Neal, 2013; Zohar & Marshall, 2001). For benefits of yoga, additional spiritual teachings might be effectful. For example, a study comparing secular meditation, spiritual meditation, and relaxation (Wachholtz & Pargament, 2005) revealed that the spiritual meditation group showed greater improvement in positive mood, spiritual health, and spiritual experiences, and greater decreases in anxiety and longer pain tolerance than the other two groups. Nevertheless, initial aim of yoga practice is mainly physical, but with maintained practice mental and spiritual intentions can appear. There are enmeshed physical, psychological, social and spiritual motivations to continue yoga practice (Lewis, 2008) which again strengthens that yoga practice is a method for biopsychosocial-spiritual health (Evans et al., 2009; Hatala, 2013; MacDonald, 2013).

The modern biopsychosocial-spiritual model of health and the traditional understanding of yoga are in accordance. As presented in the introduction, the eight steps of raja yoga described by Patanjali can be understood as limbs for social (yama, niyama), physical (asana, pranayama), mental (pratyahara, dharana, dhyana), and spiritual (samadhi) health (Satyananda Saraswati, 2013). In modern times, the five basic principles of yoga for healthy lifestyle mainly refer to physical aspect (proper exercise, proper breathing, proper relaxation, proper diet), only the fifth one hints at mental aspects (positive thinking and meditation) (Sivananda Yoga Vedanta Centre, 2008; Tóth-Soma, 2017). This implies that physical health can stand as a base for holistic health (Harihārananda, 2004). Thus, the relevance of hatha yoga is clear.

Comparing yoga to other moderate physical activates, such as exercise therapy, stretching, walking, at physical level, results are mixed but yoga mainly seems to have similar benefits (Park et al., 2014). One study, for example, (McDermott et al., 2014) reported decreased body weight and BMI in the yoga group compared to monitored walking group at

the end of an 8-week long intense intervention in adults with high risk of diabetes. Studies comparing yoga with other activities, however, mainly focus on mental aspects (Szabolcs et al., 2021; Tihanyi, Sági, et al., 2016; West et al., 2004). A cross-sectional study (Tihanyi, Sági, et al., 2016) showed that advanced yoga students have higher level of body awareness when compared to kung-fu, ballroom dance, and aerobics practitioners at advanced level. Similarly, another study (Daubenmier, 2005) reported that yoga practitioners show higher level of body awareness than aerobic participants. A recent study (Szabolcs et al., 2021) compared three types of Eastern movement forms (aikido, judo, yoga) and a control group of practitioners of Western type of exercises with each other. According to the outcomes, practitioners of Eastern movement forms reported higher levels of body awareness and spirituality compared to the control group, however, score of spirituality in the yoga group was also significantly higher compared to aikido and judo participants. Additionally, the yoga group showed significantly higher level of mindfulness compared to the control group and judo practitioners, and significantly greater self-compassion compared to all other groups. Concluding, yoga practice seems to possess benefits over Western movement forms concerning body awareness, in addition to this, have advantages for spirituality and self-compassion, and partially for mindfulness compared to other mind-body practices/Eastern movement forms.

As presented in the introduction, yoga and spirituality might have some adverse effects and/or dangers but these can be avoided with precautions and conscious attention to these potential troubles. As reported in many papers, yoga in general is a safe practice, has low rate of side-effects or injuries and is well-received by practitioners (Govindaraj et al., 2016; Groessl et al., 2015; Sengupta, 2012). Yoga can be easily adopted regardless of age or level of experience, and can be adapted to a wide range of age groups from children to elderly people, and to a wide variety of diseased populations (Boros et al., 2018; S. Dwivedi & Tyagi, 2016; Iyengar, 2014; Jeter et al., 2014; Mooventhan & Nivethitha, 2017). Yoga seems to be a great practice for improving holistic health, and a valid method for various physical and mental therapeutic reasons (Jeter et al., 2015; Mooventhan & Nivethitha, 2017); yoga practice was also suggested to be included in psychotherapy (Kamradt, 2017). Considering scientific results, designing and application of safe and effective evidence-based yoga interventions are possible.

Suggestions for yoga practice according to present findings

According to results of the present doctoral thesis (in line with previous outcomes and suggestions), beginner level hatha yoga practice is advised for various health benefits. For

improvement in physical fitness, namely flexibility, balance, and core-muscle strength a weekly beginner level hatha training with 1.5 hours duration classes seems to be sufficient for healthy adults. However, for greater benefits in balance, 2-3 times/week (or 2-3 hours/week) setting is suggested (Jin et al., 2016; Polsgrove et al., 2016). For this aim, specific asanas can be selected, namely balancing poses, such as Vriksasana (tree pose), Garudasana (eagle pose), Hasta Padangustanasa beginner version (hand to toe pose, one leg stand), Ardha Chandrasana (half moon pose), Vhirabadrasana 3. (warrior 3), Natarajasana (dancer pose) (see Appendix 2; Iyengar, 1991; Satyananda Saraswati, 2002). A specially designed yoga program on balance is also available (Ni et al., 2014). Similary, specific poses for strenghtening core-muscles can be selected (Modak, 2017; Rathore et al., 2017): Ardha Phalakasana (low plank), Vasisthasana (side plank), Purvottanasana (inclined plane or table), Sarvangasana (shoulder stand), and Virabhadrasana (Warrior) seem to be very effective for this aim (Modak, 2017). Even more precise sugesstions on strenghtening core muscles are desrcibed in the article of Rathore and colleagues (2017). For betterment in flexibility, the practice of e.g., Adho Mukha Svanasana (downward facing dog pose), Uttanasana (standing forward bend), Trikonasana (triangle pose), Janu Sirsasana (head to knee pose), Matsyendrasana (spine twist), Paschimottanasana (seated forward bend) and Gomukhasana (cow face pose) are advised (Amin & Goddman, 2014; Bal & Kaur, 2009).

For betterment in BMI, body fat percentage, and cardiovascular measures, such as resting HR and HRV, more intense yoga practices are suggested. In line with general guidelines for improving physical health that suggest around 3-5 times 30-minute long or weekly 150-300-minute long moderate-intensity aerobic exercise for adults between 18 and 65 (American College of Sports Medicine, 2017; Physical Activity Guidelines Advisory Committee, 2018), to achieve benefits in the above-mentioned variables, higher intensity hatha yoga practice, such as power or vinyasa yoga is recommended for at least 2-3 times/week (1-1.5 hours/class).

Concerning mental health, weekly setting of hatha yoga practice is recommended for those who aim benefits for negative affect and spirituality and cannot afford more time for practice. However, for greater betterment in these measures and additional benefits in mindfulness, body awareness, and positive affect, more frequent practice, namely at least 2-3 times/week (1-1.5 hours/class) practice is recommended.

To maintain both physical and mental benefits of hatha yoga, regular practice is required and thus advised. Both physically and spiritually oriented yoga classes and teachers can be selected according to personal preferences. For further spiritual aims, physical practices can be

supplemented with meditation practice, yoga philosophy, mantra chanting, and consecration, or one can also join a yoga community.

4.7. Limitations

The present doctoral work has a number of limitations. First of all, it must be mentioned, that both traditional and scientific yoga literatures are vast, thus only the most important aspects concerning the dissertation are presented. Regarding original philosophical aspects of yoga, some views are sometimes differently described or understood by various authors, or they might use different terms for the same features (Feuerstein, 2008; Muktibodhananda, 1985; Sahay, 2013; Singleton, 2010). These variations are not presented, thus it might possible that some information about yoga is presented differently elsewhere. However, the work aimed to summarize the most important philosophical and historical aspects of yoga as precise and concise as possible. Other traditions (religions, philosophies or other spiritual, mystic or occult traditions) which have interrelations with yoga were not presented.

Concerning the empirical studies, beside the limitations which were mentioned at each study, the followings need to be emphasized. The longitudinal study included only women; however, it cannot be excluded that for male participants results would be different. As physical and mental characteristic can differ between genders (Atkinson & Hilgard, 2005), some changes might occur earlier or later for men. Furthermore, the study included only two measurement points, that is one week before and after the yoga program, but there were no measurements during the intervention period. For variables, which showed betterment through yoga practice, the change might occur even with less than ten sessions. In fact, only participant who missed more than two sessions were excluded from the analyses, thus some of the yoga attendants participated just in eight or nine session (mean missing was 1.1±0.61). There was a follow-up measurement six weeks after the end of the intervention for psychological variables, but it was not conducted for physical measures. Additionally, potential correlations between physical and psychological changes were not investigated. Besides, the methodological question may arise, why the two yoga groups in Longitudinal study Part 1 were compared using 2 x 2 mixed ANOVA instead of exploring group differences with 2 x 3 mixed ANOVA as it was conducted in Longitudinal study Part 2. Both solutions could be a good choice, however, since for physical measures no group differences between the two yoga groups were expected, the 2 x 2 ANOVA meant rather a prior analysis for the main research questions (in contrast to the investigation for psychological measures in which group differences also between the two

yoga groups were assumed). Lastly, this study has a limitation respecting the relevance of verbal instructions during practice. Disparities in verbal cuing between the two yoga groups might not be diverse enough to result in different outcomes, thus potential influencing role of verbal instruction in the effects of yoga practice cannot be completely refused.

Regarding the cross-sectional investigation, an important limitation is the lack of more precise information on the sample. It is not known which exact style of hatha yoga the practitioners were engaged in, and whether yoga was practiced in group setting or at home alone or with help of videos. Additionally, participants were not asked to report any potential minor or major diseases or disorders. The lack of control for all these possible impacts on the outcomes is a shortage of this study. Furthermore, yoga practitioners were asked whether they do any other exercise or physical activity beside yoga, however, results were not controlled for this variable either. It is important to add, that there were yoga teachers in sample. According to prior analyses, yoga teachers and non-teachers significantly differed from each other in both current regularity of yoga practice (weekly hours) and yoga experience (the number of years practicing yoga). Thus, as a control variable, yoga expertise was used instead of being a yoga teacher in order not to shadow the effects of current regularity of practice. It can be mentioned, that the intercorrelation analyses of the measured psychological variables were not conducted with Bonferroni correction, however, instead, Bayesian analyses were applied to show support for valid correlations. Nevertheless, for variables which were entered in the mediation analyses, frequentist correlations with Bonferroni correction would have been significant, with the exception of the correlation between spirituality and both negative and positive affect. Anyhow, omitting spirituality from the first and third mediation analyses would not lead to different final outcomes. As a correlational study, directions of mediation analyses were hypothesized based on results of previous studies, however, valid mediations are possible through other pathways as well.

Concerning the systematic review, one of its greatest limitation is that the literature search of yoga studies was narrowed for terms of spirit, spiritual, and spirituality, but did not cover overlapping phrases such as religious, transcendence, mystic, sacred or divine. Furthermore, as methodologies of the overviewed studies were highly heterogeneous, inclusion of statistical conclusions was not possible.

Additionally, this doctoral thesis did not aim to go into the debate whether modern hatha yoga practices - which were investigated in the present work - are original yogic techniques in renewed form or many of them derive from other modern Western practices (Singleton, 2010). Here, only some short notes are presented. It is described that yoga practices were found in

early times not exclusively in India, but in other cultures as well (Muktibodhananda, 1985). Yoga is not claimed to be exclusive; it is a wisdom and practice which was not invented but received by rishis through advanced and lengthy inner practices (Devereux, 1994; Weninger, 1986). Many practices were thereafter evolved through the experiences and teachings of various yogis. However, as Harari (2014) explains, it is not rare that the same or very similar means, techniques were invented and wisdoms were emerged (sometimes, but not always at the same time) in different cultures throughout humankind's history. From a historical point of view, the origin and evolution of the teachings of yoga, as well as its interaction with other traditions and practices are highly interesting, however, might not be that relevant concerning their holistic health benefits. Anyhow, yoga is a spiritual path which offers theoretical and practical knowledge for self-awareness and health. Indeed, major forms of practices changed tremendously over time. For today's challenges, hatha yoga seems to be great tool for improving holistic health and well-being.

Finally, the general limitation of scientific inquiry of yoga is shortly mentioned. Modern science has unquestionable increments and benefits for humankind; however, it still has limitations for investigating some aspects of life, particularly the fields of consciousness and spirituality (Baktay, 1992; Broad, 2012; Cook et al., 2009; Harari, 2014; Rama et al., 1976; Wilber, 2011). Science is one type of approach for revealing truth, it examines all kinds of observable phenomena externally (or in other words materially, that is measurably). In contrast, Eastern practical approaches focus on direct, internal investigation. Meditative practices of yoga and other Eastern traditions can result in higher states of consciousness/expansion of consciousness which provides going beyond the limitations of time, space, and causality (Baktay, 1992; Bhavanani, 2011; Cook et al., 2009; Rama et al., 1976). These phenomena are, however, impossible to be captured by modern scientific tools yet. Nevertheless, there are some slow changes in neuroscience: it has already been argued that mind is separate from the brain and has its own properties (Cook et al., 2009; Searle, 2007). D. J. Siegel (2010) proposes that clinical research and neuroscience investigations are in line with more than 2.5 thousand years of contemplative practices by now. Mindfulness is a mental activity which exercises the mind to become aware of the mental tendencies and become aware of the awareness itself. This inward focus and conscious awareness help people to make friendships with themselves which is in line with the yogic teaching as "you are your own friend, and you are your own enemy" as described by the Bhagavad Gita (Hari, 2014).

4.8. Future directions

Summarizing the limitations of the present investigations, and other shortages of evidences, there are several suggestions for future research.

First of all, the present intervention of weekly ten sessions could be repeated for male participants (adjusted for other characteristics such as age and physical activity level). For that, as in the present study, gender of the yoga teacher is suggested to be the same to avoid any potential confounding effects. Also, the same setting can be investigated in various age groups and diseased populations to reveal whether the present findings can be generalized or are specific for healthy young adults. Furthermore, for more proper methodology, randomization of the intervention and control groups with balanced sample sizes and control for potential confounding factors (such as home practice and previous physical activity level) are advised. To find evidence regarding the role of verbal instruction during physically identical practice, further longitudinal studies with more extent differences in verbal cuing are needed. Also, possible effects of other aspects of yoga practice, such as personal characteristics of the teacher, usage of candles, incense, or music during classes are worth to be investigated. Specific effects of different components of yoga practice can be also furtherly explored, for that e.g., the Essential Properties of Yoga Questionnaire (EPYQ) can be applied (Park et al., 2018).

Furthermore, another important recommendation is to include more measurement times with longer intervention periods to identify more precisely the occurrence of positive changes for each particular physical and psychological variable; this could aid to plan optimal and cost-effective interventions. Additionally, potential correlations between changes in physical measures and changes in psychological measures could be explored. Concerning intercorrelations of psychological variables, such as affect, mindfulness, body awareness, and spirituality, future longitudinal analyses are required to draw evidences on specific pathways whether yoga effects them directly or indirectly through one or another, or both ways. Beside these psychological variables, inclusion of self-compassion is recommended since it also seems to be an important indicator of psychological well-being (Neff, 2011) and was shown to mediate the effects of yoga practice on enhanced quality of life and decreased perceived stress (Gard et al., 2012). Additionally, yoga practitioners showed greater level of self-compassion compared to controls practicing Western type of exercises, as well as other Eastern movement forms, namely aikido and judo (Szabolcs et al., 2021). Furthermore, as spirituality was a neglected area in yoga research, specific pathways in the relationships between spirituality and various mental health measures in yoga can be emphasized (MacDonald, 2013).

Concerning available studies, systematic exploration of the topic of yoga and spirituality is proposed with the inclusion of various overlapping terms, such as religiosity, religious, transcendence, transcendental, self-transcendence, mystic, mystical, mysticism, sacred or divine. For future studies, further exploration of the effects of yoga on spirituality is recommended with the application of complex questionnaires or various one-facet measures of spirituality. For that, see Appendix 5 and the article of MacDonald and Friedman (2009) which gives direct suggestions for spirituality measures in yoga research. Investigation of specific impacts of various elements of yoga practice on spirituality is proposed, too. Therefore, careful selection of comparison conditions is needed (Park et al., 2014). In line with this, potential differences in the effects of exercise-based or holistic yoga programs should be further examined. Similarly, comparison of Eastern and Western approaches to yoga is proposed.

Lastly, it is suggested to furtherly inspect motivations to practice yoga in general or as a control variable for other research questions. Besides, since yoga practice in the West is associated with gender, ethnicity, and education (namely, majority of yoga practitioners are white women with higher education and socioeconomic and health status) (Cramer, Ward, et al., 2016; Park et al., 2015), effects of yoga practice is proposed to be investigated among various populations concerning gender, age, ethnicity, education, and socioeconomic status.

4.9. FINAL CONCLUSIONS

The present doctoral dissertation investigated some specific aspects of yoga practice concerning physical, psychological, and spiritual associations and effects in order to bring more evidences in the vast but very heterogeneous scientific literature on yoga.

The current results revealed that weekly frequency of yoga practice (1.5 hours) is sufficient to evoke beneficial physical and psychological changes (including spirituality) after 10 sessions among healthy young women. More precisely, beginner level hatha yoga practice with the above-mentioned setting resulted in an improvement of balance, flexibility, core muscle strength, in addition, an increased level of spirituality and a decreased level of negative affect. However, it did not lead to changes in BMI, body fat percentage, HR and HRV, in addition, in mindfulness, body awareness and positive affect. Concerning BMI and body fat percentage, this type of yoga practice might not lead to changes among healthy adults, but it can be assumed that for changes in these measures more intense and longer period of practice is needed. Regarding changes is HR, HRV, mindfulness, body awareness and positive affect, presumably more frequent or longer period of practice is required.

The significance of verbal instruction during practice was investigated in order to explore a potential impact of a specific component of yoga practice which has not been examined similarly so far. Physically identical yoga classes accompanied with different types of verbal cuing (in such, that one focused mainly on physical aspects of practice, while the other also included philosophical and spiritual contents) resulted in the same outcomes concerning both physical and psychological measures. This outcome can be best explained by the characteristics of yoga practice itself, namely that hatha yoga possesses specific postures, as well as there is a sustained inner focus, mindful attention and breath regulation during practice. Social aspects (such as personality of the teacher or the group setting) of practice might have an impact, too.

To sum up, practice on weekly basis for 1.5 hours seems to be an adequate frequency and amount to lead beneficial physical, psychological changes (including spirituality), regardless of verbal instruction during practice, at least among healthy young adults. This is relevant for those who lack motivation for more practice or cannot afford more time for practice. Engaging in only one class per week, thus experiencing positive physical and mental health outcomes after a few weeks, might result in more motivation and end in greater regularity of practice, which again is associated with more benefits.

Indeed, current regularity of yoga practice was favorably associated with mindfulness, body awareness, spirituality, and positive and negative affect. In contrast, yoga expertise showed positive association only with mindfulness and positive affect. This strengthens previous outcomes which highlighted the importance of regular practice. Additionally, mindfulness was a significant mediator between yoga practice and negative affect, and body awareness was a significant mediator between yoga practice and spirituality, and also positive affect. These strengthens that mindfulness and body awareness are important factors concerning beneficial correlates of hatha yoga.

Lastly, positive associations between yoga and various aspects of spirituality seem to be evident. Physically based yoga practice can evoke beneficial spiritual effects. However, more holistic practice with the inclusion of philosophical teachings and meditation, as well as the support of community can enhance these benefits. Physical intentions (such as physical fitness and appearance) for yoga practice are higher than spiritual ones both by beginning practice and at later phases, however, spiritual intentions to practice yoga increase over time. Motivations to continue yoga involve physical, psychological, social, and spiritual factors strengthening that yoga is a tool for improving holistic, namely biopsychosocial-spiritual health.

References

Agte, V., & Chiplonkar, S. (2007). Linkage of concepts of good nutrition in yoga and modern science. *Current Science*, *92*(7), 956–960.

Ahmad, N., & Imtiaz, N. (2016). The Relation of Attachment to God with Spirituality among Yoga Practitioners. *The International Journal of Indian Psychology*, *3*(2), 69–76.

Akuthota, V., & Nadler, S. F. (2004). Core strengthening11No commercial party having a direct financial interest in the results of the research supporting this article has or will confer a benefit upon the author(s) or upon any organization with which the authors is/are associated. *Archives of Physical Medicine and Rehabilitation*, *85*, 86–92. https://doi.org/10.1053/j.apmr.2003.12.005

Allan, B., & Shearer, B. (2012). The Scale for Existential Thinking. *International Journal of Transpersonal Studies*, *31*, 21–37. https://doi.org/10.24972/ijts.2012.31.1.21

American College of Sports Medicine. (2017). General principles of exercise prescription. In D. Riebe (Ed.), *ACSM's guidelines for exercise testing and prescription* (10th ed., pp. 143–179). Lippincott Williams & Wilkins.

Amin, D. J., & Goddman, M. (2014). The effects of selected asanas in Iyengar yoga on flexibility: Pilot study. *Journal of Bodywork and Movement Therapies*, *18*(3), 399–404. https://doi.org/10.1016/j.jbmt.2013.11.008

Andysz, A., Merecz, D., Wójcik, A., Świątkowska, B., Sierocka, K., & Najder, A. (2014). Effect of a 10-week yoga programme on the quality of life of women after breast cancer surgery. *Przegląd Menopauzalny = Menopause Review*, *13*(3), 186–193. https://doi.org/10.5114/pm.2014.43823

Atkinson, & Hilgard. (2005). *Pszichológia*. Osiris. http://link.oszk.hu/libriurl.php?LN=hu&DB=any&SRY=an&SRE=000002588558

Baker, M. R., Tessier, J. M., Meyer, H. B., Sones, A. C., Sachinvala, N., & Ames, D. (2015). Yoga-Based Classes for Veterans With Severe Mental Illness: Development, Dissemination, and Assessment. *Federal Practitioner*, *32*(10), 19–25. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6364818/

Baktay, E. (1992). *A diadalmas jóga. Rádzsa jóga; a megismerés és önuralom tana*. Szukits Könyvkiadó.

Bal, B. S., & Kaur, P. J. (2009). Effects of selected asanas in hatha yoga on agility and flexibility level. *Journal of Sport and Health Research.*, *1*(2), 75-87.

Balasubramaniam, M., Telles, S., & Doraiswamy, P. M. (2012). Yoga on our minds: A systematic review of yoga for neuropsychiatric disorders. *Frontiers in Psychiatry*, *3*, 117. https://doi.org/10.3389/fpsyt.2012.00117

Beck, J. S. (2014). *Kognitív terápia: Kezdőknek és haladóknak*. Magyar Viselkedéstanulmányi és Kognitív Terápiás Egyesület.

Bennett, K., Shepherd, J., & Janca, A. (2013). Personality disorders and spirituality. *Current Opinion in Psychiatry*, *26*(1), 79–83. https://doi.org/10.1097/YCO.0b013e32835b2c17

Bergin, A. E. (1997). Preface. In P. S. Richards & A. E. Bergin (Eds.), *A spiritual strategy for counseling and psychotherapy*. American Psychological Association.

Bhalekar, S. (2017). *Pranayama-Mudra and Meditation. Traditional approach and scientific view*. Kaivalyadhama.

Bhalekar, S. (2018). *Anatomy and Physiology: Yogic context*. Kaivalyadhama.

Bhavanani, A. (2011). Understanding the Science of Yoga. *International Scientific Yoga Journal: Sense*, *1*(1), 334–344.

Bhavanani, A. (2013). *Yoga Chikitsa: Application of Yoga as a Therapy*. Dhivyananda Creation.

Bhogal, R. S. (2017). *Yoga Psychology & beyond*. Kaivalyadhama.

Bidwell, A. J., Yazel, B., Davin, D., Fairchild, T. J., & Kanaley, J. A. (2012). Yoga training improves quality of life in women with asthma. *The Journal of Alternative and Complementary Medicine*, *18*(8), 749–755. https://doi.org/10.1089/acm.2011.0079

Biesanz, J. C., Falk, C. F., & Savalei, V. (2010). Assessing Mediational Models: Testing and Interval Estimation for Indirect Effects. *Multivariate Behavioral Research*, *45*(4), 661–701. https://doi.org/10.1080/00273171.2010.498292

Bilderbeck, A. C., Farias, M., Brazil, I. A., Jakobowitz, S., & Wikholm, C. (2013). Participation in a 10-week course of yoga improves behavioural control and decreases psychological distress in a prison population. *Journal of Psychiatric Research*, *47*(10), 1438–1445. https://doi.org/10.1016/j.jpsychires.2013.06.014

Birdee, G. S., Legedza, A. T., Saper, R. B., Bertisch, S. M., Eisenberg, D. M., & Phillips, R. S. (2008). Characteristics of yoga users: Results of a national survey. *Journal of General Internal Medicine*, *23*(10), 1653–1658. https://doi.org/10.1007/s11606-008-0735-5

Bogdány, T., Boros, S., Szemerszky, R., & Köteles, F. (2016). Validation of the Firstbeat TeamBelt and BodyGuard2 systems. *Magyar Sporttudományi Szemle*, *17*(3), 5–12.

Boros, S., Csala, B., & Szabolcs, Z. (2019). Keleti mozgásformák. In F. Köteles & E. Ferentzi (Eds.), *Tanulmányok az interocepcióról. Bárdos György professzor tiszteletére* (pp. 239–279). ELTE Eötvös Kiadó.

Boros, S., Csala, B., & Szilágyi, E. (2018). Yoga Practice for The Elderly: Good Choice to Avoid Falls. *Journal of Exercise, Sports & Orthopedics*, *5*(1), 1–4. https://doi.org/10.15226/2374-6904/5/1/00166

Bredle, J. M., Salsman, J. M., Debb, S. M., Arnold, B. J., & Cella, D. (2011). Spiritual Well-Being as a Component of Health-Related Quality of Life: The Functional Assessment of Chronic Illness Therapy—Spiritual Well-Being Scale (FACIT-Sp). *Religions*, *2*(1), 77–94. https://doi.org/10.3390/rel2010077

Bringmann, H. C., Bringmann, N., Jeitler, M., Brunnhuber, S., Michalsen, A., & Sedlmeier, P. (2021). Meditation Based Lifestyle Modification (MBLM) in outpatients with mild to moderate depression: A mixed-methods feasibility study. *Complementary Therapies in Medicine*, *56*, 102598. https://doi.org/10.1016/j.ctim.2020.102598

Brisbon, N. M., & Lowery, G. A. (2011). Mindfulness and Levels of Stress: A Comparison of Beginner and Advanced Hatha Yoga Practitioners. *Journal of Religion and Health*, *50*(4), 931–941. https://doi.org/10.1007/s10943-009-9305-3

Broad, W. J. (2012). *The science of yoga: The risks and the rewards*. Simon & Schuster.

Brown, D. H. K. (2013). Seeking spirituality through physicality in schools: Learning from 'Eastern movement forms'. *International Journal of Children's Spirituality*, *18*(1), 30–45. https://doi.org/10.1080/1364436X.2013.776521

Brown, D. H. K., & Leledaki, A. (2010). Eastern Movement Forms as Body-Self Transforming Cultural Practices in the West: Towards a Sociological Perspective. *Cultural Sociology*, *4*(1), 123–154. https://doi.org/10.1177/1749975509356866

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822–848.

Bryan, S., Zipp, G., & Breitkreuz, D. (2021). The Effects of Mindfulness Meditation and Gentle Yoga on Spiritual Well-Being in Cancer Survivors: A Pilot Study. *Alternative Therapies in Health and Medicine*, *27*(3), 32–38.

Büssing, A., Bretz, S. V., & Beerenbrock, Y. (2021). Ethical Principles of Yoga Philosophy in Western Yoga Practitioners: Validation of the Yama/Niyama Questionnaire. *Complementary Medicine Research*, 1–11. https://doi.org/10.1159/000513026

Büssing, A., Föller-Mancini, A., Gidley, J., & Heusser, P. (2010). Aspects of spirituality in adolescents. *International Journal of Children's Spirituality*, *15*(1), 25–44. https://doi.org/10.1080/13644360903565524

Büssing, A., Hedtstück, A., Khalsa, S. B., Ostermann, T., & Heusser, P. (2012). Development of Specific Aspects of Spirituality during a 6-Month Intensive Yoga Practice. *Evidence-Based Complementary and Alternative Medicine : ECAM*, *2012*, 981523. https://doi.org/10.1155/2012/981523

Büssing, A., Michalsen, A., Khalsa, S. B. S., Telles, S., & Sherman, K. J. (2012). Effects of yoga on mental and physical health: A short summary of reviews. *Evidence-Based Complementary and Alternative Medicine: ECAM*, *2012*, 165410. https://doi.org/10.1155/2012/165410

Büssing, A., Ostermann, T., & Matthiessen, P. F. (2005). Role of religion and spirituality in medical patients: Confirmatory results with the SpREUK questionnaire. *Health and Quality of Life Outcomes*, *3*(1), 10. https://doi.org/10.1186/1477-7525-3-10

Cartwright, T., Mason, H., Porter, A., & Pilkington, K. (2020). Yoga practice in the UK: A cross-sectional survey of motivation, health benefits and behaviours. *BMJ Open*, *10*(1), e031848. https://doi.org/10.1136/bmjopen-2019-031848

Cashwell, C. S., Bentley, P. B., & Yarborough, J. P. (2007). The Only Way Out Is Through: The Peril of Spiritual Bypass. *Counseling and Values*, *51*(2), 139–148. https://doi.org/10.1002/j.2161-007X.2007.tb00071.x

Cashwell, C. S., Glosoff, H. L., & Hammond, C. (2010). Spiritual Bypass: A Preliminary Investigation. *Counseling and Values*, *54*(2), 162–174. https://doi.org/10.1002/j.2161-007X.2010.tb00014.x

Chauhan, A., Semwal, D. K., Mishra, S. P., & Semwal, R. B. (2017). Yoga Practice Improves the Body Mass Index and Blood Pressure: A Randomized Controlled Trial. *International Journal of Yoga*, *10*(2), 103–106. https://doi.org/10.4103/ijoy.IJOY_46_16

Collins, C. (1998). Yoga: Intuition Preventive Medicine Treatment. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, *27*(5), 563–568. https://doi.org/10.1111/j.1552-6909.1998.tb02623.x

Cook, C., Powell, A., & Sims, A. (Eds.). (2009). *Spirituality & Psychiatry*. RCPsych Publications.

Coué, E. (2010). *Elméd gyógyító hatalma*. Egyensúlyért Bt.

Cowen, V. S., & Adams, T. B. (2005). Physical and perceptual benefits of yoga asana practice: Results of a pilot study. *Journal of Bodywork and Movement Therapies*, *9*(3), 211–219. https://doi.org/10.1016/j.jbmt.2004.08.001

Cowen, V. S., & Adams, T. B. (2007). Heart rate in yoga asana practice: A comparison of styles. *Journal of Bodywork and Movement Therapies*, *11*(1), 91–95. https://doi.org/10.1016/j.jbmt.2006.08.001

Cramer, H., Lauche, R., Haller, H., Steckhan, N., Michalsen, A., & Dobos, G. (2014). Effects of yoga on cardiovascular disease risk factors: A systematic review and meta-analysis. *International Journal of Cardiology*, *173*(2), 170–183. https://doi.org/10.1016/j.ijcard.2014.02.017

Cramer, H., Lauche, R., Langhorst, J., & Dobos, G. (2015). Are Indian yoga trials more likely to be positive than those from other countries? A systematic review of randomized controlled trials. *Contemporary Clinical Trials*, *41*, 269–272. https://doi.org/10.1016/j.cct.2015.02.005

Cramer, H., Lauche, R., Langhorst, J., & Dobos, G. (2016). Is one yoga style better than another? A systematic review of associations of yoga style and conclusions in randomized yoga trials. *Complementary Therapies in Medicine*, *25*, 178–187. https://doi.org/10.1016/j.ctim.2016.02.015

Cramer, H., Ostermann, T., & Dobos, G. (2018). Injuries and other adverse events associated with yoga practice: A systematic review of epidemiological studies. *Journal of Science and Medicine in Sport*, *21*(2), 147–154. https://doi.org/10.1016/j.jsams.2017.08.026

Cramer, H., Ward, L., Steel, A., Lauche, R., Dobos, G., & Zhang, Y. (2016). Prevalence, Patterns, and Predictors of Yoga Use: Results of a U.S. Nationally Representative Survey. *American Journal of Preventive Medicine*, *50*(2), 230–235. https://doi.org/10.1016/j.amepre.2015.07.037

Crews, D. A., Stolz-Newton, M., & Grant, N. S. (2016). The use of yoga to build self-compassion as a healing method for survivors of sexual violence. *Journal of Religion & Spirituality in Social Work: Social Thought*, *35*(3), 139–156. https://doi.org/10.1080/15426432.2015.1067583

Crowley, N., & Jenkinson, G. (2009). Pathological spirituality. In C. Cook, A. Powell, & A. Sims (Eds.), *Spirituality and psychiatry* (pp. 254–272). RCPsych Publications.

Csala, B., Ferentzi, E., Tihanyi, B. T., Drew, R., & Köteles, F. (2020). Verbal Cuing Is Not the Path to Enlightenment. Psychological Effects of a 10-Session Hatha Yoga Practice. *Frontiers in Psychology*, *11*. https://doi.org/10.3389/fpsyg.2020.01375

Csala, B., & Köteles, F. (2021). Validation of the Hungarian version of the short form of Spiritual Connection Questionnaire (SCQ-14). *Mentálhigiéné És Pszichoszomatika*, *22*(2), 207–228. https://doi.org/10.1556/0406.22.2021.006

Csala, B., Köteles, F., & Boros, S. (2018). Effect of 10-week long hatha yoga practice on BMI, balance, flexibility and core strength among female university participants. *Magyar Sporttudományi Szemle*, *19*(76), 12–18.

Csala, B., Springinsfeld, C. M., & Köteles, F. (2021). The Relationship Between Yoga and Spirituality: A Systematic Review of Empirical Research. *Frontiers in Psychology*, *12*, 3052. https://doi.org/10.3389/fpsyg.2021.695939

Csala, B., Szemerszky, R., Körmendi, J., Köteles, F., & Boros, S. (submitted for publication). *Is weekly frequency of yoga practice sufficient? Physiological effects of hatha yoga among healthy novice women*.

Csala, B., Tihanyi, B. T., Boros, S., Selmeczi, J. C., & Köteles, F. (2017). A jógagyakorlás és az affektivitás kapcsolatának potenciális mediátorai: Tudatos jelenlét, testi válaszkészség, önegyüttérzés, spiritualitás. *Magyar Sporttudományi Szemle*, *18*(71), 19–24.

Curtis, K., Osadchuk, A., & Katz, J. (2011). An eight-week yoga intervention is associated with improvements in pain, psychological functioning and mindfulness, and changes in cortisol levels in women with fibromyalgia. *Journal of Pain Research*, *4*, 189–201. https://doi.org/10.2147/JPR.S22761

Danhauer, S. C., Mihalko, S. L., Russell, G. B., Campbell, C. R., Felder, L., Daley, K., & Levine, E. A. (2009). Restorative yoga for women with breast cancer: Findings from a randomized pilot study. *Psycho-Oncology*, *18*(4), 360–368. https://doi.org/10.1002/pon.1503

Danhauer, S. C., Tooze, J. A., Farmer, D. F., Campbell, C. R., McQuellon, R. P., Barrett, R., & Miller, B. E. (2008). Restorative yoga for women with ovarian or breast cancer: Findings from a pilot study. *Journal of the Society for Integrative Oncology*, *6*(2), 47–58.

Daubenmier, J. J. (2005). The relationship of yoga, body awareness, and body responsiveness to self-objectification and disordered eating. *Psychology of Women Quarterly*, *29*(2), 207–219. https://doi.org/10.1111/j.1471-6402.2005.00183.x

de Oliveira, G., Tavares, M. da C. C. G. F., de Faria Oliveira, J. D., Rodrigues, M. R., & Santaella, D. F. (2016). Yoga Training Has Positive Effects on Postural Balance and Its Influence on Activities of Daily Living in People with Multiple Sclerosis: A Pilot Study.

Explore (New York, N.Y.), *12*(5), 325–332. https://doi.org/10.1016/j.explore.2016.06.005

De Witt, A. (2013). Worldviews and Their Significance for the Global Sustainable Development Debate. *Environmental Ethics*, *35*, 133–162. https://doi.org/10.5840/enviroethics201335215

Deborah, A. (2009). *The Yamas & Niyamas: Exploring Yoga's Ethical Practice*. On-Word Bound Books LLC.

Delaney, K., & Anthis, K. (2010). Is Women's Participation in Different Types of Yoga Classes Associated with Different Levels of Body Awareness Satisfaction? *International Journal of Yoga Therapy*, *20*(1), 62–71. https://doi.org/10.17761/ijyt.20.1.t44l6656h22735g6

Desai, R., Tailor, A., & Bhatt, T. (2015). Effects of yoga on brain waves and structural activation: A review. *Complementary Therapies in Clinical Practice*, *21*(2), 112–118. https://doi.org/10.1016/j.ctcp.2015.02.002

Devereux, G. (1994). *The Elements of Yoga*. Element Books Ltd.

Dienes, Z. (2011). Bayesian Versus Orthodox Statistics: Which Side Are You On? *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *6*(3), 274–290. https://doi.org/10.1177/1745691611406920

Dittmann, K. A., & Freedman, M. R. (2009). Body Awareness, Eating Attitudes, and Spiritual Beliefs of Women Practicing Yoga. *Eating Disorders*, *17*(4), 273–292. https://doi.org/10.1080/10640260902991111

Domingues, R. B. (2018). Modern postural yoga as a mental health promoting tool: A systematic review. *Complementary Therapies in Clinical Practice*, *31*, 248–255. https://doi.org/10.1016/j.ctcp.2018.03.002

Dömötör, Z., Nordin, S., Witthöft, M., & Köteles, F. (2019). Modern health worries: A systematic review. *Journal of Psychosomatic Research*, *124*, 109781. https://doi.org/10.1016/j.jpsychores.2019.109781

Drury, N. (1994). *A miszticizmus és az ezoterikus tanok lexikona*. Ferenczy Könyvkiadó.

Duncan, P. W., Weiner, D. K., Chandler, J., & Studenski, S. (1990). Functional reach: A new clinical measure of balance. *Journal of Gerontology*, *45*(6), M192-197. https://doi.org/10.1093/geronj/45.6.m192

Dwivedi, S., & Tyagi, P. (2016). Yoga as a health promotion lifestyle tool. *Indian Journal of Medical Specialities*, *7*(1), 29–34. https://doi.org/10.1016/j.injms.2016.01.001

Dwivedi, U., Kumari, S., Akhilesh, K. B., & Nagendra, H. R. (2015). Well-being at workplace through mindfulness: Influence of Yoga practice on positive affect and aggression. *AYU (An International Quarterly Journal of Research in Ayurveda)*, *36*(4), 375. https://doi.org/10.4103/0974-8520.190693

Elias, A. C. A., Ricci, M. D., Rodriguez, L. H. D., Pinto, S. D., Giglio, J. S., & Baracat, E. C. (2015). The biopsychosocial spiritual model applied to the treatment of women with breast cancer, through RIME intervention (relaxation, mental images, spirituality). *Complementary Therapies in Clinical Practice*, *21*(1), 1–6. https://doi.org/10.1016/j.ctcp.2015.01.007

Elwy, A. R., Groessl, E. J., Eisen, S. V., Riley, K. E., Maiya, M., Lee, J. P., Sarkin, A., & Park, C. L. (2014). A systematic scoping review of yoga intervention components and study quality. *American Journal of Preventive Medicine*, *47*(2), 220–232. https://doi.org/10.1016/j.amepre.2014.03.012

Emanuelsen, L., Drew, R., & Köteles, F. (2015). Interoceptive sensitivity, body image dissatisfaction, and body awareness in healthy individuals. *Scandinavian Journal of Psychology*, *56*(2), 167–174. https://doi.org/10.1111/sjop.12183

Emerson, D., Sharma, R., Chaudhry, S., & Turner, J. (2009). Trauma-Sensitive Yoga: Principles, Practice, and Research. *International Journal of Yoga Therapy*, *19*.

Emmons, R. A. (2000). Is Spirituality an Intelligence? Motivation, Cognition, and the Psychology of Ultimate Concern. *The International Journal for the Psychology of Religion*, *10*(1), 3–26. https://doi.org/10.1207/S15327582IJPR1001_2

Emmons, R. A. (2006). Spirituality. In M. Csíkszentmihályi & I. S. Csikszentmihalyi (Eds.), *A Life Worth Living.Contributions to positive psychology* (pp. 62-81.). Oxford University Press.

Evans, S., Moieni, M., Taub, R., Subramanian, S. K., Tsao, J. C. I., Sternlieb, B., & Zeltzer, L. K. (2010). Iyengar Yoga for Young Adults with Rheumatoid Arthritis: Results From a Mixed-Methods Pilot Study. *Journal of Pain and Symptom Management*, *39*(5), 904–913. https://doi.org/10.1016/j.jpainsymman.2009.09.018

Evans, S., Tsao, J. C., Sternlieb, B., & Zeltzer, L. K. (2009). Using the Biopsychosocial Model to Understand the Health Benefits of Yoga. *Journal of Complementary and Integrative Medicine*, *6*(1). https://doi.org/10.2202/1553-3840.1183

Falk, G. D. (2009). *Stripping the Gurus*. Million Monkeys Press.

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191.

Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology*, *43*(4), 522–527. https://doi.org/10.1037/h0076760

Fetzer/NIA Working Group. (1999). *Multidimensional Measurement of Religiousness/Spirituality for Use in Health Research*. John E. Fetzer Institute.

Feuerstein, G. (2008). *The yoga tradition: Its history, literature, philosophy, and practice* (Third edition). Hohm Press.

Field, T. (2016). Yoga research review. *Complementary Therapies in Clinical Practice*, *24*, 145–161. https://doi.org/10.1016/j.ctcp.2016.06.005

Gaiswinkler, L., & Unterrainer, H. F. (2016). The relationship between yoga involvement, mindfulness and psychological well-being. *Complementary Therapies in Medicine*, *26*, 123–127. https://doi.org/10.1016/j.ctim.2016.03.011

Gall, T. L., Charbonneau, C., Clarke, N. H., Grant, K., Joseph, A., & Shouldice, L. (2005). Understanding the Nature and Role of Spirituality in Relation to Coping and Health: A Conceptual Framework. *Canadian Psychology/Psychologie Canadienne*, *46*(2), 88–104. https://doi.org/10.1037/h0087008

Ganesan, S., Gaur, G. S., Negi, V. S., Sharma, V. K., & Pal, G. K. (2020). Effect of Yoga Therapy on Disease Activity, Inflammatory Markers, and Heart Rate Variability in Patients with Rheumatoid Arthritis. *The Journal of Alternative and Complementary Medicine*, *26*(6), 501–507. https://doi.org/10.1089/acm.2019.0228

Gard, T., Brach, N., Hölzel, B. K., Noggle, J. J., Conboy, L. A., & Lazar, S. W. (2012). Effects of a yoga-based intervention for young adults on quality of life and perceived stress: The potential mediating roles of mindfulness and self-compassion. *The Journal of Positive Psychology*, *7*(3), 165–175. https://doi.org/10.1080/17439760.2012.667144

Gard, T., Noggle, J. J., Park, C. L., Vago, D. R., & Wilson, A. (2014). Potential self-regulatory mechanisms of yoga for psychological health. *Frontiers in Human Neuroscience*, *8*. https://doi.org/10.3389/fnhum.2014.00770

Garner, M., Reith, W., & Krick, C. (2019). 10-Week Hatha Yoga Increases Right Hippocampal Density Compared to Active and Passive Control Groups: A Controlled Structural cMRI Study. *Journal of Neuroimaging in Psychiatry and Neurology*, *04*(01). https://doi.org/10.17756/jnpn.2019-027

Geary, B. (2003). *The contribution of spirituality to well-being in sex offenders*. ProQuest Information & Learning.

Govindaraj, R., Karmani, S., Varambally, S., & Gangadhar, B. N. (2016). Yoga and physical exercise—A review and comparison. *International Review of Psychiatry (Abingdon, England)*, *28*(3), 242–253. https://doi.org/10.3109/09540261.2016.1160878

Grabara, M. (2017). Hatha Yoga as a Form of Physical Activity in the Context of Lifestyle Disease Prevention. *Polish Journal of Sport and Tourism*, *24*(2), 65–71. https://econpapers.repec.org/article/vrsspotou/v_3a24_3ay_3a2017_3ai_3a2_3ap_3a65-71_3an_3a1.htm

Greene, K. M., & Maggs, J. L. (2017). Academic time during college: Associations with mood, tiredness, and binge drinking across days and semesters. *Journal of Adolescence*, *56*, 24–33. https://doi.org/10.1016/j.adolescence.2016.12.001

Griera, M. (2017). Yoga in Penitentiary Settings: Transcendence, Spirituality, and Self-Improvement. *Human Studies*, *40*(1), 77–100. https://doi.org/10.1007/s10746-016-9404-6

Groessl, E. J., Chopra, D., & Mills, P. J. (2015). An Overview of Yoga Research for Health and Well-Being. *Journal of Yoga & Physical Therapy*, *5*(4), 1–4. https://doi.org/10.4172/2157-7595.1000210

Gyollai, A., Simor, P., Koteles, F., & Demetrovics, Z. (2011). Psychometric properties of the Hungarian version of the original and the short form of the Positive and Negative Affect Schedule (PANAS). *Neuropsychopharmacologia Hungarica: A Magyar Pszichofarmakologiai Egyesulet Lapja = Official Journal of the Hungarian Association of Psychopharmacology*, *13*(2), 73–79.

Halder, K., Chatterjee, A., Pal, R., Tomer, O. S., & Saha, M. (2015). Age related differences of selected Hatha yoga practices on anthropometric characteristics, muscular strength and flexibility of healthy individuals. *International Journal of Yoga*, *8*(1), 37–46. https://doi.org/10.4103/0973-6131.146057

Hamilton, N. A., Kitzman, H., & Guyotte, S. (2006). Enhancing Health and Emotion: Mindfulness as a Missing Link Between Cognitive Therapy and Positive Psychology. *Journal of Cognitive Psychotherapy*, *20*(2), 123–134. https://doi.org/10.1891/jcop.20.2.123

Harari, Y. N. (2014). *Sapiens: A brief history of humankind*. Random House.

Hari, S. (2014). *Srimad Bhagavadgita*. Gita Press.

Hariharananda, P. (2004). *Kriya Yoga: The scientific progress of soul culture and the essence of all religions*. Prajna Publication.

Harrington, A. (2008). *The cure within: A history of mind-body medicine*. W W Norton & Co.

Hartfiel N, Havenhand J, Khalsa Sb, Clarke G, & Krayer A. (2011). The effectiveness of yoga for the improvement of well-being and resilience to stress in the workplace. *Scandinavian Journal of Work, Environment & Health*, *37*(1), 70–76. http://europepmc.org/abstract/MED/20369218

Hasselle-Newcombe, S. (2005). Spirituality and 'Mystical Religion' in Contemporary Society: A Case Study of British Practitioners of the Iyengar Method of Yoga. *Journal of Contemporary Religion*, *20*(3), 305–322. https://doi.org/10.1080/13537900500249806

Hatala, A. R. (2013). Towards a Biopsychosocial–Spiritual Approach in Health Psychology: Exploring Theoretical Orientations and Future Directions. *Journal of Spirituality in Mental Health*, *15*(4), 256–276. https://doi.org/10.1080/19349637.2013.776448

Hauser, B. (2013). *Yoga Traveling: Bodily Practice in Transcultural Perspective*. Springer.

Hayward, J. W., & Varela, F. J. (Eds.). (2001). *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of Mind*. Shambala.

Héjjas, I. (2005). *India ősi bölcsesség. Az indiai eredetű vallások filozófiája és létszemlélete*. INOK Kft.

Hendriks, T., de Jong, J., & Cramer, H. (2017). The Effects of Yoga on Positive Mental Health Among Healthy Adults: A Systematic Review and Meta-Analysis. *Journal of Alternative and Complementary Medicine (New York, N.Y.)*, *23*(7), 505–517. https://doi.org/10.1089/acm.2016.0334

Henry, J. (2006). Strategies for achieving well-being. In M. Csíkszentmihályi & I. S. Csikszentmihalyi (Eds.), *A life worth living: Contributions to positive psychology* (pp. 120-138.). Oxford University Press.

Higgins, J. P. T., Altman, D. G., Gøtzsche, P. C., Jüni, P., Moher, D., Oxman, A. D., Savović, J., Schulz, K. F., Weeks, L., & Sterne, J. A. C. (2011). The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ*, *343*. https://doi.org/10.1136/bmj.d5928

Hill, P. C., & Pargament, K. I. (2003). Advances in the conceptualization and measurement of religion and spirituality. Implications for physical and mental health research. *The American Psychologist*, *58*(1), 64–74.

Hoeger, W. W., & Hopkins, D. R. (1992). A comparison of the sit and reach and the modified sit and reach in the measurement of flexibility in women. *Research Quarterly for Exercise and Sport*, *63*(2), 191–195. https://doi.org/10.1080/02701367.1992.10607580

Hofmann, L. (2013). The Impact of Kundalini Yoga on Concepts and Diagnostic Practice in Psychology and Psychotherapy. In B. Hauser (Ed.), *Yoga Traveling: Bodily Practice in Transcultural Perspective*. Springer.

Hölzel, B. K., Lazar, S. W., Gard, T., Schuman-Olivier, Z., Vago, D. R., & Ott, U. (2011). How does mindfulness meditation work? Proposing mechanisms of action from a conceptual and neural perspective. *Perspectives on Psychological Science*, *6*(6), 537–559.

IBM Corp. (2017). *IBM SPSS Statistics for Windows, Version 25.0.* (Version 25) [Computer software]. IMB Corp.

Impett, E. A., Daubenmier, J. J., & Hirschman, A. L. (2006). Minding the body: Yoga, embodiment, and well-being. *Sexuality Research & Social Policy*, *3*(4), 39–48. https://doi.org/10.1525/srsp.2006.3.4.39

Ivtzan, I., & Jegatheeswaran, S. (2015). The yoga boom in western society: Practitioners' spiritual vs. physical intentions and their impact on psychological wellbeing. *J Yoga Phys Ther*, *5*(3), 1–7.

Ivtzan, I., & Papantoniou, A. (2014). Yoga meets positive psychology: Examining the integration of hedonic (gratitude) and eudaimonic (meaning) wellbeing in relation to the extent of yoga practice. *Journal of Bodywork and Movement Therapies*, *18*(2), 183–189. https://doi.org/10.1016/j.jbmt.2013.11.005

Iyengar, B. K. S. (1991). *Light on Yoga*. The Aquarian Press.

Iyengar, B. K. S. (1994). *Light on Yoga* (Revised Edition). Schocken Books.

Iyengar, B. K. S. (2014). *Yoga. The holistic path to health* ((Revised edition)). DK Publishing.

Jain, A. R. (2014). Who Is to Say Modern Yoga Practitioners Have It All Wrong? On Hindu Origins and Yogaphobia. *Journal of the American Academy of Religion*, *82*(2), 427–471. https://doi.org/10.1093/jaarel/lft099

Jarosz, A., & Wiley, J. (2014). What Are the Odds? A Practical Guide to Computing and Reporting Bayes Factors. *The Journal of Problem Solving*, *7*(1). https://doi.org/10.7771/1932-6246.1167

JASP Team. (2019). *JASP(Version 0.9.0.1) [Computer software]* (0.9.0.1) [Computer software]. https://jasp-stats.org/

JASP Team. (2020). *JASP (Version 0.12.2.0) [Computer software]* (0.12.2.0) [Computer software]. https://jasp-stats.org/

Jeter, P. E., Nkodo, A.-F., Moonaz, S. H., & Dagnelie, G. (2014). A systematic review of yoga for balance in a healthy population. *Journal of Alternative and Complementary Medicine (New York, N.Y.)*, *20*(4), 221–232. https://doi.org/10.1089/acm.2013.0378

Jeter, P. E., Slutsky, J., Singh, N., & Khalsa, S. B. S. (2015). Yoga as a Therapeutic Intervention: A Bibliometric Analysis of Published Research Studies from 1967 to 2013. *The Journal of Alternative and Complementary Medicine*, *21*(10), 586–592. https://doi.org/10.1089/acm.2015.0057

Jin, H. M., Kim, S. Y., & Moon, H. (2016). Changes in muscular strength, balance, and body composition in middle-aged women with power yoga. *The FASEB Journal*, *30*(1 Supplement), 1240.7-1240.7. http://www.fasebj.org/content/30/1_Supplement/1240.7

Jois, K. P. (2002). *Yoga Mala*. North Point Press.

Journal, Y., & McCall, T. (2007). *Yoga as Medicine: The Yogic Prescription for Health and Healing* (Illustrated edition). Bantam.

Kaczvinszky, J. (1994). *Kelet világossága I. Bevezetés a yogába*. Kötet Kiadó.

Kaczvinszky, J. (1995). *Kelet világossága II. Gyakorlati yoga*. Kötet Kiadó.

Kaczvinszky, J. (1943). *Kelet világossága III. Misztikus yoga*. Hindy András Könyvkiadó.

Kaminoff, L. (2007). *Yoga anatomy*. Human Kinetics.

Kaminoff, L., & Matthews, A. (2011). *Yoga anatomy* (Second Edition). Human Kinetics.

Kamradt, J. M. (2017). Integrating yoga into psychotherapy: The ethics of moving from the mind to the mat. *Complementary Therapies in Clinical Practice*, *27*, 27–30. https://doi.org/10.1016/j.ctcp.2017.01.003

Key, J. (2013). 'The core': Understanding it, and retraining its dysfunction. *Journal of Bodywork and Movement Therapies*, *17*(4), 541–559. https://doi.org/10.1016/j.jbmt.2013.03.012

Khalsa, S. B. S. (2018). *Scientific understanding of the Mechanisms Underlying the Therapeutic Benefits of Yoga*. Kaivalyadhama 9th International Conference Yoga as Therapy: Scope, Evidence and Evolution, Lonavla, India.

King, D., & DeCicco, T. (2009). A Viable Model and Self-Report Measure of Spiritual Intelligence. *International Journal of Transpersonal Studies*, *28*, 68–85. https://doi.org/10.24972/ijts.2009.28.1.68

Klein, C., Keller, B., Silver, C. F., Hood, R. W., & Streib, H. (2016). Positive Adult Development and 'Spirituality': Psychological Well-Being, Generativity, and Emotional Stability. In *Semantics and Psychology of 'Spirituality'. A Cross-cultural Analysis*. https://pub.uni-bielefeld.de/record/2784419

Kline, R. B. (2013). *Beyond significance testing. Statistics reform in the behavioral sciences* (2th edition). American Psychological Association.

Koenig, H. G., McCullough, M., & Larson, D. (2001). *Handbook of Religion and Health*. Oxford University Press. https://doi.org/10.1093/acprof:oso/9780195118667.001.0001

Komninos, T. (2009). Prosocial behavior as a moderator of the relationship between spirituality and subjective well-being. *ETD Collection for Fordham University*, 1–120. https://fordham.bepress.com/dissertations/AAI3377048

Kornfield, J. (1989). Obstacles and vicissitudes in spiritual practice. In S. Grof & C. Grof (Eds.), *Spiritual emergency: When personal transformation becomes a crisis* (pp. 137-169.). St. Martin's Press.

Köteles, F. (2014). A Testi Tudatosság Kérdőív magyar verziójának (BAQ-H) vizsgálata jógázó és fiatal felnőtt kontroll mintán. *Mentálhigiéné És Pszichoszomatika*, *15*(4), 373–391. https://doi.org/10.1556/Mental.15.2014.4.4

Köteles, F., & Simor, P. (2013). Modern Health Worries, Somatosensory Amplification and Subjective Symptoms: A Longitudinal Study. *International Journal of Behavioral Medicine*, *20*(1), 38–41. https://doi.org/10.1007/s12529-011-9217-y

Köteles, F., Simor, P., Czető, M., Sárog, N., & Szemerszky, R. (2016). Modern health worries—The dark side of spirituality? *Scandinavian Journal of Psychology*, *57*(4), 313–320. https://doi.org/10.1111/sjop.12297

Kramananda, S. (1983). *Yogic Management of Common Diseases*. Yoga Publications Trust.

Kumar, S., Prasad, S., Balakrishnan, B., Muthukumaraswamy, K., & Ganesan, M. (2016). Effects of Isha Hatha Yoga on Core Stability and Standing Balance. *Advances in Mind-Body Medicine*, *30*(2), 4–10.

Langhorst, J., Klose, P., Dobos, G. J., Bernardy, K., & Häuser, W. (2013). Efficacy and safety of meditative movement therapies in fibromyalgia syndrome: A systematic review and meta-analysis of randomized controlled trials. *Rheumatology International*, *33*(1), 193–207. https://doi.org/10.1007/s00296-012-2360-1

Larkey, L., Jahnke, R., Etnier, J., & Gonzalez, J. (2009). Meditative movement as a category of exercise: Implications for research. *Journal of Physical Activity & Health*, *6*(2), 230–238. https://doi.org/10.1123/jpah.6.2.230

Lauche, R., Langhorst, J., Lee, M. S., Dobos, G., & Cramer, H. (2016). A systematic review and meta-analysis on the effects of yoga on weight-related outcomes. *Preventive Medicine*, *87*, 213–232. https://doi.org/10.1016/j.ypmed.2016.03.013

Lee, H. S., Katz, L., & Sheehan, D. (2015). The Use of Eastern Philosophy to Human Movement to Promote Physical Literacy with Students. *Runner: The Journal of the Health and Physical Education Council of The Alberta Teachers' Association*, *47*(1).

Lewis, C. S. (2008). Life chances and wellness: Meaning and motivation in the 'yoga market'. *Sport in Society*, *11*(5), 535–545. https://doi.org/10.1080/17430430802196538

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *PLOS Medicine*, *6*(7), e1000100. https://doi.org/10.1371/journal.pmed.1000100

Lindeman, M., & Saher, M. (2007). Vitalism, purpose and superstition. *British Journal of Psychology (London, England: 1953)*, *98*(Pt 1), 33–44.

Lötzke, D., Wiedemann, F., Rodrigues Recchia, D., Ostermann, T., Sattler, D., Ettl, J., Kiechle, M., & Büssing, A. (2016). *Iyengar-Yoga Compared to Exercise as a Therapeutic Intervention during (Neo)adjuvant Therapy in Women with Stage I–III Breast Cancer: Health-Related Quality of Life, Mindfulness, Spirituality, Life Satisfaction, and Cancer-Related Fatigue* [Research article]. Evidence-Based Complementary and Alternative Medicine. https://doi.org/10.1155/2016/5931816

Lu, C., Tito, J. M., & Kentel, J. A. (2009). Eastern Movement Disciplines (EMDs) and Mindfulness: A New Path to Subjective Knowledge in Western Physical Education. *Quest*, *61*(3), 353–370. https://doi.org/10.1080/00336297.2009.10483621

Ma, L.-L., Wang, Y.-Y., Yang, Z.-H., Huang, D., Weng, H., & Zeng, X.-T. (2020). Methodological quality (risk of bias) assessment tools for primary and secondary medical studies: What are they and which is better? *Military Medical Research*, *7*(1), 7. https://doi.org/10.1186/s40779-020-00238-8

MacDonald, D. A. (2013). A Call for the Inclusion of Spirituality in Yoga Research. *Journal of Yoga & Physical Therapy*, *03*. https://doi.org/10.4172/2157-7595.1000138

MacDonald, D. A., & Friedman, H. L. (2009). Measures of spiritual and transpersonal constructs for use in yoga research. *International Journal of Yoga*, *2*(1), 2–12. https://doi.org/10.4103/0973-6131.53837

Mallinson, J. (2004). *The Gheranda Samhita: The original Sanskrit and an English translation*. YogaVidya.com.

Mallinson, J., & Singleton, M. (2017). *Roots of Yoga*. Penguin Books.

Mathad, M. D., Pradhan, B., & Sasidharan, R. K. (2017). Effect of Yoga on Psychological Functioning of Nursing Students: A Randomized Wait List Control Trial. *Journal of Clinical and Diagnostic Research: JCDR*, *11*(5), KC01–KC05. https://doi.org/10.7860/JCDR/2017/26517.9833

McCall, M. C. (2014). In search of yoga: Research trends in a western medical database. *International Journal of Yoga*, *7*(1), 4–8. https://doi.org/10.4103/0973-6131.123470

McDermott, K. A., Rao, M. R., Nagarathna, R., Murphy, E. J., Burke, A., Nagendra, R. H., & Hecht, F. M. (2014). A yoga intervention for type 2 diabetes risk reduction: A pilot randomized controlled trial. *BMC Complementary and Alternative Medicine*, *14*, 212. https://doi.org/10.1186/1472-6882-14-212

Mehling, W. E., Gopisetty, V., Daubenmier, J. J., Price, C. J., Hecht, F. M., & Stewart, A. (2009). Body awareness: Construct and self-report measures. *PLoS ONE*, *4*(5), e5614. https://doi.org/10.1371/journal.pone.0005614

Mehling, W. E., Price, C., Daubenmier, J. J., Acree, M., Bartmess, E., & Stewart, A. (2012). The Multidimensional Assessment of Interoceptive Awareness (MAIA). *PLoS ONE*, *7*(11), e48230. https://doi.org/10.1371/journal.pone.0048230

Mehling, W. E., Wrubel, J., Daubenmier, J. J., Price, C. J., Kerr, C. E., Silow, T., Gopisetty, V., & Stewart, A. L. (2011). Body Awareness: A phenomenological inquiry into the common ground of mind-body therapies. *Philosophy, Ethics, and Humanities in Medicine*, *6*(1), 6. https://doi.org/10.1186/1747-5341-6-6

Meissner, M., Cantell, M. H., Steiner, R., & Sanchez, X. (2016). *Evaluating Emotional Well-Being after a Short-Term Traditional Yoga Practice Approach in Yoga Practitioners with an Existing Western-Type Yoga Practice* [Research article]. Evidence-Based Complementary and Alternative Medicine. https://doi.org/10.1155/2016/7216982

Michelis, E. D. (2005). *A History of Modern Yoga: Patanjali and Western Esotericism*. A&C Black.

Moadel, A. B., Shah, C., Wylie-Rosett, J., Harris, M. S., Patel, S. R., Hall, C. B., & Sparano, J. A. (2007). Randomized Controlled Trial of Yoga Among a Multiethnic Sample of Breast Cancer Patients: Effects on Quality of Life. *Journal of Clinical Oncology*, *25*(28), 4387–4395. https://doi.org/10.1200/JCO.2006.06.6027

Modak, P. (2017). A Comprehensive Review of Yoga and Core Strength: Strengthening Core Muscles as Important Method for Injury Prevention (Lower Back Pain) and Performance Enhancement in Sports. *International Journal of Sport and Health Sciences*, *11*(8).

Moliver, N., Mika, E., Chartrand, M., Haussmann, R., & Khalsa, S. (2013). Yoga experience as a predictor of psychological wellness in women over 45 years. *International Journal of Yoga*, *6*(1), 11–19. https://doi.org/10.4103/0973-6131.105937

Monk-Turner, E., & Turner, C. (2010). Does yoga shape body, mind and spiritual health and happiness: Differences between yoga practitioners and college students. *International Journal of Yoga*, *3*(2), 48.

Moola, S., Munn, Z., Tufanaru, C., Aromataris, E., Sears, K., Sfetcu, R., Currie, M., Qureshi, R., Mattis, P., Lisy, K., & Mu, P.-F. (2020). Chapter 7: Systematic reviews of etiology and risk. In E. Aromataris & Z. Munn (Eds.), *JBI Manual for Evidence Synthesis*. The Joanna Briggs Institute.

Mooventhan, A., & Nivethitha, L. (2017). Evidence based effects of yoga practice on various health related problems of elderly people: A review. *Journal of Bodywork and Movement Therapies*, *21*(4), 1028–1032. https://doi.org/10.1016/j.jbmt.2017.01.004

Muktibodhananda, S. (1984). *Swara Yoga. The Tantric Science of Brain Breathing*. Yoga Publications Trust.

Muktibodhananda, S. (1985). *Hatha Yoga Pradipika. Light on Hatha Yoga*. Yoga Publications Trust.

Murugan, M., & Durai, C. (2019). Influence of asana with Surya Namaskar practices on core strength among intercollegiate cricket players. *International Journal of Yogic, Human Movement and Sports Sciences*, *4*(1), 627–628.

Nakau, M., Imanishi, J., Imanishi, J., Watanabe, S., Imanishi, A., Baba, T., Hirai, K., Ito, T., Chiba, W., & Morimoto, Y. (2013). Spiritual Care of Cancer Patients by Integrated Medicine in Urban Green Space: A Pilot Study. *EXPLORE*, *9*(2), 87–90. https://doi.org/10.1016/j.explore.2012.12.002

Nandeesh, Y. D., Kulkarni, D., & Kamble, S. V. (2016). Depression , Anxiety , Stress and Spirituality in Yoga Practitioners. *The International Journal of Indian Psychology*, *3*(3), 110-118.

Nayek, B., & Chatterjee, K. (2016). Effect of 6-weeks yoga and aerobic exercise on muscular strength and flexibility of pre- adolescence students. *International Journal of Yogic, Human Movement and Sports Sciences*, *1*(1), 12-16. http://www.theyogicjournal.com/pdf/2016/vol1issue1/PartA/1-1-5-842.pdf

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass*, *5*(1), 1–12.

Ness, A., & Briles, K. (2016). *Perceptions of Yoga Spirituality in Minnesota*. *8*, 51–62.

Newby, K. (2014). The Effects of Yoga with Meditation (YWM) on Self-Criticism, Self-Compassion, and Mindfulness. *PCOM Psychology Dissertations*. https://digitalcommons.pcom.edu/psychology_dissertations/296

Ni, M., Mooney, K., Richards, L., Balachandran, A., Sun, M., Harriell, K., Potiaumpai, M., & Signorile, J. F. (2014). Comparative impacts of Tai Chi, balance training, and a specially-designed yoga program on balance in older fallers. *Archives of Physical Medicine and Rehabilitation, 95*(9), 1620-1628.e30. https://doi.org/10.1016/j.apmr.2014.04.022

Odynets, T., Briskin, Y., Todorova, V., Tyshchenko, V., & Bondarenko, O. (2019). Effect of yoga in the modulation of heart rate variability in patients with breast cancer. *Advances in Rehabilitation, 33*(4), 5–11. https://doi.org/10.5114/areh.2019.89821

Oman, D. (2013). Defining religion and spirituality. In R. F. Paloutzian & C. L. Park (Eds.), *Handbook of the psychology of religion and spirituality, 2nd ed* (pp. 23–47). Guilford Press.

Pandit, D. P., Upadhyah, A., Goyal, P., & Sharma, D. (2019). Effect of short term yoga on body weight, BMI, body fat percentage & blood pressure. *Indian Journal of Clinical Anatomy and Physiology*, *6*(2), 179–182. https://doi.org/10.18231/j.ijcap.2019.040

Pandya, S. P. (2017). Millenarianism and yoga: A spiritual approach to mental health. *Journal of Spirituality in Mental Health, 19*(2), 151–168. https://doi.org/10.1080/19349637.2016.1222601

Pandya, S. P. (2018). Auroville as an intentional spiritual community and the practice of Integral yoga. *Cogent Arts & Humanities*, *5*(1), 1537079.

Pandya, S. P. (2019). Facebook and Yoga: Gurus, New Age, and Spirituality through Social Media. *Journal of Religion, Media and Digital Culture*, *8*(2), 246–275. https://doi.org/10.1163/21659214-00802004

Parak, J., & Korhonen, I. (2013). Accuracy of Firstbeat Bodyguard2 beat-to-beat heart rate monitor. *White Paper by Firstbeat Technologies Ltd*. http://www.firstbeat.com/userData/firstbeat/tiedostolataukset/white_paper_bodyguard2_final.pdf

Pargament, K. I. (1999). The Psychology of Religion and Spirituality? Yes and No. *The International Journal for the Psychology of Religion*, *9*(1), 3–16. https://doi.org/10.1207/s15327582ijpr0901_2

Park, C. L., Braun, T., & Siegel, T. (2015). Who practices yoga? A systematic review of demographic, health-related, and psychosocial factors associated with yoga practice.

Journal of Behavioral Medicine, *38*(3), 460–471. https://doi.org/10.1007/s10865-015-9618-5

Park, C. L., Elwy, A. R., Maiya, M., Sarkin, A. J., Riley, K. E., Eisen, S. V., Gutierrez, I., Finkelstein-Fox, L., Lee, S. Y., Casteel, D., Braun, T., & Groessl, E. J. (2018). The Essential Properties of Yoga Questionnaire (EPYQ): Psychometric Properties. *International Journal of Yoga Therapy*, *28*(1), 23–38. https://doi.org/10.17761/2018-00016R2

Park, C. L., Finkelstein-Fox, L., Groessl, E. J., Elwy, A. R., & Lee, S. Y. (2020). Exploring how different types of yoga change psychological resources and emotional well-being across a single session. *Complementary Therapies in Medicine*, *49*, 102354. https://doi.org/10.1016/j.ctim.2020.102354

Park, C. L., Groessl, E., Maiya, M., Sarkin, A., Eisen, S. V., Riley, K., & Elwy, A. R. (2014). Comparison groups in yoga research: A systematic review and critical evaluation of the literature. *Complementary Therapies in Medicine*, *22*(5), 920–929. https://doi.org/10.1016/j.ctim.2014.08.008

Park, C. L., Riley, K. E., Bedesin, E., & Stewart, V. M. (2016). Why practice yoga? Practitioners' motivations for adopting and maintaining yoga practice. *Journal of Health Psychology*, *21*(6), 887–896. https://doi.org/10.1177/1359105314541314

Patwardhan, A. R. (2016). Developing a Small Theory of Treatment of Yoga. *Journal of Yoga and Physiotherapy*, *1*(2), 1–6.

Patwardhan, A. R. (2017). Yoga Research and Public Health: Is Research Aligned With The Stakeholders' Needs? *Journal of Primary Care & Community Health*, *8*(1), 31–36. https://doi.org/10.1177/2150131916664682

Peterman, A. H., Fitchett, G., Brady, M. J., Hernandez, L., & Cella, D. (2002). Measuring spiritual well-being in people with cancer: The functional assessment of chronic illness therapy--Spiritual Well-being Scale (FACIT-Sp). *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, *24*(1), 49–58. https://doi.org/10.1207/S15324796ABM2401_06

Peterson, C., & Seligman, M. E. P. (2004). *Character Strengths and Virtues: A Handbook and Classification*. Oxford University Press. https://www.apa.org/pubs/books/4317046

Physical Activity Guidelines Advisory Committee. (2018). *2018 Physical Activity Guidelines Advisory Committee*. U.S. Department of Health and Human Services.

Piedmont, R. L. (1999). Does Spirituality Represent the Sixth Factor of Personality? Spiritual Transcendence and the Five-Factor Model. *Journal of Personality*, *67*(6), 985–1013. https://doi.org/10.1111/1467-6494.00080

Piedmont, R. L. (2007). Cross-cultural generalizability of the Spiritual Transcendence Scale to the Philippines: Spirituality as a human universal. *Mental Health, Religion & Culture*, *10*(2), 89–107. https://doi.org/10.1080/13694670500275494

Piedmont, R. L., & Leach, M. M. (2002). Cross-Cultural Generalizability of the Spiritual Transcendence Scale in India: Spirituality as a Universal Aspect of Human Experience. *American Behavioral Scientist*, *45*(12), 1888–1901. https://doi.org/10.1177/0002764202045012011

Pikó, B., Kovács, E., & Kriston, P. (2011). Spiritualitás—Vallás—Egészség. Fiatalok mentális egészsége a spirituális jóllét mutatóinak tükrében. *Mentálhigiéné És Pszichoszomatika*, *12*(3), 261–276. https://doi.org/10.1556/Mental.12.2011.3.4

Polsgrove, M. J., Eggleston, B. M., & Lockyer, R. J. (2016). Impact of 10-weeks of yoga practice on flexibility and balance of college athletes. *International Journal of Yoga*, *9*(1), 27. https://doi.org/10.4103/0973-6131.171710

Powers, D. V., Cramer, R. J., & Grubka, J. M. (2007). Spirituality, life stress, and affective well-being. *Journal of Psychology and Theology*, *35*(3), 235–243.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879–891. https://doi.org/10.3758/BRM.40.3.879

Prescott, D. S. (2015). Book review: Trauma-Sensitive Yoga in Therapy. *ATSA Forum*, *XXVII*(2).

Quintero, S., & Long, J. (2019). Toxic Positivity: The Dark Side of Positive Vibes. *The Psychology Group Fort Lauderdale*. https://thepsychologygroup.com/toxic-positivity/

Radhakrishnan, G. (2019). Effect of static asanas practices on core strength and balance among college students. *International Journal of Yogic, Human Movement and Sports Sciences*, *4*(1), 992-994.

Rama, S. (1983). *Inspired Thoughts of Swami Rama*. Himalayan Institute Press.

Rama, S., Ballentine, R., & Ajaya, S. (1976). *Yoga & Psychotherapy. The Evolution of Consciousness*. Himalayan Institute Press.

Rathore, M., Trivedi, S., Abraham, J., & Sinha, M. B. (2017). Anatomical Correlation of Core Muscle Activation in Different Yogic Postures. *International Journal of Yoga*, *10*(2), 59–66. https://doi.org/10.4103/0973-6131.205515

Raub, J. A. (2002). Psychophysiologic effects of Hatha Yoga on musculoskeletal and cardiopulmonary function: A literature review. *Journal of Alternative and Complementary Medicine (New York, N.Y.)*, *8*(6), 797–812. https://doi.org/10.1089/10755530260511810

Richards, K., Campenni, C., & Muse-Burke, J. (2010). Self-care and Well-being in Mental Health Professionals: The Mediating Effects of Self-awareness and Mindfulness. *Journal of Mental Health Counseling*, *32*(3), 247–264. http://essential.metapress.com/content/0N31V88304423806

Riley, K. E., & Park, C. L. (2015). How does yoga reduce stress? A systematic review of mechanisms of change and guide to future inquiry. *Health Psychology Review*, *9*(3), 379–396. https://doi.org/10.1080/17437199.2014.981778

Rishi, V. (2005). *Practical Yoga Psychology*. Yoga Publications Trust.

Rogers, C. (1951). *Client-centered therapy: Its current practice, implications and theory*. Constable.

Roland, K. P., Jakobi, J. M., & Jones, G. R. (2011). Does yoga engender fitness in older adults? A critical review. *Journal of Aging and Physical Activity*, *19*(1), 62–79. https://doi.org/10.1123/japa.19.1.62

Ross, A., Friedmann, E., Bevans, M., & Thomas, S. (2012). Frequency of yoga practice predicts health: Results of a national survey of yoga practitioners. *Evidence-Based Complementary and Alternative Medicine: ECAM*, *2012*, 983258. https://doi.org/10.1155/2012/983258

Ross, A., Friedmann, E., Bevans, M., & Thomas, S. (2013). National survey of yoga practitioners: Mental and physical health benefits. *Complementary Therapies in Medicine*, *21*(4), 313–323. https://doi.org/10.1016/j.ctim.2013.04.001

Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *Journal of Alternative and Complementary Medicine (New York, N.Y.)*, *16*(1), 3–12. https://doi.org/10.1089/acm.2009.0044

Safara, M., & Ghasemi, P. (2017). The Effectiveness of Yoga on Spiritual Intelligence in Air Traffic Controllers of Tehran Flight Control Center. *Journal of Education and Learning*, *6*(4), 276–284.

Sahay, G. S. (2013). *Hathayogapradipika of Svatmarama*. Morarji Desai National Institute of Yoga.

Saher, M., & Lindeman, M. (2005). Alternative medicine: A psychological perspective. *Personality and Individual Differences*, *39*(6), 1169–1178. https://doi.org/10.1016/j.paid.2005.04.008

Sarbacker, S. R. (2014). Reclaiming the Spirit through the Body: The Nascent Spirituality of Modern Postural Yoga. *Entangled Religions*, *1*, 95–114. https://doi.org/10.13154/er.v1.2014.95-114

Satyananda Saraswati, S. (2002). *Asana Pranayama Mudra Bandha*. Yoga Publications Trust.

Satyananda Saraswati, S. (2013). *Four Chapters on Freedom. Commentary on the Yoga Sutras of Sage Patanjali*. Yoga Publications Trust.

Scherwitz, L., Pullman, M., McHenry, P., Gao, B., & Ostaseski, F. (2006). A Contemplative Care Approach to Training and Supporting Hospice Volunteers: A Prospective Study of Spiritual Practice, Well-Being, and Fear of Death. *EXPLORE*, *2*(4), 304–313. https://doi.org/10.1016/j.explore.2006.04.001

Schmalzl, L., Powers, C., & Henje Blom, E. (2015). Neurophysiological and neurocognitive mechanisms underlying the effects of yoga-based practices: Towards a comprehensive theoretical framework. *Frontiers in Human Neuroscience*, *9*. https://doi.org/10.3389/fnhum.2015.00235

Schmalzl, L., Powers, C., Zanesco, A. P., Yetz, N., Groessl, E. J., & Saron, C. D. (2018). The effect of movement-focused and breath-focused yoga practice on stress parameters and sustained attention: A randomized controlled pilot study. *Consciousness and Cognition*, *65*, 109–125. https://doi.org/10.1016/j.concog.2018.07.012

Schubert, M. M., Clark, A. S., De La Rosa, A. B., & Newcomer, S. C. (2018). Heart rate and thermal responses to power yoga. *Complementary Therapies in Clinical Practice*, *32*, 195–199. https://doi.org/10.1016/j.ctcp.2018.07.003

Searle, J. R. (2007). Dualism revisited. *Journal of Physiology, Paris*, *101*(4–6), 169–178. https://doi.org/10.1016/j.jphysparis.2007.11.003

Seena, N. S., Suresh, S., & Ravindranadan, V. (2017). Emotional intelligence, spiritual intelligence and subjective well-being of yoga practitioners. *Indian Journal of Positive Psychology*, *8*(4), 577–582.

Sengupta, P. (2012). Health Impacts of Yoga and Pranayama: A State-of-the-Art Review. *International Journal of Preventive Medicine*, *3*(7), 444–458. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3415184/

Shapiro, D., & Cline, K. (2008). Mood Changes Associated with Iyengar Yoga Practices: A Pilot Study. *International Journal of Yoga Therapy*, *14*(1), 35–44. https://doi.org/10.17761/ijyt.14.1.47r6323xv20h786u

Sharma, R., Gupta, N., & Bijlani, R. L. (2008). Effect of yoga based lifestyle intervention on subjective well-being. *Indian Journal of Physiology and Pharmacology*, *52*(2), 123–131.

Sherman, S. A., Rogers, R. J., Davis, K. K., Minster, R. L., Creasy, S. A., Mullarkey, N. C., O'Dell, M., Donahue, P., & Jakicic, J. M. (2017). Energy Expenditure in Vinyasa Yoga Versus Walking. *Journal of Physical Activity and Health*, *14*(8), 597–605. https://doi.org/10.1123/jpah.2016-0548

Shields, S. A., Mallory, M. E., & Simon, A. (1989). The Body Awareness Questionnaire: Reliability and validity. *Journal of Personality Assessment*, *53*(4), 802. https://doi.org/10.1207/s15327752jpa5304_16

Shryack, J., Steger, M. F., Krueger, R. F., & Kallie, C. S. (2010). The structure of virtue: An empirical investigation of the dimensionality of the virtues in action Inventory of Strengths. *Personality and Individual Differences*, *48*(6), 714–719. https://doi.org/10.1016/j.paid.2010.01.007

Siegel, D. J. (2010). *Mindsight: The New Science of Personal Transformation* (Reprint edition). Bantam Books.

Siegel, R. D. (2014). *The Science of Mindfulness: A Research-Based Path to Well-Bein*. THE GREAT COURSES.

Simor, P., Petke, Z., & Köteles, F. (2013). Measuring pre-reflexive consciousness: The Hungarian validation of the Mindful Attention Awareness Scale (MAAS). *Learning & Perception*, *5*(s2), 17–29. https://doi.org/10.1556/LP.5.2013.Suppl2.2

Simpson, J. A., & Weiner, E. S. C. (1989). *The Oxford English Dictionary.* Clarendon Press; Oxford University Press.

Singleton, M. (2010). *Yoga Body: The Origins of Modern Posture Practice*. Oxford University Press.

Singleton, M. (2013). Transnational Exchange and the Genesis of Modern Postural Yoga. In B. Hauser (Ed.), *Yoga Traveling: Bodily Practice in Transcultural Perspective*. Springer.

Singleton, M., & Byrne, J. (Eds.). (2008). *Yoga In the Modern World: Contemporary Perspectives*. Routledge.

Sirois, F. M., Bann, C. M., & Walsh, E. G. (2018). The role of mind-body awareness in the outcomes of complementary and alternative medicine (CAM). *European Journal of Integrative Medicine*, *22*, 37–43. https://doi.org/10.1016/j.eujim.2018.07.008

Sivananda Yoga Vedanta Centre. (2008). *Yoga: Mind & Body*. Dorling Kindersley.

Smith, C., Hancock, H., Blake-Mortimer, J., & Eckert, K. (2007). A randomised comparative trial of yoga and relaxation to reduce stress and anxiety. *Complementary Therapies in Medicine*, *15*(2), 77–83. https://doi.org/10.1016/j.ctim.2006.05.001

Smith, J. A., Greer, T., Sheets, T., & Watson, S. (2011). Is there more to yoga than exercise? *Alternative Therapies in Health and Medicine*, *17*(3), 22–29.

Stec, K. (2020). Yoga and relaxation for promoting public health: A review of the practice and supportive research. *Biomedical Human Kinetics*, *12*(1), 133–140. https://doi.org/10.2478/bhk-2020-0017

Sterne, J. A., Savović, J., Page, M. J., Elbers, R. G., Blencowe, N. S., Boutron, I., Cates, C. J., Cheng, H.-Y., Corbett, M. S., & Eldridge, S. M. (2019). RoB 2: A revised tool for assessing risk of bias in randomised trials. *Bmj*, *366*.

Strand, S. L., Hjelm, J., Shoepe, T. C., & Fajardo, M. A. (2014). Norms for an isometric muscle endurance test. *Journal of Human Kinetics*, *40*, 93–102. https://doi.org/10.2478/hukin-2014-0011

Sullivan, M. B., Moonaz, S., Weber, K., Taylor, J. N., & Schmalzl, L. (2018). Toward an Explanatory Framework for Yoga Therapy Informed by Philosophical and Ethical Perspectives. *Alternative Therapies in Health and Medicine*, *24*(1), 38–47.

Suni, J. H., Husu, P., & Rinne, M. (2009). *Fitness for Health: The ALPHA-FIT Test Battery for Adults Aged 18-69. Tester's Manual. European Union, DG Sanco*. UKK Institute for Health Promotion Research.

Suni, J. H., Oja, P., Miilunpalo, S. I., Pasanen, M. E., Vuori, I. M., & Bös, K. (1998). Health-related fitness test battery for adults: Associations with perceived health, mobility, and back function and symptoms. *Archives of Physical Medicine and Rehabilitation*, *79*(5), 559–569. https://doi.org/10.1016/S0003-9993(98)90073-9

Swain, T. A., & McGwin, G. (2016). Yoga-Related Injuries in the United States From 2001 to 2014. *Orthopaedic Journal of Sports Medicine*, *4*(11), 2325967116671703. https://doi.org/10.1177/2325967116671703

Swartz, J. (2015). *The Essence of Enlightenment: Vedanta, the Science of Consciousness*. Sentient Publications.

Szabolcs, Z., Csala, B., Szabo, A., & Köteles, F. (2021). Psychological aspects of three movement forms of Eastern origin: A comparative study of aikido, judo and yoga. *Annals of Leisure Research*, *0*(0), 1–21. https://doi.org/10.1080/11745398.2020.1843507

Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology. (1996). Heart Rate Variability: Standards of Measurement, Physiological Interpretation, and Clinical Use. *Circulation*, *93*(5), 1043–1065. http://circ.ahajournals.org

Taylor, L. E. V., Stotts, N. A., Humphreys, J., Treadwell, M. J., & Miaskowski, C. (2013). A biopsychosocial-spiritual model of chronic pain in adults with sickle cell disease. *Pain Management Nursing: Official Journal of the American Society of Pain Management Nurses*, *14*(4), 287–301. https://doi.org/10.1016/j.pmn.2011.06.003

Theeboom, M., & De Knop, P. (1999). Asian Martial Arts and Approaches of Instruction in Physical Education. *European Journal of Physical Education*, *4*(2), 146–161. https://doi.org/10.1080/1740898990040204

Tihanyi, B. T., Böőr, P., Emanuelsen, L., & Köteles, F. (2016). Mediators between yoga practice and psychological well-being: Mindfulness, body awareness, and satisfaction with body image. *European Journal of Mental Health*, *11*(01–02), 112–127. https://doi.org/10.5708/EJMH.11.2016.1-2.7

Tihanyi, B. T., Ságí, A., Csala, B., Tolnai, N., & Köteles, F. (2016). Body awareness, mindfulness and affect: Does the kind of physical activity make a difference? *European Journal of Mental Health*, *11*(01–02), 97–111. https://doi.org/10.5708/EJMH.11.2016.1-2.6

Tihanyi, B. T., Ferentzi, E., Beissner, F., & Köteles, F. (2018). The neuropsychophysiology of tingling. *Consciousness and Cognition*, *58*, 97–110. https://doi.org/10.1016/j.concog.2017.10.015

Tolahunase, M. R., Sagar, R., Faiq, M., & Dada, R. (2018). Yoga- and meditation-based lifestyle intervention increases neuroplasticity and reduces severity of major depressive disorder: A randomized controlled trial. *Restorative Neurology and Neuroscience*, *36*(3), 423–442. https://doi.org/10.3233/RNN-170810

Tolnai, N., Szabó, Z., Köteles, F., & Szabo, A. (2016). Physical and psychological benefits of once-a-week Pilates exercises in young sedentary women: A 10-week longitudinal study. *Physiology & Behavior*, *163*, 211–218. https://doi.org/10.1016/j.physbeh.2016.05.025

Tomcsányi, T., Martos, T., Ittzés, A., Horváth-Szabó, K., Szabó, T., & Nagy, J. (2011). A Spirituális Transzcendencia Skála hazai alkalmazása: Elmélet, pszichometriai jellemzők, kutatási eredmények és rövidített változat. *Pszichológia*, *31*(2), 165–192. https://doi.org/10.1556/Pszicho.31.2011.2.5

Tóth-Soma, L. (2017). *Tradicionális jógairányzatok Magyarországon*. Magyar Jógaoktatók Szövetsége.

Tran, M. D., Holly, R. G., Lashbrook, J., & Amsterdam, E. A. (2001). Effects of Hatha Yoga Practice on the Health-Related Aspects of Physical Fitness. *Preventive Cardiology*, *4*(4), 165–170. https://doi.org/10.1111/j.1520-037x.2001.00542.x

Tyagi, A., & Cohen, M. (2016). Yoga and heart rate variability: A comprehensive review of the literature. *International Journal of Yoga*, *9*(2), 97–113. https://doi.org/10.4103/0973-6131.183712

Ueshiba, K. (1984). *The spirit of aikido. 1st ed*. Kodansha International.

Underwood, L. G., & Teresi, J. A. (2002). The Daily Spiritual Experience Scale: Development, theoretical description, reliability, exploratory factor analysis, and preliminary construct validity using health-related data. *Annals of Behavioral Medicine*, *24*(1), 22–33. https://doi.org/10.1207/S15324796ABM2401_04

Unterrainer, H.-F., Nelson, O., Mcgrath, J., & Fink, A. (2012). The English Version of the Multidimensional Inventory for Religious/Spiritual Well-Being (MI-RSWB-E): First Results from British College Students. *Religions*, *3*, 588–599. https://doi.org/10.3390/rel3030588

Vader, J.-P. (2006). Spiritual health: The next frontier. *European Journal of Public Health*, *16*(5), 457–457. https://doi.org/10.1093/eurpub/ckl234

Vadiraja, H. S., Rao, R., Nagarathna, R., Nagendra, H., Rekha, M., Vanitha, N., Kodaganur, G., Srinath, B. S., Vishweshwara, M. S., Madhavi, Y. S., Ajaikumar, B. S., Bilimagga, R., & Rao, N. (2009). Effects of yoga program on quality of life and affect in early breast cancer patients undergoing adjuvant radiotherapy: A randomized controlled trial. *Complementary Therapies in Medicine*, *17*, 274–280. https://doi.org/10.1016/j.ctim.2009.06.004

Van Puymbroeck, M., Schmid, A., Shinew, K. J., & Hsieh, P.-C. (2011). Influence of Hatha yoga on physical activity constraints, physical fitness, and body image of breast cancer survivors: A pilot study. *International Journal of Yoga Therapy*, *1*(21), 49–60. http://www.iaytjournals.org/doi/abs/10.17761/ijyt.21.1.n852143rv21x188u?code=iayt-site

Vasu, S. C. (1914). *Siva Samhita*. The Panini Office, Bhuvaneswari Asrama.

Veda Bharati, S. (1985). *Philosophy of Hatha Yoga*. Himalayan Institute India.

Vígh, B. (1972). *Jóga és tudomány*. Gondolat.

Vígh, B. (1985). *A jóga és az idegrendszer* (2.). Gondolat.

Vígh, B. (2007). *A jóga orvosi szemmel*. Alliter Kiadói és Oktatásfejlesztő Alapítvány.

Vivekananda, R. (2005). *Practical Yoga Psychology*. Yoga Publications Trust.

Vos, T., Carter, R., Barendregt, J., Mihalopoulos, C., Veerman, J. L., Magnus, A., Cobiac, L., Bertram, M. Y., Wallace, A. L., & ACE–Prevention Team. (2010). *Assessing cost-effectiveness in prevention: (ACE-Prevention) : final report*. University of Queensland, Brisbane and Deakin University. http://www.sph.uq.edu.au/bodce-ace-prevention

Wachholtz, A. B., & Pargament, K. I. (2005). Is spirituality a critical ingredient of meditation? Comparing the effects of spiritual meditation, secular meditation, and relaxation on spiritual, psychological, cardiac, and pain outcomes. *Journal of Behavioral Medicine, 28*(4), 369–384. https://doi.org/10.1007/s10865-005-9008-5

Wahlström, M., Rydell Karlsson, M., & Medin, J. (2018). Perceptions and experiences of MediYoga among patients with paroxysmal atrial fibrillation—An interview study. *Complementary Therapies in Medicine*, *41*, 29–34. https://doi.org/10.1016/j.ctim.2018.09.002

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063–1070. https://doi.org/10.1037/0022-3514.54.6.1063

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin*, *98*(2), 219–235.

Watson, D., Wiese, D., Vaidya, J., & Tellegen, A. (1999). The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence. *Journal of Personality and Social Psychology*, *76*(5), 820–838. https://doi.org/10.1037/0022-3514.76.5.820

Weiner, D. K., Duncan, P. W., Chandler, J., & Studenski, S. A. (1992). Functional reach: A marker of physical frailty. *Journal of the American Geriatrics Society*, *40*(3), 203–207.

Weninger, A. (1986). *Az idő partján – Jóga és személyiség*. Tankönyvkiadó.

Weninger, A. (1987). *A keleti jóga*. MÉDIA Kiadói Iroda.

Weninger, A. (1991). *Jóga a mindennapokban*. Nótárius Kiadó GMK.

West, J., Otte, C., Geher, K., Johnson, J., & Mohr, D. C. (2004). Effects of hatha yoga and african dance on perceived stress, affect, and salivary cortisol. *Annals of Behavioral Medicine*, *28*(2), 114–118. https://doi.org/10.1207/s15324796abm2802_6

Wheeler, P., & Hyland, M. E. (2008). The development of a scale to measure the experience of spiritual connection and the correlation between this experience and values. *Spirituality and Health International*, *9*(4), 193–217. https://doi.org/10.1002/shi.348

Wigglesworth, C., & Neal, J. (2013). Spiritual Intelligence. In *Handbook of Faith and Spirituality in the Workplace* (pp. 441–453). Springer New York. https://doi.org/10.1007/978-1-4614-5233-1_27

Wilber, K. (2011). *Eye to Eye: The Quest for the New Paradigm* (THIRD EDITION, REVISED). Shambala.

Yesudian, S., & Haich, E. (1992). *Sport és jóga*. Magyar Világ Kiadó.

Youkhana, S., Dean, C. M., Wolff, M., Sherrington, C., & Tiedemann, A. (2016). Yoga-based exercise improves balance and mobility in people aged 60 and over: A systematic review and meta-analysis. *Age and Ageing*, *45*(1), 21–29. https://doi.org/10.1093/ageing/afv175

Zinnbauer, B. J., Pargament, K. I., Cole, B., Rye, M. S., Butter, E. M., Belavich, T. G., Hipp, K. M., Scott, A. B., & Kadar, J. L. (1997). Religion and spirituality: Unfuzzying the fuzzy. *Journal for the Scientific Study of Religion*, *36*(4), 549–564. https://doi.org/10.2307/1387689

Zohar, D., & Marshall, I. (2001). *SQ: Connecting With Our Spiritual Intelligence*. Bloomsbury Publishing.

Appendices

Appendix 1

1.1. Jnana, karma and bhakti yoga

The path of jnana, karma, and bhakti yoga is unfolded in the Bhagavad Gita, which is one of the main yogic scriptures together with Patanjali Yoga Sutras and hatha yoga texts (Baktay, 1992; Michelis, 2005). Bhagavad Gita is also an essential sacred writing of Hindu religion and translations may have different misinterpretations of it. Though, it is a very pure teaching that reveals the truth through abstractions and practical methods (Michelis, 2005; Swartz, 2015). Bhagavad Gita gives various definitions of yoga and provides a nondualist understanding of life. As a part of jnana yoga, it explains that "the soul is never born, nor it ever dies; … is it unborn, eternal, everlasting and primeval; even though the body is slain, the soul is not" (Hari, 2014, p. 53.). The individual soul/self, the *atman* (or even called *jivatman*), is the same as the supreme, imperishable self, *Brahman,* and is eternal. It teaches the proper attitude of mind, not to get attached to the gain and loss, pleasure and pain, but keep equanimity of mind in case of both good and bad, since the true self is eternal and free of all these happenings. In yoga, renunciation does not mean renunciation of life or action, but the renunciation of the attachment to the fruits or outcomes of the actions. This is also called *karma yoga,* the art of proper action. This means that one takes a responsible life and performs his/her duties at best but does not get attached to or influenced by the results of them. This attitude of selfless action – knowing that I did everything I could, but the rest does not depend on me – can help with mental equilibrium. "He who sees inaction in action, and action in inaction, is a wise among men; he is a Yogi" (Hari, 2014, p. 101.). According to these teachings "perform your duties established in Yoga, renouncing attachment, and be even-minded in success and failure; evenness of mind is called Yoga" (Hari, 2014, p. 65.). The yoga of Bhagavad Gita teaches control over the body, the senses, the mind, and intellect. It says that "one's own self is one's friend, and one's own self in one's enemy" (Hari, 2014, p. 127.), referring to the fact that one needs conscious effort for keeping proper attitude of mind and create mental balance within. This can be achieved by making friendship with our own mental tendencies and thus cultivating them. "When your intellect … rest steady and undistracted in contemplation of God, you will attain Yoga (everlasting union with God)" (Hari, 2014, p. 67.). The devotional part of the teaching is the path of *bhakti yoga*. It appears hand in hand with jnana and karma yoga in form

of devotion to knowledge and action, in form of worship of the formless, eternal self. God is not a personalized entity but the supreme reality, the only truth, the ultimate self. Devotion is actually a desire for liberation, a trust in knowledge, in dharma, the universal law of life. Acting in the world with an attitude of devotion, gratitude, and self-surrender can quickly result in peace of mind and thus in attainment of oneness (Baktay, 1992; Hari, 2014; Swartz, 2015). Besides these elementary teachings, Bhagavad Gita gives also several practical advices, such as balanced diet and sleep, helping emotional states, and correct body posture for meditation (Hari, 2014). These are in line with the teachings of raja and hatha yoga.

1.2. The system of yoga together with Samkhya and Vedanta

The word Samkhya means to reckon, to count, or enumeration, and it was compiled by sage Kapila in the 6th century BCE. It describes the manifested, material world, and the process of creation. As a dualistic teaching it differentiates between *purusha* and *prakriti*, i.e., between pure consciousness and matter (Baktay, 1992; Héjjas, 2005; Satyananda Saraswati, 2013). These are symbolized by Shiva (one of the main God in Hinduism which represent supreme consciousness) and Shakti (personalized primordial cosmic energy), the male and the female energies. The creation happens through the division of prakriti into *akasa* (or mula prakriti), which is still uncreated and unmanifested matter, and *prana*, the driving or moving force of the universe. In creation, 24 tattvas, namely basic principles or elements materialize. Without going into details, as shortly mentioned above, this manifestation happens from the most subtle to the gross elements. Also, the *gunas*, the so-called qualities or modifications of matter play an important role in the process of creation and in the created world. These are: *sattva*, the guna of calmness, balance, order, and purity; *rajas*, the guna of activity, alertness, passion, and restlessness; *tamas*, which is the guna of darkness, dullness, inertia, and ignorance. The three gunas are present everywhere in our life and effect the body and the mind. Yoga aims to create sattvic states in order to achieve equilibrium and self-realization.

Yoga acknowledges and is based upon the teachings of Samkhya. Patanjali denotes in the second sutra "Yogaschitta vrtti nirodhah" (Satyananda Saraswati, 2013, p. 31.) which means that yoga is stopping of the patterns of the mind. If the mind is still then "the seer is established (abides) in his own essential nature" (Satyananda Saraswati, 2013, p. 40.). This implies that purusha realizes his own nature, namely the self realizes itself. For that, firstly, *viyoga* is needed which is the separation of purusha from prakriti, the seer from the seen, i.e., consciousness/awareness form the body-mind complex. After one understands this knowledge,

the individual self can be united with universal self, this union is *yoga*, the end of the path. This is actually the realization that there is only the pure consciousness, the oneness of all things (Satyananda Saraswati, 2013). This is already that state of non-duality, the teaching of Vedanta. The meaning of the word Vedanta is twofold. Veda means knowledge, and anta means end. Vedanta is in fact the end of the Vedas, the essence of them. On the other hand, it implies that it is the "end of the knowledge", the final teaching. Two prominent figures of (Advaita) Vedanta were Gaudapada in the 5th century CE and Adi Shankaracharya in the 8th century CE (Baktay, 1992; Héjjas, 2005). As mentioned before, according to Vedanta, there is only one reality, the supreme self/soul named *Brahman*. Everything is that *Brahman*, and everything derives from it. *Ishvara*, which can be called as "God", is also a part of *Brahman*, more precisely it is an outpouring force of it which has the power of creation. It can be understood as a more personalized God, however, it is still pure consciousness. In contrast to *Brahman*, which is non-dual, *Ishvara* is already one. As *Ishvara* comes forth and starts to create, the material world is projected, and the truth is veiled. This is maya, the illusion. Such as once the movie is projected, the white linen cannot be seen. As the movie, also the material world is only apparently real, the real is only *Brahman* (which of course, does not imply that the apparently real is not important) (Baktay, 1992; Héjjas, 2005; Swartz, 2015).

To sum it up, according to Samkhya "you are not that", referring to the fact, that you, namely your real self is not prakriti, that is not the body or not even the mind. However, you are pure consciousness. In contrast to Samkhya, Vedanta denotes "Tat tvam asi" which means "you are that", you are *Brahman*, the eternal self, which is "Sat chit ananda", that is truth, consciousness, and bliss. This is, however, cannot be understand by thinking or with intellectual knowledge, it can be comprehended only by personal experience which requires dedicated practice (Baktay, 1992; Héjjas, 2005).

1.3 Supplements to hatha yoga

The systematic form of hatha yoga emerged around the 6th - 9th century CE. However, the origin of hatha yoga might goes back to even earlier times, as scriptures such as some of the Upanishads and Puranas from around the 6th century BCE mention hatha yoga (Muktibodhananda, 1985). Even if hatha yoga existed in that era, it became prevalent around the middle or end of the first millennium, and incorporated elements of tantric practices and alchemy (Muktibodhananda, 1985; Sahay, 2013). Traditional hatha yogic texts arose a little later, the first writing is probably the Goraksa Sataka written by Gorkasa (or also referred to as

Gorakhnath or Gorkasanatha) who possibly lived around the 9th - 10th century CE. The most well-known scripture is Hatha Yoga Pradipika (H.Y.P.) compiled by Swatmarama dated in between the 12th – 14th century. Important later scriptures are, furthermore, the Shiva Samhita (15th-17th century CE), Hatharatnavali, and Gheranda Samhita (17th century CE) (Devereux, 1994; Muktibodhananda, 1985; Sahay, 2013; Singleton, 2010). They all describe the elements of hatha yoga slightly differently, they contain diverse steps/limbs and various numbers of the practices within a step/limb. However, they share the main principles and the most important practices imply asana, kriya, pranayama, mudra, bandha, and samadhi (Muktibodhananda, 1985; Sahay, 2013).

Asana:

According to mythical tradition, Shiva was the founder of yoga, who firstly thought the secrets of yoga to his wife, Parvati. It is a long and exciting story, however, concerning asana it is interesting to know, that Shiva showed to Parvati 84 asanas which are the best to attain raja yoga. (These were narrowed down from the 8.400.000 poses which represent the number of species or the incarnations every individual must pass) (Mallinson & Singleton, 2017; Sahay, 2013; Satyananda Saraswati, 2002).

Kriya:

Mostly six main purification processes are described*: dhauti, neti, basti, trataka, nauli* and *kapalabhati*. The last one is also often understood as a pranayama since it is a breathing technique. Also, there is one more specific breathing called *nadi shodana* (or named as *anuloma vilioma*) which aims to purify the nadis (Sahay, 2013; Satyananda Saraswati, 2002).

Pranayama:

The practice of pranayama operates on the pranic body. Pranamaya kosha consists of several *nadis, chakras*, as well as *granthis* (translated as knots) and *adharas* (focus points). It incorporates 5 major sub-pranas called *pancha prana* (*prana, apana, samana, udana, vyana*). Through pranayama, the nadis get purified and prana can be directed into susumna. If the serpent power of Kundalini is also aroused, the pranic flow can pierce the chakras and knots and reach sahasrara, the crown. Thus, the state of mental balance, stability and samadhi is achieved (Baktay, 1992; Bhalekar, 2017; Sahay, 2013; Satyananda Saraswati, 2002).

Mudras and bandhas:

Mudras and bandhas are practiced together with pranayama in order to direct the prana into susumna. There are four bandhas: *moola, uddiyana, jalandhara,* and *mahabandha*, namely the root lock, the abdominal lock, the throat lock, and the great lock which is simultaneous performance of the previous three. Both bandhas and mudras are very important for awakening

Kundalini, and, as prana entered susumna, these techniques help to pierce through the chakras and granthis. Hatha Yoga Pradipika describes ten mudras including the bandhas, while Gheranda Samhita introduces 25 of them (Mallinson, 2004; Sahay, 2013; Satyananda Saraswati, 2002).

Samadhi:

Hatha Yoga Pradipika names its fourth limb as *nadanushandhana* which refers to devotion to the internal sound of nada. This is a type of practice of laya yoga. Both hatha and laya end in the final aim of raja yoga, namely samadhi: "Just as salt, because of mixing in the water attains dissolution (oneness), similarly oneness of mind and soul is named Samadhi" (H.Y.P. Chapter 4., Verse 5.) (Sahay, 2013, p. 171.).

1.4 Alteration of yoga during the last 1.5 century

One of the most prominent figures of the alteration of yoga in the last 1.5 century was Swami Vivekananda. His mission is also called after his great guru as "Ramakrishna movement". In 1986 Swami Vivekananda published his book on raja yoga in which he conducted a revisitation of yoga history, different teachings, and beliefs and reformed the classical Hindu approach to broader definition and made it comprehensible without a religious attitude. This process happened with the help of both Eastern and Western professionals. After 1896, modern yoga started to flourish both in India and abroad (Hauser, 2013; Michelis, 2005; Singleton & Byrne, 2008).

This transnational exchange influenced postural aspects of yoga practice the most. Before modern time, asana was not prominent among yoga practices. Even if in hatha yoga there was a strong emphasis on the physical body, asana was just one of the main techniques. In contrast, nowadays yoga is often (mis)understood as asana practice (sometimes even neglecting any other theoretical or practical teachings of hatha yoga) (Singleton, 2010, 2013; Singleton & Byrne, 2008). Postural yoga began to develop at the beginning of the 19th century, some of the most important figures of this transformation were Swami Kuvalayananda, Shri Yogendra, and Tirumalai Krishnamacharya. Due to their work a renaissance of postural yoga as form of physical fitness and therapeutic practice emerged. This asana development was influenced by the international physical culture movement, Western science and medicine, and also interacted with Western therapeutic movement forms, dances, and spiritual trends (Singleton, 2010, 2013; Singleton & Byrne, 2008).

Swami Kuvalayananda and Shri Yogendra were students of the great guru, Paramahamsa Shri Madhvadasji who taught them mainly asana and pranayama. Swami Kuvalayananda established a teaching and research institute called Kaivalyadhama in Lonavla in 1921, while Shri Yogendra created The Yoga Institute in the neighborhood of Bombay in 1918. Both of them dedicated their lifes to link yoga and science and to corroborate the physiological health benefits of asana and other hatha yoga techniques. They created asana practice for general health of the public. They highly contributed to the spreading of asana practice both in fitness-oriented and therapeutic form (Singleton, 2013). With a little later start, Krishnamacharya was also a main character of the development of postural yoga. His main disciples were the well-known yoga teachers of the West, namely K. Pattabhi Jois, B. K. S. Iyengar, Indra Devi, and T. K. V. Desikachar. His most prominent years were between 1930-1960 in Mysore where he unfolded the most physicalized forms of yoga. Dynamic elements and repetitive sequences were created based upon an ancient script called Yoga Kurunta which may be truth or not. Nevertheless, the impact he made is unquestionable, many modern forms of yoga practices derive from his teachings: the most known *Iyengar-yoga* which is a proper alignment-based asana teaching started by B. K. S. Iyengar; *ashtanga vinyasa,* formed and taught by K. Pattabhi Jois; and other modern yoga styles, such as vinyasa flow, hatha flow, power yoga, and many other new trends. These began to flourish in the early 1990 in the USA (Singleton, 2010, 2013).

It is hard to highlight only some gurus of the 20th century, since many of them left major imprints in modern yoga history, and still leave huge impacts on several yoga practitioners around the globe. For example, Paramahamsa Yogananda was a great guru of the modern Kriya Yoga system who wrote the famous book entitled “Autobiography of a Yogi”. He spent several years in the USA and met Western sciences which he incorporated in his teachings (Singleton, 2013; Tóth-Soma, 2017). Also, e.g., Swami Rama spent several years in the Himalayas with his great guru, Bengali Baba and also studied and taught many years in Western countries. He aimed to build a bridge between ancient yoga and modern science. His yogic abilities were studied in the research laboratories of the Menninger Foundation in the USA. His intention was to serve humankind with the teachings of yoga. The institutions of Himalayan Yoga Tradition welcome people from all around the world regardless of religion, or any other orientation (Rama, 1978; Rama et al., 1976; Tóth-Soma, 2017). Similarly, following Swami Vivekanada’s initiative, Swami Sivananda denoted yoga as universal science and emphasized its service in humankind as a tool for peace and prosperity of the world (Singleton & Byrne, 2008).

In the 20th century many modern yoga traditions and yoga school has been formed. Some schools put more emphasis on the physical practice such as Iyengar yoga or ashtanga vinyasa yoga of K. P. Jois. Some traditions focus mainly on the mental level, for example, Ramana Maharishi's teachings, the early Transcendental Meditation of Maharishi Mahesh Yogi, Sri Chinmoy's teaching, or the Chinmaya Mission. Some of them emphasize equally philosophy and both physical and mental elements of practice, these are e.g., the Himalayan Yoga Institute, Kriya Yoga, Sivanada Yoga, Satyanda's Bihar School of Yoga, Kaivalyadhama Institute at Lonavla, or The Yoga Institute in Santacruz, Mumbai. Some schools or organizations have similarly integrative teaching, but they also incorporate denominational aspects, such as the ISKCON of Swami Prabhupada, Sahaja Yoga of Shri Mataji Nirmala Devi, or Kundalini yoga of Yogi Bhajan. The denominational aspect of these traditions is mostly not exclusive, it might be followed or not by the aspirants (Devereux, 1994; Michelis, 2005; Tóth-Soma, 2017).

These examples, of course, do not cover all of the modern traditions and yoga schools. There are also various modern yoga (asana) class forms which are taught individually without a particular background, such as simple hatha yoga, flow yoga, or yin yoga (Park et al., 2018). Besides, it is important to mention Bikram yoga which is a very sport-like yoga class. There are huge debates around its founder, Bikram, and his lucrative teachings. In a nutshell, from a yogic view of point, health benefits can be valued, however, probable misconceptions about yoga is also a relevant consequence of Bikram and Bikram yoga (Hauser, 2013; Michelis, 2005; Singleton, 2010; Singleton & Byrne, 2008).

To sum up, yoga, which was multifarious in appearance even in early times, showed a huge alteration through time, especially in the last 1.5 century. This is, however, not surprising. As the world, way of living and thinking of people, science, religions, and cultures change, so do yoga. In a way, it can be said that development and transformation of yoga is an adaptation of it to the changes of the society and people. Yoga gurus in the modern era adjusted the teachings to the challenges and difficulties of the modern lifestyle, as well as to globalization. A common concept among them was that yoga is important not only for the physical and mental health, and moral and spiritual progress of the individuals, but also for the nation and for the whole planet. Even if their work was pervaded with nationalist causes, they aimed to share the teachings and practice of yoga to serve humankind, facilitate universal brotherhood, and foster world peace and freedom. From this view of point, yoga stands as a methodology for living a good life individually and globally. These perspectives were present throughout the 20th century

and are present today. Many yoga intuitions and communities were created to share the teachings of yoga (Singleton & Byrne, 2008).

Reference not included in the main reference list

Rama, S. (1978). *Living with the Himalayan Masters*. Himalayan Institute Press.

Appendix 2

Longitudinal study Part 1 & 2

Yoga class plan of the 10 yoga sessions in general (1.5 hours each)

Yoga classes always followed the same sequence regarding the groups of asanas, however sessions varied across which specific asana was/asanas were included from the particular group. Sessions were always completely the same for the two different yoga groups.

Group/Type of asanas	Sepcific asana(s)
Crossed leg seated position	Sukhasana - inward focus, breath awareness *(always)*
Warming up exercises (Pawanamuktasana series)	movements of the joints: neck, wrist, elbow, shoulder, hip, knee, ankle - e.g.: Baddha Konasana *(5-7 short exercises)*
Marjari asana	cat-cow pose and its variations *(always)*
Sunsalutation	12 steps: 1. Pranamasana 2. Urdva Hastasana 3. Uttanasana 4. Ashwa Sanchalanasana 5. Kumbhakasana 6. Asthanga Namaskara 7. Bhujangasana 8. Parvatasana 9. Ashwa Sanchalanasana 10. Uttanasana 11. Urdva Hastasana 12. Pranamasana Hands and arms down, repetition with the other side. *(1 round from class 3; 2 rounds from class 6)*
Urdhva Mukha Svanasana, Adho Mukha Svanasana	*(from class 2)*
Standing poses	Tadasana, Uttkatasana, Uttanasana, Virabhadrasana 1., Parsvottanasana, Virabhadrasana 2., Parsvakonasana, Trikonasana, Parivritta Trikonasana, Prasaritta Padottanasana *(3-6 of these poses)*
Balancing postures	Vriksasana, Garudasana, Hasta Padangustanasa beginner version, Ardha

	Chandrasana, Vhirabadrasana 3., Natarajasana *(1-2 of these poses)*
Inversions *(only ocasionally)*	Shasnakasna *(class 4)*, Ardha Sirsasana *(classes 7, 8)* Sirsasana *(classes 9, 10)*
Prones poses	Ardha Shalabasana, Shalabasana variations, Bhujangasana, Saral Bhujangasana, Kapotasana, Dhanurasana *(1-2 of these poses)*
Forward bends and spine streches	Balasana, Paschimottanasana, Janu Sirsasana, Upavista Konasana, Arda Matsyendrasana, Gomukasana *(1-2 of these poses)*
Supine poses	abdominal poses: Navasana and variations, Purvottanasana, Setu Bhandasana, Ustrsasana, Pawanamuktasana, Supta Hasta Pandagustasana, Chakrasana *(1-2 of these poses)*
Inversions	Sarvangasana, Halasana, Matsyasana *(1-3 of these poses)*
Ending pose	Spinal twist and/or Ananda Balasana *(always)*
Savasana	Relaxation for 8-10 minutes *(always)*

Appendix 3

Applied questionaries in Longitudinal study Part 2 & Cross-sectional study

Introductory questions in Longitudinal study Part 2

Kora:
Jelenlegi egyetemi képzés (karikázza be a megfelelőt): BA MA
Befejezett szemeszterek száma:

Jelölje meg, hogy melyik leírás illik legjobban az általános aktivitási szintjére!
(1) Nem végez rendszeres szabadidő sporttevékenységet, legfeljebb csak alkalmanként sportol
(2) Heti 1-2 alkalommal végez szabadidős sporttevékenységet, heti max. 2 órában
(3) Heti 2-3 órát tölt sporttevékenységgel.
(4) Heti 4-5 órát sportol
(5) Versenyszerűen sportol vagy heti legalább 5 erős edzése van.

Amennyiben rendszeresen sportol, milyen mozgásformákat végez?

Jelölje meg, hogy az elmúlt három hónapban melyik leírás illett legjobban az aktivitási szintjére!
(1) Nem végez rendszeres szabadidő sporttevékenységet, legfeljebb csak alkalmanként sportol
(2) Heti 1-2 alkalommal végez szabadidős sporttevékenységet, heti max. 2 órában
(3) Heti 2-3 órát tölt sporttevékenységgel.
(4) Heti 4-5 órát sportol
(5) Versenyszerűen sportol vagy heti legalább 5 erős edzése van.

Volt már tapasztalata bármilyen spirituális tevékenységgel?
(pl. templom, testi tudatosság fejlesztése, tai chi, reiki, autogén tréning, relaxáció)

Ha igen, milyennel?

Ha jelenleg is gyakorolja ezt a spirituális tevékenységet, írja le, egy átlagos héten hány alkalommal?
Ha jelenleg is gyakorolja ezt a spirituális tevékenységet, írja le, egy átlagos alkalom hány percig tart?

Miért jelentkezett az órára?

Introductory questions in Cross-sectional study

1. életkor
2. nem
3. végzettség (alapfokú, középfokú, felsőfokú)
4. sorolja fel azt az öt dolgot, amiben érzése szerint fejlődött a jógázás hatására (nyílt kérdés)
5. jógaoktató? (igen/nem)
6. az utóbbi 4 hétben hetente átlagosan jógával töltött órák száma (óra/hét)
7. az utóbbi 4 hétben a jógázás átlagos gyakorisága (alkalom/hét)
8. mióta jógázik (év)
9. Végez rendszeresen más testmozgást? (igen/nem)
10. Ha igen, mit?
11. Milyen rendszerességgel? (alkalom/hét)

Body Awareness Questionnaire (BAQ)

Testi Tudatosság Kérdőív (BAQ)

Ez a kérdőív saját érzésekre és tapasztalatokra vonatkozó állításokat tartalmaz. Kérem, olvasson el figyelmesen minden állítást, majd jelölje be azt, hogy mennyire igaz Önre nézve. A számok a következőket jelentik:

Értékelés:
1: Egyértelműen nem igaz
2: Határozottan nem igaz
3: Inkább nem igaz
4: Nem tudom eldönteni
5: Inkább igaz
6: Határozottan igaz
7: Teljes mértékben igaz

1. Észre szoktam venni, hogyan reagál a testem a különböző ételekre.
2. Amikor megütöm magam, mindig meg tudom mondani, hogy lesz-e belőle horzsolás vagy nem.
3. Mindig tisztában vagyok azzal, hogy mikor erőltetem meg magam annyira, hogy másnap fájni fog.
4. Bizonyos ételek fogyasztását követően mindig megérzem az energiaszintemben beálló változásokat.
5. Már előre tudom azt, hogy influenzás leszek.
6. Lázmérés nélkül is meg tudom állapítani azt, hogy hőemelkedésem van.
7. Különbséget tudok tenni aközött, hogy az éhségtől vagy az alvás hiányától vagyok-e fáradt.
8. Előre pontosan tudom azt, hogy az alváshiány miatti fáradtság a nap melyik részében fog rám törni.
9. Tisztában vagyok az aktivitási szintem váltakozásának napi ritmusával.
*10. Nem tapasztalok szezonális változásokat a testi működéseimben.**
11. Már a reggeli ébredésnél tudom, hogy mennyi energiám lesz a nap folyamán.
12. Már lefekvéskor meg tudom mondani, hogy mennyire fogok jól aludni aznap éjjel.
13. Észreveszem magamon a kimerültség jól meghatározható testi jeleit.
14. Rendszerint észreveszem az időjárás-változásokra adott jellegzetes testi reakcióimat.

15. Előre meg tudom mondani, hogy mennyi alvásra van szükségem ahhoz, hogy frissen ébredjek.
16. Előre nagyon pontosan meg tudom mondani azt, hogy a sportolási szokásaim megváltozása milyen mértékben befolyásolja az energiaszintemet.
17. Úgy tűnik, létezik egy számomra optimális elalvási időpont.
18. Észreveszem a testem túlzott éhségre adott jellegzetes reakcióit.

Mindful Attention and Awareness Scale (MAAS)

Mentális Figyelem és Tudatosság Kérdőív

A következő állítások a mindennapi élményeivel kapcsolatosak. Használja az alábbi, 1-6-ig terjedő skálát annak eldöntésére, hogy milyen gyakran, vagy ritkán vannak mostanában ilyen élményei. Kérjük, azt a választ jelölje meg, amelyik valójában jellemző Önre, és ne azt, amelyet ideálisnak gondolna! Kérem, hogy minden állítást külön-külön vizsgáljon meg, függetlenül a többitől.

1	2	3	4	5	6
szinte mindig	nagyon gyakran	elég gyakran	elég ritkán	nagyon ritkán	szinte soha

1. Előfordul, hogy átélek bizonyos érzelmeket, úgy hogy azok csak később tudatosulnak bennem.
2. Előfordul, hogy figyelmetlenségből, vagy mert épp máshol jár az agyam, eltörök vagy kiöntök valamit
3. Nehezemre esik a jelen pillanatra koncentrálni.
4. Ha mennem kell valahová, igyekszem minél gyorsabban odaérni, anélkül hogy gondosan odafigyelnék az élményekre, amelyek az út során élnek.
5. Igyekszem figyelmen kívül hagyni a testi feszültség, rossz közérzet vagy kényelmetlenség érzését, amíg még nem elég erősek ahhoz, hogy teljesen lekössék a figyelmemet.
6. Előfordul, hogy szinte azonnal elfelejtem az emberek nevét, miután bemutatkoztak nekem.
7. Úgy tűnik, mintha olykor gépiesen viselkednék, anélkül, hogy tudatában lennék annak, mit is csinálok.
8. Folyton „rohanok a teendőim után”, anélkül, hogy valóban odafigyelnék rájuk.
9. Ha valamit el akarok érni, kizárólag a végső célra koncentrálok úgy, hogy néha észre se veszem, miket is művelek, csak, hogy az adott célt elérjem.
10. Automatikusan végzem el a feladataimat vagy a munkámat, anélkül, hogy valóban odafigyelnék arra, amit csinálok.
11. Előfordul, hogy csak fél füllel figyelek valakire, aki beszél hozzám, miközben valami egész mást csinálok.
12. Előfordul, hogy csak úgy céltalanul bolyongok, vagy vezetem az autóm egyik helyről a másikra, majd azon kapom magam, hogy nem tudom, miért is mentem oda, ahol vagyok.
13. Folyton a múltamon vagy a jövőmön rágódom.

14. Előfordul, hogy alig vagy egyáltalán nem figyelek arra, amit épp csinálok.
15. Megesik, hogy úgy eszegetek valami rágcsálni valót, hogy közben alig figyelek arra, hogy eszem.

Positive and Negative Affect Schedule (PANAS)

I-PANAS

Az alábbiakban felsorolt szavak különböző érzéseket és érzelmeket írnak le. Kérjük, olvasson el minden jellemzőt, majd jelölje be azt a választ, amely leginkább kifejezi azt, hogy ÁLTALÁBAN hogyan érzi magát!

	egyáltalán nem, vagy csak alig	kicsit	mérsékelten	eléggé	nagyon
érdeklődő					
kiborult, magamon kívül vagyok					
izgatott, feldobott					
zaklatott, feldúlt					
erős					
bűntudatom van					
rémült					
ellenséges					
lelkes					
büszke					
ingerlékeny					
éber					
megszégyenült					
elhivatott					
ideges					
elszánt, határozott					
figyelmes					
feszült					
aktív, élénk					
dühös					
félénk					

Short form of PANAS

Pozitív és Negatív Affektivitás Kérdőív (PANAS) - rövid

Az alábbiakban felsorolt szavak különböző érzéseket és érzelmeket írnak le. Kérjük, olvasson el minden jellemzőt, majd jelölje be azt a választ, amely leginkább kifejezi azt, hogy ÁLTALÁBAN hogyan érzi magát!

	egyáltalán nem, vagy csak alig	kicsit	mérsékelten	eléggé	nagyon
zaklatott, feldúlt					
ellenséges					
éber					
megszégyenült					
elhivatott					
ideges					
elszánt, határozott					
figyelmes					
félénk					
aktív, élénk					

Spiritual Connection Questionnaire (SCQ-14) – short form

Spirituális kapcsolat kérdőív (SCQ-14-H)

Az alábbiakban a spiritualitással kapcsolatos állításokat talál. Kérjük, minden egyes esetben döntse el azt, hogy mennyire ért vagy nem ért egyet az adott állítással és karikázza be a véleményével leginkább megegyező a számot. Nincsenek jó vagy rossz válaszok. Kérjük, ne hagyjon ki egyetlen állítást sem!

1: határozottan nem értek egyet
2: nem értek egyet
3: inkább nem értek egyet
4: nem tudom eldönteni
5: inkább egyetértek
6: egyetértek
7: határozottan egyetértek

1. A spiritualitás jobbá teszi az életemet
2. Nem érzem, hogy spirituális kapcsolatban lennék a körülöttem levő világgal
3. Időnként az az érzésem, mintha az emberekből egyfajta „belső fény” sugározna
4. Soha nem volt olyan spirituális élményem, ami megváltoztatta az életemet
5. Az élet egy nagyobb terv része
6. Nem érzem, hogy létezne valamilyen, az embereket összekötő energia
7. Érzem azt, hogy belső spirituális erőm van
8. Nincs személyes kapcsolatom valamiféle nálam nagyobb erővel
9. Érzem a másokkal való spirituális kapcsolatból származó belső erőt
10. A spiritualitás nem fontos számomra
11. Érzem, hogy mindig véd egy végső hatalom, erő vagy lény
12. Soha nem leszek senkivel spirituális kapcsolatban
13. Boldoggá tesz, hogy kapcsolódom valami spirituálishoz
14. Nem érzem azt, hogy bármiféle spirituális kapcsolatban lennék az univerzummal

Appendix 4

Tables of the Systematic review

Appendix 4.1

Evaluation of the risk of bias (in 5 domains and overall) in RCT studies using RoB 2.0 tool (Higgins et al., 2011)

Article	**Randomization process**	**Deviations from intended intervention**	**Missing Outcome data**	**Measurement of the outcome**	**Selection of reported result**	**Overall**
Danhauer et al., 2009	Low	Low	Low	Some	Some	Some
Lötzke et al., 2016	Low	Low	Low	Some	Some	Some
Moadel et al., 2007	Some	Low	High	Some	Some	High
Pandya, 2019	High	Low	Some	Some	Some	High
Safara & Ghasemi, 2017	Low	Low	Some	Some	Some	Some
Smith et al., 2011	Some	Low	High	Some	Some	High

Note. Low: Low concern, Some: Some concern, High: High concern.

Appendix 4.2

Evaluation of the risk of bias of cross-sectional studies with quantitative approach using JBI critical appraisal checklist for analytical cross-sectional studies (Moola et al., 2020)

Article	1.Were the criteria for inclusion in the sample clearly defined?	2. Were the study subjects and the setting described in detail?	3. Was the exposure measured in a valid and reliable way?	4. Were objective, standard criteria used for measurement of the condition?	5. Were confounding factors identified?	6. Were strategies to deal with confounding factors stated?	7. Were the outcomes measured in a valid and reliable way?	8. Was appropriate statistical analysis used?	**Yes %**	**No %**
Ahmad & Imtiaz, 2016	N	N	N	Y	N	N	Y	Y	37.5	62.5
Csala et al., 2017	N	Y	Y	Y	Y	Y	Y	Y	87.5	12.5
Dittmann & Freedman, 2009	Y	Y	Y	Y	N	N	Y	Y	75	25
Gaiswinkler & Unterrainer, 2016	Y	Y	Y	Y	Y	Y	Y	Y	100	0
Ivtzan & Jegatheeswaran, 2015	Y	Y	Y	Y	N	N	Y	Y	75	25
Ivtzan & Papantoniou, 2014	Y	N	Y	Y	N	N	Y	Y	62.5	37.5
Moliver et al., 2013	Y	Y	Y	Y	Y	Y	Y	Y	100	0
Monk-Turner & Turner, 2010	N	N	N	Y	N	N	Y	Y	37.5	62.5
Nandeesh et al., 2016	Y	N	N	Y	N	N	Y	Y	50	50
Park et al., 2016	Y	Y	Y	Y	N	N	Y	Y	75	25
Seena et al., 2017	Y	N	N	Y	N	N	Y	Y	50	50

Quilty et al., 2013	Y	Y	Y	Y	N	N	Y	Y	75	25

Note. Y: Yes, N: No. (No results of "Unclear" or "Not applicable").

Appendix 4.3
Summary of the articles with quantitative approach

Article	**Design**	**Sample size (yoga group)**	**Control group(s)**	**Sample condition, age, gender**	**Measurement tool**	**Type of yoga practice**	**Frequency of intervention/previous experience with yoga**	**Major findings**	**Origin of the study**
Ahmad & Imtiaz, 2016	cross-sectional	N=60	no	Participants from various Yoga Training Centers and Institutions of Delhi and NCR; mean age: NR, age between 35-60 yrs; gender: NR	Spirituality Scale (SS; Hardt et al., 2012), 4 subscales: 1. Belief in God, 2. Search for meaning, 3. Mindfulness, 4. Feeling of security	NR	NR	Among yoga practitioners, spirituality is not associated with avoidant and anxious attachment to God	India
Baker et al., 2015	longitudinal	N=49	no	Veterans with severe mental illness, with various previous experience of yoga; mean age: 61.4 yrs; 9.2% female	Bio Psycho-Social-Spiritual Scale (BPSS; no citation)	Yoga-based wellness classes: "Breathing, Stretching, Relaxation" (BSR) P, B, R	8 weeks; 3 different groups: short (< 30 min), medium (30-59 min), and long (> 60 min) classes	"Perceived benefits of yoga" is associated with spiritual well-being, class duration, duration of attendance, and frequency of attendance	USA
Büssing et al., 2012	longitudinal	N=160	no	Participants starting a 2-year yoga teacher training in Yoga Vidya Centers; mean age: 40.9 yrs; 91% female	Aspects of Spirituality (ASP; Büssing et al., 2010), 4 subscales: 1. Religious orientation: prayer/trust in God, 2. Search for insight/wisdom, 3. Conscious interactions/compassion, 4. Transcendence conviction	Intensive yoga practice: P, B, R, M, Ma, LS, RB, L	6 months; weekly 3-hour evening tutorial in small groups + intensive training weekends about every 2 months + 1 hour/day home practice	Increase in Conscious interactions/compassion, and Religious orientation: prayer/trust in God; marginal increase in Search for Insight/wisdom; no change in Transcendence conviction	Europe (Germany)
Csala et al., 2017	cross-sectional	N=85	no	Regular yoga practitioners;	Spiritual Connection Questionnaire (SCQ-	NR (postural yoga)	Average number of years of yoga practice 7.7;	Spirituality is associated with	Europe (Hungary)

				mean age: 43.8 yrs; 84.7% female	14; Wheeler and Hyland, 2008)		Average amount of yoga practice: 4.9 hours/week	regularity of yoga practice (hours/week)	
Danhauer et al., 2008	longitudinal	N=51	no	Women with ovarian or breast cancer (any stage; 61% actively undergoing cancer treatment); mean age: 58.9 yrs; 100% female	FACIT-Sp (Peterman et al., 2002), 2 subscales: 1. Sense of meaning/peace, 2. Role of faith	Restorative yoga: P, B, R + ahimsa emphasized	10 weeks; weekly 75 min class	No changes in spirituality	USA
Danhauer et al., 2009*	longitudinal	N=22	N=22, waitlist control	Women with breast cancer (any stage; 34% actively undergoing cancer treatment); mean age: 55.8 yrs; 100% female	FACIT-Sp (Peterman et al., 2002), 2 subscales: 1. Sense of meaning/peace, 2. Role of faith	Restorative yoga: P, B, R + ahimsa emphasized	10 weeks; weekly 75 min class	Improvement of Sense of meaning/peace in the yoga group	USA
Dittmann & Freedman, 2009; Study 1.	cross-sectional	N=129, 2 subgroups: G1: who practiced primarily for psychospiritual reasons N=99, G2: who practiced primarily for physical or appearance reasons N=30	no	Regular yoga practitioners in yoga and fitness centers; mean age: 47.4 yrs; 100% female	Spiritual Readiness Scale (established by the authors), 2 subscales: 1. Meaningfulness of ritual, 2. Importance of seeking	NR (postural yoga)	Average number of years of yoga practice: 12.1; at least 1 hour/week	Spirituality is higher in women practicing with psychospiritual reasons; spirituality is associated with Body Awareness, Body Responsiveness, Intuitive Eating, and Body Satisfaction	USA
Gaiswinkler & Unterrainer, 2016	cross-sectional	N=362, 3 subgroups according to Yoga Immersion Scale (YI-S):	N=93, gymnastics (mixed methods)	Regular yoga practitioners in yoga and fitness studios; mean age: 33.53 yrs; 90.3% female	Multidimensional Inventory for Religious/Spiritual Well-Being (MI-RSWB; Unterrainer et al., 2012),	Postural yoga: Hatha Yoga, Bikram Yoga, Ashtanga	Involvement with yoga is assessed by the Yoga Immersion Scale (YI-S)	Yoga immersion, i.e., duration and frequency, is associated with Religious/Spiritual Well-Being;	Europe (Austria)

		Y1: Yoga marginal N=111, Y2: Yoga moderate N=120, Y3: Yoga high N=131			6 subscales: 1. General religiosity, 2. Forgiveness, 3. Connectedness, 4. Hope immanent, 5. Hope transcendent, 6. Experiences of sense and meaning	Yoga, Iyengar Yoga, Karma Yoga, Hormone Yoga		Religious/Spiritual Well-Being is higher in practitioners with more practice	
Ivtzan & Jegatheeswaran, 2015	cross-sectional	N=235	no	Regular yoga practitioners; mean age: 40.25 yrs; 81.7% female	Motivation for yoga practice at beginning and continued: comparing physical fitness and spiritual motives	Various forms of hatha yoga (postural yoga)	Diverse range of yoga experience: Number of years of yoga practice: 11% for less than 1 year, 55% for up to 10 years, 23% for 10-20 years; Amount of yoga practice: 31% daily, 35% at least 3 times/week, 34% at least 1 time/week	Greater initial and continued physical intentions than spiritual intentions; spiritual intentions become more salient over time suggesting that Western yoga can cultivate spirituality; practitioners with spiritual intentions report higher psychological well-being	Europe (UK)
Ivtzan & Papantoniou, 2014	cross-sectional	N=124	no	Regular yoga practitioners and participants who had no experience with yoga; mean age: 40.65 yrs; 72.5% female	Meaning in Life Questionnaire (MLQ; Steger et al., 2006); Gratitude Questionnaire-Six Item Form (GQ-6) (McCullough et al., 2002)	Various forms of hatha yoga	82 regular practitioners: Number of years of yoga practice: 39% up to 1 year, 23% for 2 years, 38% more than 2 years; Amount of yoga practice: at least 2 times/week; 42 participants with no experience with yoga	Experience with yoga (number of years practicing yoga) is associated with Meaning in life and Gratitude	Europe (UK)

Lötzke et al., 2016*	longitudinal	N=45	N=47, conventional physical exercise	Women with breast cancer (stages I-III; 100% undergoing oncological treatment) (no previous experience with yoga); mean age: 51 yrs; 100% female	Spiritual Attitudes and Coping with Illness (SpREUK; Büssing et a., 2005), 3 subscales: 1. Search for support/access to spirituality/religiosity, 2. Trust in higher guidance/source, 3. Reflection: positive interpretation of disease	Regenerative Iyengar yoga: P, B	12 weeks; weekly 1 hour + 2 times/week 20 min home practice (guided by written instructions)	Increase of Reflection: positive interpretation of disease; decrease to initial level after 3 months; no differences between yoga and control group	Europe (Germany)
Moadel et al., 2007*	longitudinal	N=84	N=44, waitlist control	Women with breast cancer (stages I to III; 48% receiving oncological treatment: chemotherapy or antiestrogen therapy); mean age: 52.1 yrs; 100% female	FACIT-Sp (Peterman et al., 2002), 2 subscales: 1. Sense of meaning/peace, 2. Role of faith	Based on hatha yoga: P, B, M	12 weeks; weekly 1.5 hours class	No change in spirituality; among patients not receiving chemotherapy: deterioration of spirituality in control compared to yoga group	USA
Moliver et al., 2013	cross-sectional	N=211		Regular yoga practitioners over 45 years; mean age: NR; 100% female	The Subjective Well-Being Inventory - Transcendence subscale (SUBI-T; Sell, 1994)	Hatha yoga: P, B, R, M	Average number of years of yoga practice: NR; Average amount of yoga practice: 4.21 hours/week and 2.56 hours/week of seated meditation	Transcendence is most strongly associated with frequency of current yoga practice, furthermore with total lifetime hours and total calendar years spent in yoga	USA
Monk-Turner & Turner, 2010	cross-sectional	N=61	N=126, non-yoga practitioners	Regular yoga practitioners over 18 yrs; mean age: NR; 62% female in the total sample, 77%	Body, Mind, Spirit Wellness and Characteristic Inventory (BMS-WBCI; Hey et al., 2006)	Hatha yoga	Regular practitioners, further details NR	Group differences in 5 out of 9 items: yoga practitioners are more likely to (1) express their spirituality appropriately and in healthy ways, (2)	USA

				female in the yoga group				recognize the positive contribution faith could make to the quality of life, (3) routinely undertake new experiences to enhance spiritual health, (4) have a positive outlook on life, and (5) experience happiness within	
Nakau et al., 2013	longitudinal	N=22	no	Breast and lung cancer patients (varied stages; 0% actively undergoing cancer treatment); mean age: 58.1 yrs; 82% female	FACIT-Sp (Peterman et al., 2002), 2 subscales: 1. Sense of meaning/peace, 2. Role of faith	Yoga practice: P, B, R, M (as a part of integrated therapy)	12 weeks; weekly 1.5 hours yoga session + daily video guided home practice	Increased spiritual well-being at the end of the intervention	Japan
Nandeesh et al., 2016	cross-sectional	N=80	no	Regular yoga practitioners; mean age: 40.5 yrs; 50% female	FACIT-Sp (Peterman et al., 2002), 2 subscales: 1. Sense of meaning/peace, 2. Role of faith	NR	Number of years of yoga practice: at least one year	Among yoga practitioners, spirituality shows negative correlation with depression, anxiety and stress	India
Pandya, 2017	longitudinal	N=1914	no	Participants of Raja Yoga spiritual program of the Brahmakumaris across nine countries; mean age: NR, over 20 yrs; 53.3% female	Spirituality Index of Wellbeing Scale (SIWS; Daaleman & Frey, 2004)	Raja yoga: reading of literature, listening to talks/lectures, watching meditation videos, and self-practice M, LS, RB, L, Ma	One year; Raja Yoga courses on a regular basis	Increased spiritual well-being after program participation	India

Pandya, 2018; Part 1.	longitudinal	N=744	no	Auroville spiritual community residents; Post intervention mean age: 42.7 yrs; 70% female	Scale for existential thinking (SET; Allan & Shearer, 2012); Aspirations Index (AI; Kasser & Ryan, 1996), 2 subscales: 1. Extrinsic aspirations of wealth, fame and image, 2. Intrinsic aspirations of meaningful relationships; Existential Anxiety Questionnaire (EAQ; Weems et al., 2004); Daily Spiritual Experiences Scale (DSES; Underwood & Teresi, 2002); Worldview Scale (WS; De Witt, 2013)	Integral yoga of Sri Aurobindo LS	10 years; residence in Auroville spiritual community	Increased levels of existential thinking, aspirations, spiritual experiences and integrative worldview, and decreased level of existential anxieties after 10 years of residence	India
Pandya, 2019*	longitudinal	N=3488	N=3488, no intervention	Members of four guru-led new religious movements (Chinmaya Mission, Mata Amritanandamayi Mission, the Art of Living Foundation, and the Isha Foundation); Pre intervention mean age: 42,4 yrs; 55.8% female	Daily Spiritual Experiences Scale (DSES; Underwood & Teresi, 2002); Religious Commitment Inventory-10 (RCI-10; Worthington et al., 2003)	Customized Facebook yoga lessons: P, B, R, M, RB, L	3 years; daily spiritual messages + 30 min audio or video yoga lesson 1 time/week, + daily home practice	Increased level of spiritual experiences and religious commitment compared to control group at the end of the intervention; strongest predictor of positive outcomes was regular self-practice	India
Park et al., 2016	cross-sectional	N=516, 2 subgroups:	no	Regular yoga practitioners;	Motives for adopting and maintaining yoga practice	Various forms of hatha yoga	Average number of years of yoga practice: 8.41 for	Primary reasons for adopting yoga practice are exercise,	USA

		Yoga teachers: N=156, Yoga students: N=360		mean age: 43.9 yrs; 88.9% female			students, 13.16 for teachers; Average amount of yoga practice: 5.5 hours/week for students, 9.03 hours/week for teachers	flexibility, and stress relief, and top changed primary reason is spirituality for both students and teachers; spirituality is a reason for maintaining practice	
Safara & Ghasemi, 2017*	longitudinal	N=20	N=20, no intervention	Male air traffic controllers in Tehran flight control center; mean age: NR, age between 25-40 yrs; 0% female	Spiritual Intelligence Self-Report Inventory (SISRI; King & DeCicco, 2009), 4 subscales: 1. Critical existential thinking, 2. Production of personal meaning, 3. Transcendental consciousness, 4. Expanded state of consciousness	Yoga exercise	8 weeks; 2.5 hours classes 2 times/week + 1 hour/day home practice (½ hour in the morning and ½ hour in the evening)	All aspects of spiritual intelligence increased in the yoga group compared to the control group	Iran
Scherwitz et al., 2006	longitudinal	N=46	no	two Zen hospice volunteer cohorts, out of them 21 yoga practitioners; mean age: 41 yrs; 76% female	FACIT-Sp (Peterman et al., 2002), 2 subscales: 1. Sense of meaning/peace, 2. Role of faith; Self-Transcendence Survey (Reed, 1991)	Hatha yoga	No yoga intervention (training program for beginning hospice volunteers)	Yoga practitioners have consistently lower fear of death than the group average	USA
Seena et al., 2017	cross-sectional	N=60	N=60, non-yoga practitioners	Regular yoga practitioners; mean age: NR, age between 25-50 yrs; 43.3% female	Spiritual Intelligence Self-Report Inventory (SISRI; King & DeCicco, 2009), 4 subscales: 1. Critical existential thinking, 2. Production of personal meaning, 3. Transcendental consciousness, 4. Expanded state of consciousness	NR	Number of years of yoga practice: 3 or more years of practice	Higher level of Spiritual Intelligence in all dimensions of Spiritual Intelligence among yoga practitioners compared to control	India

Smith et al., 2011*	longitudinal	N=43, 2 subgroups: G1: Integrated Yoga N=33, G2: Yoga-as-exercise N=10	N=26, no intervention	Undergraduate students; mean age: 21.2 yrs; 50.5% female	Herth Hope Scale (HHS; Herth, 1992)	Hatha yoga: P, B, R, M, and homework; G1: Meditation with yamas and niyamas of yogic philosophy, G2: Meditation using mindful breathing	7 weeks; 1-hour classes 2 times/week	Increased level of hope in both yoga groups compared to control	USA
Quilty et al., 2013	cross-sectional	N=604	no	Adults enrolled in a 4-week beginner yoga program (BYP); median age: 35.5 yrs; 86% female	Use of yoga in a real-world setting: perceptions of yoga, motives for yoga practice	Enrolled in BYP of three styles: hatha, kundalini, and ashtanga	Beginners or retuners starting a 4-week program	73% endorse yoga as a spiritual activity; for 37% of the respondents seeking a spiritual experience is a reason to start or return to yoga (the fourth reason after general wellness, physical exercise, and stress management)	USA

Note. NR: not reported; P: posture; B: breathing exercise; R: relaxation; M: meditation; LS: lifestyle advice; RB: reading books, manuals, or other teachings; L: lectures on philosophy; Ma: mantras; FACIT-Sp: Functional Assessment of Chronic Illness Therapy - Spiritual Well-Being Scale; *: study with randomized design

Appendix 4.4
Summary of the articles with qualitative approach

Article	Design	Sample size (yoga group)	Control group(s)	Sample condition, age, gender	Measurement tool	Type of yoga practice	Frequency of intervention/previous yoga experience	Major findings	Origin of the study
Dittmann & Freedman, 2009; Study 2.	cross-sectional	N=18	no	Regular yoga practitioners from yoga and fitness centers; mean age: NR, age between 23-62 yrs; 100% female	15-minute recorded phone interview: how yoga practice affected spirituality, and how spirituality affected eating and body image attitudes	NR (postural yoga)	Average number of years of yoga practice: 12.1; at least 1 hour/week	Positive changes in sense of spirituality; yoga is a method for spiritual growth	USA
Griera, 2017	longitudinal	N=56	no	Prisoners (time spent in prison M=2.25 yrs); mean age: 38.2 yrs; 16% female	Surveys (N=56) and interviews (N=25) of the impact, meaning, and implications of yoga practice in prison	Holistic program: Kundalini yoga based physical practice, and suggestion for yoga philosophy literature P, B, R, M, RB, Ma	"yoga quarantine": 40 days, 2-3 hours/day; "yoga intensive": 2 months, 2 hours/3 times a week	Yoga is different from other form of movements: 1. Divine and transcendent experiences (feeling of freedom, silence, connectedness) 2. Brings an expansive spiritual semantic framework of life, it is a means of self-improvement 3. Offers a transcendent layer of reality	Europe (Spain)
Hasselle-Newcombe, 2005	cross-sectional	N=188	no, but compared to data of general UK population	Regular Iyengar yoga practitioners; mean age: 47 yrs; 84% female	17 pages long questionnaire: multiple choice, Likert scale questions and qualitative comments on aspects of yoga	Iyengar yoga (postural yoga)	Number of years of yoga practice: between 11 and 15; Average amount of yoga practice: 1 class/week + home	Long-term practitioners are no more likely to have a spiritual interest in their practice than beginners;	Europe (UK)

					practice which are not directly relevant to spirituality, reasons why people begin and continue to practice yoga, perceived effects of yoga		practice 3–5 hours/week	yoga gives sense of meaning to life in 85% of practitioners; 83% of yoga practitioners have a spiritual life compared to 45% of the general UK population; concept of God associated with spirituality and not religiosity; spirituality: experience of 'imminence', inward looking, mundane, but very personal experiences of holiness	
Lewis, 2008	cross-sectional	N=9	no	Regular vinyasa yoga practitioners; mean age: NR; gender: NR	Loosely structured interviews with a focus on motivational factors for yoga practice	Vinyasa yoga (postural yoga)	NR	Enmeshed social, psychological, physical and spiritual meanings and motivations to continue yoga practice; motivation changes with time: originally to achieve the perfect 'yoga body', later deeper mental and spiritual motivation	USA

Ness & Briles, 2016	cross-sectional	N=11	no	Yoga instructors; mean age: NR; 82% female	In-depth, semi-structured interviews about the traditional spirituality of yoga	Trained yoga teachers in various hatha yoga styles	NR	Lack of spirituality in westernized yoga; importance of meditation and yoga philosophy for spiritual progress; practice is the key to entering into yoga spirituality	USA
Pandya, 2018; Part 2.	longitudinal	N=19	no	Auroville spiritual community residents; Post intervention mean age: 44 yrs; 31,6% female	In-depth interview: open-ended questions about life and existence, aspirations, fears and anxieties, and spiritual experiences	Integral yoga of Sri Aurobindo LS	10 years, NR	Increased level of existential thinking, spiritual inclinations and integrative worldview after 10 years of residence; important aspects: philosophical teachings, consecration, meditation, prayer, and social support	India
Wahlström et al., 2018*	longitudinal	N=12	N=44, relaxation group N=44, only standard treatment	Patients with symptomatic paroxysmal atrial fibrillation; mean age: 63.5 yrs; 41.6% female	Individual semi-structured interviews on how participants experienced therapeutic yoga	MediYoga (therapeutic yoga derived from Kundalini yoga) P, R, M	12 weeks, weekly 1 hour + encouraged to perform MediYoga at home with CD-record	Yoga participants' perceptions and experiences: 1. A sense of existence and presence – experience of more inner peace, 2. Increased awareness of connection of physical and mental functions	Europe (Sweden)

Note. NR: not reported; P: posture; B: breathing exercise; R: relaxation; M: meditation; LS: lifestyle advice; RB: reading books, manuals, or other teachings; Ma: mantras; *: study with randomized design.

Appendix 4.5

Summary of the articles between 2020-2021 (all with quantitative approach)

Article	**Design**	**Sample size (yoga group)**	**Control group(s)**	**Sample condition, age, gender**	**Measurement tool**	**Type of yoga practice**	**Frequency of intervention/previous experience with yoga**	**Major findings**	**Origin of the study**
Bringmann et al., 2021	longitudinal	N=20	no	Patients with a current diagnosis of a mild or moderate depressive episode; mean age: NR; 88% female	Aspects of Spirituality (ASP; Büssing et al., 2010), 4 subscales: 1. Religious orientation: prayer/trust in God, 2. Search for insight/wisdom, 3. Conscious interactions/compassion, 4. Transcendence conviction	Meditation Based Lifestyle Modification (MBLM) - a complex mind-body intervention: P, B, R, MLS, RB, L (yama, niyama emphasized), Ma	8 weeks, weekly 3-hour class + 45 min daily home practice recommended	Increase in Search for Insight/wisdom, but no changes in the other 3 subscales at the end of the intervention	Europe (Germany)
Bryan et al., 2021	longitudinal	N=8	no	Cancer survivors; mean age: 61 yrs; 87.5% female	FACIT-Sp (Peterman et al., 2002), 3 subdomains: meaning, peace, and faith; 2 open-ended questions	Gentle yoga and mindfulness meditation: P, B, R, M	10 weeks; 45 min classes 2 times/week	Increased spiritual well-being at the end of the intervention; increased levels of meaning and faith, but no changes in peace; reported spiritual perceptions: peaceful, tranquil, opportunity for prayer, spiritually connected	USA
Büssing et al., 2021	cross-sectional	N=901	no	Regular yoga practitioners; mean age: 49 yrs; 89% female	Interpretation of yoga; Yama/Niyama Questionnaire (YaNiQ; Büssing et al., 2021)	Various forms of yoga: 88% Yoga Vidya	Average number of years of yoga practice: 13, Average amount of yoga practice 55% several times/week;	Yoga as a spiritual path for 78%; Participants' perspectives on their practice whether it is seen as gymnastics or	Europe (Germany)

							31% daily; 11% once/week, 3% less than once/week	spiritual path influence yama/niyama scores: participants regarding yoga as a spiritual path have higher scores for (1) Devotion/Self-Reflection/Contentment, (2) Restrain/Truthfulness/Self-Discipline, and (3) Non-Possessiveness, but not for (4) Non-Harming	
Cartwright et al., 2020	cross-sectional	N= 2434	no	Adult UK residents practicing yoga within the previous 12 months; mean age: 48.7 yrs; 87.3% female	Motivation for yoga practice	Various forms of hatha yoga	Average number of years of yoga practice: 13.9; Average amount of yoga practice: 5.52 hours/week	Initial reasons were general wellness (39%), fitness (19%) and flexibility (8.5%); most notable change in spirituality over time: recent spiritual motivation 21%	Europe (UK)
Csala et al., 2020	longitudinal	N=50, 2 subgroups: Sport group (physical aspect emphasized): N=27, Spiritual group (philosophical and spiritual contents included): N=23	N=34, no intervention	Beginner female students; mean age: 22 yrs, 100% female	Spiritual Connection Questionnaire (SCQ-14; Wheeler and Hyland, 2008)	Beginner hatha yoga; Sport group: P, B, R; Spiritual group: P, B, R, Phi, Ma	10 weeks; weekly 1.5 hours class, no home practice	No differences between the two yoga groups; Increased spiritual connection in the merged yoga group compared to control at the end of the intervention	Europe (Hungary)

Park et al., 2020	interventional	N=144	no	Regular yoga practitioners (average number of years of yoga practice: 7.1); mean age: 40 yrs; 78% female	Psychological resources: Self-Transcendence Subscale of the Temperament and Character Inventory (STS; MacDonald & Holland, 2002); Peace subscale of FACIT-Sp (Canada et al., 2008)	11 forms of hatha yoga: included components measured by Essential Properties of Yoga Questionnaire (EPYQ; Park et al., 2018)	1-hour long single yoga session	Increased self-transcendence and spiritual peace after yoga class independently of style; both changes in self-transcendence and spiritual peace favorably correlated with changes in emotions; higher levels of warmth and friendliness of the yoga teacher correlate with increased self-transcendence	USA

Note. NR: not reported; P: posture; B: breathing exercise; R: relaxation; M: meditation; LS: lifestyle advice; RB: reading books, manuals, or other teachings; Phi: philosophy, L: lectures on philosophy; Ma: mantras; FACIT-Sp: Functional Assessment of Chronic Illness Therapy - Spiritual Well-Being Scale.

Appendix 5

List of spirituality questionnaires used by the analyzed studies of the Systematic review (numbers indicate the number of studies which include the given questionnaire)

- Functional Assessment of Chronic Illness Therapy - Spiritual Well-Being Scale (FACIT-Sp) (Peterman et al., 2002) (6)
- Spiritual Attitudes and Coping with Illness (SpREUK) (Büssing et al., 2005) (1)
- Religious Commitment Inventory-10 (RCI-10) (Worthington et al., 2003) (1)
- Spiritual Intelligence Self-Report Inventory (SISRI) (King & DeCicco, 2009) (2)
- Self-Transcendence Survey (Reed, 1991) (1)
- Spiritual Connection Questionnaire (SCQ-14) (Wheeler & Hyland, 2008) (1)
- Daily Spiritual Experiences Scale (DSES) (Underwood & Teresi, 2002) (2)
- Gratitude Questionnaire-Six Item Form (GQ-6) (McCullough et al., 2002) (1)
- Herth Hope Scale (HHS) (Herth, 1992) (1)
- Aspirations Index (AI) (Kasser & Ryan, 1996) (1)
- Scale for Existential Thinking (SET) (Allan & Shearer, 2012) (1)
- Existential Anxiety Questionnaire (EAQ) (Weems et al., 2004) (1)
- Worldview Scale (WS) (De Witt, 2013) (1)
- Meaning in Life Questionnaire (MLQ) (Steger et al., 2006) (1)
- Spiritual Readiness Scale (Dittmann & Freedman, 2009) (1)
- Spirituality Scale (SS) (Hardt et al., 2012) (1)
- Aspects of Spirituality (ASP) (Büssing et al., 2010) (1)
- Spirituality Index of Wellbeing Scale (SIWS) (Daaleman & Frey, 2004) (1)
- Body, Mind, Spirit Wellness and Characteristic Inventory (BMS-WBCI) (Hey et al., 2006) (1)
- Bio-Psycho-Social-Spiritual Scale (BPSS) no citation (1)
- Multidimensional Inventory for Religious/Spiritual Well-Being (MI-RSWB) (Unterrainer et al., 2012) (1)
- The Subjective Well-Being Inventory- Transcendence subscale (SUBI-T) (Sell, 1994) (1)

References

Allan, B., & Shearer, B. (2012). The Scale for Existential Thinking. *International Journal of Transpersonal Studies*, *31*, 21–37. https://doi.org/10.24972/ijts.2012.31.1.21

Büssing, A., Föller-Mancini, A., Gidley, J., & Heusser, P. (2010). Aspects of spirituality in adolescents. *International Journal of Children's Spirituality*, *15*(1), 25–44. https://doi.org/10.1080/13644360903565524

Büssing, A., Ostermann, T., & Matthiessen, P. F. (2005). Role of religion and spirituality in medical patients: Confirmatory results with the SpREUK questionnaire. *Health and Quality of Life Outcomes*, *3*(1), 10. https://doi.org/10.1186/1477-7525-3-10

Daaleman, T. P& F., rey, B. B. (2004). The Spirituality Index of Well-Being: A New Instrument for Health-Related Quality-of-Life Research. *Annals of Family Medicine*, *2*(5), 499–503. https://doi.org/10.1370/afm.89

De Witt, A. (2013). Worldviews and Their Significance for the Global Sustainable Development Debate. *Environmental Ethics*, *35*, 133–162. https://doi.org/10.5840/enviroethics201335215

Dittmann, K. A., & Freedman, M. R. (2009). Body Awareness, Eating Attitudes, and Spiritual Beliefs of Women Practicing Yoga. *Eating Disorders*, *17*(4), 273–292. https://doi.org/10.1080/10640260902991111

Hardt, J., Schultz, S., Xander, C., Becker, G., & Dragan, M. (2012). The Spirituality Questionnaire: Core Dimensions of Spirituality. *Psychology*, *3*, 116–122. https://doi.org/10.4236/psych.2012.31017

Herth, K. (1992). Abbreviated instrument to measure hope: Development and psychometric evaluation. *Journal of Advanced Nursing*, *17*(10), 1251–1259. https://doi.org/10.1111/j.1365-2648.1992.tb01843.x

Hey, W. T., Calderon, K. S., & Carroll, H. (2006). Use of body-mind-spirit dimensions for the development of a wellness behavior and characteristic inventory for college students. *Health Promotion Practice*, *7*(1), 125–133. https://doi.org/10.1177/1524839904268525

Kasser, T., & Ryan, R. (1996). *Further Examining the American Dream: Differential Correlates of Intrinsic and Extrinsic Goals*. https://doi.org/10.1177/0146167296223006

King, D., & DeCicco, T. (2009). A Viable Model and Self-Report Measure of Spiritual Intelligence. *International Journal of Transpersonal Studies*, *28*, 68–85. https://doi.org/10.24972/ijts.2009.28.1.68

McCullough, M. E., Emmons, R. A., & Tsang, J.-A. (2002). The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*, *82*(1), 112–127. https://doi.org/10.1037/0022-3514.82.1.112

Peterman, A. H., Fitchett, G., Brady, M. J., Hernandez, L., & Cella, D. (2002). Measuring spiritual well-being in people with cancer: The functional assessment of chronic illness therapy--Spiritual Well-being Scale (FACIT-Sp). *Annals of Behavioral Medicine: A Publication of the Society of Behavioral Medicine*, *24*(1), 49–58. https://doi.org/10.1207/S15324796ABM2401_06

Reed, P. G. (1991). Self-transcendence and mental health in oldest-old adults. *Nursing Research*, *40*(1), 5–11.

Sell, H. (1994). The Subjective Well-Being Inventory (SUBI). *International Journal of Mental Health*, *23*(3), 89–102. https://doi.org/10.1080/00207411.1994.11449289

Steger, M. F., Frazier, P., Oishi, S., & Kaler, M. (2006). The meaning in life questionnaire: Assessing the presence of and search for meaning in life. *Journal of Counseling Psychology*, *53*(1), 80–93. https://doi.org/10.1037/0022-0167.53.1.80

Underwood, L. G., & Teresi, J. A. (2002). The Daily Spiritual Experience Scale: Development, theoretical description, reliability, exploratory factor analysis, and preliminary construct validity using health-related data. *Annals of Behavioral Medicine*, *24*(1), 22–33. https://doi.org/10.1207/S15324796ABM2401_04

Unterrainer, H.-F., Nelson, O., Mcgrath, J., & Fink, A. (2012). The English Version of the Multidimensional Inventory for Religious/Spiritual Well-Being (MI-RSWB-E): First Results from British College Students. *Religions*, *3*, 588–599. https://doi.org/10.3390/rel3030588

Weems, C. F., Costa, N. M., Dehon, C., & Berman, S. L. (2004). Paul Tillich's theory of existential anxiety: A preliminary conceptual and empirical examination. *Anxiety, Stress & Coping: An International Journal*, *17*(4), 383–399. https://doi.org/10.1080/10615800412331318616

Wheeler, P., & Hyland, M. E. (2008). The development of a scale to measure the experience of spiritual connection and the correlation between this experience and values. *Spirituality and Health International*, *9*(4), 193–217. https://doi.org/10.1002/shi.348

Worthington, E., Wade, N., Hight, T., Ripley, J., Mccullough, M., Berry, J., Schmitt, M., Berry, J., Bursley, K., & O'Connor, L. (2003). The Religious Commitment Inventory—10: Development, Refinement, and Validation of a Brief Scale for Research and Counseling. *Journal of Counseling Psychology*, *50*, 84–96. https://doi.org/10.1037/0022-0167.50.1.84