University of Southampton

Faculty of Environmental and Life Sciences

School of Psychology

Yoga and the three flows of compassion

Volume 1 of 1

by

Laura Pick

Thesis for the degree of Doctorate in Clinical Psychology

December 2021

Word count: 14,982

University of Southampton

Abstract

Faculty of Environmental and Life Sciences

School of Psychology

Doctor of Philosophy

Yoga and the three flows of compassion

by

Laura Pick

Yoga is increasingly recognised as an effective practice to support mental and physical health. A core component of yoga ethics, compassion is increasingly recognised as a protective factor for psychopathology and a potential meditating factor underlying yoga's effects. However, despite conceptual similarities, there is a lack of research exploring the links between compassion theory and yoga.

Chapter 1 presents a systematic review and narrative synthesis exploring yoga-based interventions and self-compassion in Helping Professionals (HPs). Findings from 10 included studies found that self-compassion was improved through yoga interventions for HPs and HP students across different settings and yoga interventions. However, methodological limitations impacted the strength of the findings. In addition to improving study quality, recommendations for future research included the need to explore the clinical significance of findings and consideration of measuring compassion towards others. Implications for clinical and research practice were discussed.

Chapter 2 presents a quantitative study exploring the differences between yoga practisers (YP) and non-yoga practisers (NYP) on measures of wellbeing, mindfulness, self-criticism and compassion. The second part explored YPs and the limbs of yoga, namely ahimsa (ethics), pranayama (breathwork) and dharana (meditation). In total, 459 participants (184 YPs, 275 NYPs) completed an online survey. Results revealed that YPs reported significantly higher wellbeing, mindfulness, self-compassion and compassion from others, and lower self-criticism. Ahimsa significantly positively correlated with the three flows of compassion and was the strongest predictor of wellbeing and compassion. Implications and recommendations for the inclusion of the ethics of yoga in interventions and research is discussed.

Table of Contents

Table of Tables

Table of Figures

Research Thesis: Declaration of Authorship

Print name: Laura Pick

Title of thesis: Yoga and the three flows of compassion

I declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. None of this work has been published before submission.

Signature: ..... Date: 03/12/2021

Acknowledgements

I would firstly like to thank my primary supervisor Dr Ali Bennetts, for sharing your passion for yoga research with me. It has been an honour to read and write about a topic so close to my heart. Your support, guidance and belief in my abilities got me through. To Dr Margo Ononaiye, who has supported me, not only through supervising my thesis but in all aspects of clinical training. I don't have the word count to express how much you have helped me and I am grateful to have had your guidance along my journey.

I would like to thank Dr Chris Irons for teaching me about compassion theory and for supporting this project. To James Williamson, for volunteering your time and providing essential support in screening papers and conducting quality assessment. To my cohort for all the coffees, laughs and late night chats over the last three years; I feel privileged to have experienced training with you.

And finally, I need to express my gratitude to my family. To my mum Diana, for your strength, love and unfaltering belief in what I can achieve. To my sister Maddy, for your calm, solid presence, wisdom and ability to make me laugh. To Aswad, I count my lucky stars to have met you. Thank you for your motivational talks when I doubt myself and for always being by my side. To my Nan, for embodying compassion; I miss you every day. And finally, to my daughter Sade. You are the real teacher. Your kindness, mindfulness, determination and humour amaze me every day. This is all for you, girl.

Chapter 1 Literature Review Paper

Title: Yoga and self-compassion in the helping professions:

A systematic review

Journal Specification: The journal **'**OBM Integrative and Complementary Therapies' has been chosen as a guide in determining the preparation of the paper. Articles providing comprehensive reviews have no word limit.

Word Count: 7,178 (excluding tables and references)

Abstract

Helping Professionals (HPs) are under high levels of stress and face high rates of burnout, affecting not only their wellbeing but also the care of their patients. There is increasing evidence to support the beneficial effects of self-compassion, with yoga being suggested as an effective practice to enhance self-compassion and buffer against work-related stress. However, to date, there have been no systematic reviews which have evaluated yoga-based interventions on self-compassion in HPs. With this in mind, the aim of this review is to address this gap in the literature. Following PRISMA guidelines, a comprehensive systematic search was performed on published and grey literature in January 2021. The literature search was constructed around search terms for 'yoga' and 'compassion'. Yoga intervention studies were eligible if they included a validated measure of self-compassion pre and post intervention. The search yielded ten quantitative empirical studies. The review found that self-compassion was improved through the practice of yoga interventions for HPs and HP students across a variety of settings and interventions. However, these results are interpreted with caution due to methodological limitations such as heterogeneity of yoga interventions, high risk of bias and poor reporting of interventions. Suggestions are made regarding future research, such as the need to explore the clinical significance of increased self-compassion in the workplace, in addition to improving study quality, reporting and rigour. Whilst this review is limited to investigating self-compassion, future research should consider measuring compassion towards and from others.

1.1 Introduction

1.1.1 Helping professionals

Helping professions, defined as 'occupations that provide health and education services to individuals and groups' (American Psychological Association, 2020), are increasingly recognised as being threatened by the consequences of work-related stress (Nieuwenhuijsen et al., 2010). Helping Professionals (HPs) regularly work in high-pressured services, with clients and families experiencing suffering, grief, pain and strong emotional states (Keidel, 2002; Payne, 2001). Research suggests that there is a greater prevalence of anxiety, depression, emotional exhaustion and secondary trauma in HPs and those training within the profession (Bond et al., 2013; Galantino et al., 2005; Shirey, 2007). Such factors are associated with reduced physical health (Nieuwenhuijsen et al., 2010), poorer client relationships (Leiter et al., 1998), reduced patient care (Shanafelt et al., 2002) and increased medical errors (Shamian et al., 2016).

More recently, there is growing awareness of 'moral injury' (Ford, 2019; Haight et al., 2017), a term used to describe the lasting psychological distress caused by repeated actions, or lack of them, which violates someone's moral code and expectations (Litz et al., 2009) as one source of workplace stress. Moral injury occurs over time, due to constraints beyond a HP's control, such as insufficient resources, growing administrative responsibilities and higher caseloads (Reith, 2018; Sibeoni et al., 2019). This in turn may result in HPs being unable to give the level of care and emotional support their patients or clients need (Dean et al., 2019). This is especially important, given the context of Covid-19, where services are highly pressured, and HPs have had to make decisions about the allocation of critical resources for patient care (White & Lo, 2020). Given the high staff turnover associated with work-related stress (Strolin et al., 2007) and reports of increased rates of suicide in practitioners (Duarte et al., 2020), reducing the impact of

occupational stress is vital for the wellbeing of HPs and for the standards of healthcare services and quality of care (Gabassi et al., 2002).

1.1.2 Compassion

Identified as a personal resource, developing compassion may be one way of minimising the negative impact of work-related stress (Raab, 2014). A cornerstone of Buddhist philosophy for thousands of years, compassion has only recently been recognised by Western psychology (see Gilbert, 2020). There are many definitions of compassion (see Strauss et al., 2016); however, Neff's (2003a) theory of self-compassion is the most cited conceptual framework. Neff describes self-compassion as "*being open to and moved by one's own suffering, experiencing feelings of caring and kindness towards oneself, taking an understanding and non-judgmental attitude towards one's inadequacies and failures, and recognizing one's experience is part of the common human experience*" (Neff, 2003a, p. 224). Neff defines self-compassion as having three interconnecting components: mindful awareness, self-kindness and a sense of common humanity. This notion suggests that self-compassion involves employing the three components in times of difficulty. In recognising that individual suffering is part of the human experience, one can feel more connected with others, less alone, and ultimately able to take a more balanced view towards their suffering (Neff, 2003a).

To operationalise self-compassion, Neff (2003b) developed the Self-Compassion Scale (SCS), a self-report measure used comprehensively in the literature. The SCS provides a total score of self-compassion and six subscales, made up of three positive aspects of self-compassion (self-kindness, common humanity, mindfulness) and three reverse scored opposing constructs (self-judgment, isolation, and over-identification). Research consistently shows that self-compassion strongly correlates with psychological wellbeing and is predictive of lower symptom severity in anxiety and depression (Neff et al., 2007). Meta-analyses have shown lower scores on the SCS are associated with anxiety, depression, negative affect, self-criticism, perfectionism and rumination,

with large effect sizes, in clinical and non-clinical samples (Macbeth & Gumley, 2012; Zessin et al., 2015). Furthermore, higher scores have been positively correlated with life satisfaction, emotional intelligence, happiness, and positive affect (Neff, 2011). Whilst the SCS is a standard tool to measure self-compassion throughout the literature, the suitability of this tool has been called into question due to concerns regarding the construct validity (Muris & Petrocchi, 2017).

Compassion has been more broadly conceptualised by Gilbert (2005a; 2005b; 2010) as a biopsychosocial model, rooted in attachment and evolutionary theory (see Bowlby, 1969; 1982). Using social mentality theory, Gilbert (1989; 2000) defines compassion as a motivational system, encompassing two inter-related mind-sets. The first mind-set involves being sensitive to the suffering of the self and others and being motivated to care and feel sympathy and empathy. The second mind-set requires committed action to alleviate the suffering. Gilbert suggests that specific social mentalities stimulate neurophysiological pathways (e.g., Porges, 2007) linked to our emotion-regulation, known as the affect-regulation system (Gilbert et al., 2009; 2014). The model maps our emotions onto three systems: the threat and protection system (associated with anger, anxiety and activation of the sympathetic nervous system); the drive system (associated with resource seeking), and the soothing system (related to non-wanting, safeness, and the parasympathetic nervous system). The model suggests that psychological distress arises from an overactive threat system and underactive soothing system. In addition, Gilbert (2014) highlights that compassion flows in three directions and all flows are important in emotional regulation. The three flows include compassion for the self (self-compassion), compassion for others and compassion from others.

In support of Gilbert's (2009; 2014) model of affect-regulation, Porges (2017) has identified neural pathways that contribute to compassion and proposes that compassion is dependent on a vagal mediated state (a major component of the para-sympathetic nervous system) that supports feelings of safety. Compassionate Mind Training (CMT; Gilbert, 2010) has

been shown to alter heart rate variability (HRV), a measure of the autonomic nervous system (see Di Bello et al., 2020 for review) and numerous cortical areas (Singer & Engert, 2019; Weng et al., 2013). Whilst research supports that receiving care and kindness from attachment figures stimulates neurophysiological systems linked to increased wellbeing (Porges, 2007), evidence that compassion stimulates the same systems is limited. For example, Kirschner et al. (2019) asserts that although Gilbert's model of affect-regulation is based on neurophysiological theory, most evidence is based on self-report measures, such as the SCS (Neff, 2003b). Thus, it has been proposed that physiological measures, such as HRV, should be used to support self-report measures to fully understand the underlying mechanisms that compassion stimulates (Kirschner et al., 2019).

1.1.3 Self-compassion in helping professionals

Research into self-compassion as a moderator of occupational stress and compassionate care in HP settings has accelerated in recent years (Sinclair et al., 2017). It proposes a positive impact of mindfulness and self-compassion on healthcare providers' resilience (Kemper et al., 2015). It has been found that self-compassion and wellbeing were negatively associated with burnout, compassion fatigue and/or stress symptoms in HPs, including medical and nursing students, midwives, psychologists and clinicians (Olson & Kemper, 2014). Furthermore, it has been reported that self-compassion mediates the association between empathic concern and work-related stress (Duarte et al., 2016), and reduces emotional regulation difficulties and improves interpersonal functioning in healthcare providers (Finlay-Jones et al., 2015). Self-compassion was positively correlated with better mental health in clinicians and was associated with greater confidence in providing calm, compassionate care to patients (Olson & Kemper, 2014). Furthermore, in a review of 14 qualitative studies of mindfulness training with healthcare workers, Morgan et al. (2015) found common themes related to self-compassion; participants reported that the training enhanced their self-care and increased their experience of self-

compassion, which in turn increased their ability to be present and compassionate with their clients.

Whilst the findings are promising, much of the research used student populations, relied on self-report measures of self-compassion and were not able to establish causality (Barnard & Curry, 2011; Beaumont et al., 2016a; Olson & Kemper, 2014). Furthermore, a systematic review by Sinclair et al. (2017) identified that the alleged outcomes of self-compassion increasing compassionate care did not include data on the perspectives of patients or families, limiting the validity of this finding. The emerging evidence does however highlight the potential benefits of developing self-compassion in HPs, and the importance of future research to explore effective and definable methods for nurturing this capacity.

1.1.4 Yoga, self-compassion and helping professionals

One way to promote self-compassion and emotional well-being, which in turn may have a positive impact on patient care in HPs, may be through the practice of yoga. Yoga, which originated over 5000 years ago in India as a contemplative discipline of both mental and physical practices, promotes the concept of unity between mind, body and spirit (Desikachar, 1995). Whilst yoga in the West often focuses on the physical postures (Ivtzan & Jegatheeswaran, 2014), classical yoga involves a comprehensive system and philosophy as outlined in Patanjali's *Yoga Sūtras* (Bryant, 2008), known as the eightfold path. This multi-tiered framework comprises the following practices: *yamas* (ethical/moral practises), *niyamas* (internal personal practises/self-discipline), *pranayama* (breathwork), *asana* (postures), *pratyahara* (withdrawal of the senses), *dharana* (concentration meditation), *dhyana* (deep level meditation) and *samadhi* (full meditative absorption).

A recent meta-analysis reported that yoga was effective in preventing and managing physiological and psychological difficulties in nurses, doctors and dentists (Cocchaira et al., 2019),

finding that stress, burnout, musculoskeletal problems and sleep issues were consistently reduced in those who practised yoga (Cocchaira et al., 2019). Furthermore, a recent systematic review of yoga interventions for HPs reported finding reduced stress, anxiety, depression, aches and back pain following yoga interventions, in addition to increased self-care and self-compassion (Ciezar-Andersen et al., 2021). Gard et al. (2012) explored the effect of yoga on young adults with mental health diagnoses and found that mindfulness and self-compassion mediated the effect of yoga on quality of life and changes in self-compassion mediated changes in perceived stress over time. Shallit (2018) explored the mediating effect of self-compassion following a yoga intervention and found that the 'self-judgement' component of the SCS (Neff, 2003b) significantly mediated anxiety and depression. These findings have been supported by qualitative research, as Ford (2018) reported that 100% of family therapists described yoga as heightening compassion for the self and others. However, limitations of the yoga studies were similar to previous reviews (Elwy et al., 2014), and included poor reporting of yoga interventions, small sample sizes, lack of control groups and non-randomisation (Ciezar-Andersen et al., 2021).

Recent theoretical frameworks have developed outlining the mechanisms underlying yoga-based practices from both neurophysiological and psychological perspectives (Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018; Sullivan et al., 2018). Gard et al. (2014) propose a self-regulatory model of yoga, which encompasses emotional, cognitive, and behavioural mechanisms for psychological health. The authors suggest that through both top-down and bottom-up practices, yoga may be effective at activating the parasympathetic nervous system, which is a pre-requisite for experiencing compassion (see Porges, 2017). Yoga is proposed to enhance self-regulation through an integrated practice of ethics, postures, breathwork and meditation (Bennetts, 2022; Gard et al., 2014; Sullivan et al., 2018). Compassion has been stipulated as a potential mediator in all these models and has been linked to the incorporation of ethical enquiry (through the yamas and niyamas; Bennetts, 2022). Kishida et al. (2018) suggest that wellbeing improves with yoga practice because of changes in self-compassion, with an indirect pathway to

compassion to others through self-compassion or mindfulness. Whilst these frameworks stipulate the importance of self-compassion in the mechanisms of yoga, further research is required to validate these models.

1.1.5 Summary and present study

Research suggests that HPs are vulnerable to work-related stress, which detrimentally affects physiological and psychological health (Bond et al., 2013; Nieuwenhuijsen et al., 2010) as well as client care (Shanafelt et al., 2002). Self-compassion has been associated with positive psychological health and resilience to stress (Raab et al., 2014) and emerging evidence suggests it may be a mediating factor in the positive effects of mind-body therapies, such as yoga (Gard et al., 2012). Given the growing interest in yoga practices (Birdee et al., 2008) and the developing evidence of yoga as a promising tool for managing stress in HPs (Cocchiara et al., 2019), well designed and sustainable yoga interventions, that enhance self-compassion, may be particularly beneficial for the HP population.

1.1.6 Review question

Do yoga interventions enhance self-compassion in the helping professions?

1.2 Method

The planning and implementation of the current review was informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines for systematic reviews and meta-analyses (Moher et al., 2009). The review protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) prior to data extraction. Registration number: CRD42021229273 (http://www.crd.york.ac.uk/PROSPERO).

1.2.1 Information sources and search strategy

Scoping searches were conducted via Google Scholar, PROSPERO and Delphis. A systematic literature search of the following electronic bibliographic databases was conducted to identify appropriate published studies for the review: CINAHL Plus with Full Text, MEDLINE, PsycINFO and Web of Science (all accessed via EBSCO) and EMBASE (accessed via OVID). The following database sources were systematically searched to identify relevant grey literature: ProQuest for Dissertations and Theses, the Cochrane Library, NHS Evidence and TRIP. Additionally, a hand search of the tables of contents of the International Journal of Yoga was performed.

Key terms in the research question, previous systematic review methods and early scoping searches informed the search strategy. Search terms A were designed to capture yoga interventions and search terms B were designed to capture measures of compassion. Helping professional terms were not used in the article search because of the many different terms used to describe this population. See Appendix A for details of the individual search strategy used for each database. Boolean operators were used in search strings to combine medical subject headings, thesaurus terms, or text word search terms. A librarian was consulted on the use of Boolean operators, truncation and proximity searching. No constraints (i.e. field, language or date restrictions) were applied to the search strategy, to ensure relevant studies were not missed.

1.2.2 Inclusion and exclusion criteria

Following the PICOS strategy, all studies were screened based on predetermined inclusion and exclusion criteria (Table 1).

Table 1.

Description of the PICOS strategy

Parameter	Inclusion criteria	Exclusion criteria
Population	Helping professionals or trainees/students of that profession Over 18 and any gender Studies where administrative staff have been included in the sample of helping professionals were included if they made up less than 50% of the sample.	Entire study population not explicitly identified as falling within the definition of helping professional, or students of the professions
Intervention	Any intervention that was (a) defined as 'yoga' or explicitly based on yoga philosophy and (b) encompassed at least three elements of yoga, including: *asana* (physical postures), *pranayama* (breathwork) and meditation/ mindfulness Any duration or frequency of intervention Interventions administered online or 'in-person'	Studies that are similar to, but not explicitly defined as yoga Interventions that did not include at least three components of yoga Studies in which yoga was included as part of a wider non-yoga intervention or where individual elements of yoga (e.g. yogic breathing) were the focus of the intervention to the exclusion of other elements
Comparison	Not applicable	No exclusion criteria based on comparative or control interventions, providing all other inclusion criteria are satisfied
Outcome	A validated, quantitative measure of self-compassion was used pre and post intervention Qualitative studies which also have a validated measure of self-compassion	Does not report on outcome specified in inclusion criteria Does not provide pre and post outcome measures
Study design	Original empirical studies All types of quantitative studies (e.g. cross sectional studies, correlational studies, randomised control trials (RCT's), non-RCT's, single case studies and case-control studies) Qualitative studies which include a pre/post quantitative measure of self-compassion	Non empirical studies Qualitative studies which do not include a pre/post quantitative measure of self-compassion Manuscripts not available in English Manuscripts without findings available

	Studies published in peer-reviewed journals or unpublished manuscript/dissertations
	Only manuscripts written in English with findings available

The American Psychological Association (2020) defines a helping profession as *"occupations that provide health and education services to individuals and groups, including occupations in the fields of psychology, psychiatry, counselling, medicine, nursing, social work, physical and occupational therapy, teaching, and education"*, and this definition was used to establish inclusion in the present study. Studies where administrative staff were included in the sample were included if they made up less than 50% of the sample. Students in training were included as evidence shows that this group are also at risk of psychological difficulties, burnout and compassion fatigue, which may affect client care (Bond et al., 2013; Shirey, 2007). The dates selected were from the start of the database records to 12th January 2021. The search was re-run on 1st September 2021 and no new studies were identified as eligible for screening.

1.2.3 Screening and study selection

Screening and selection were informed by the PRISMA guidelines (Moher et al., 2009); see Figure 1 for the PRISMA flow diagram. Overall, 10 studies met the full inclusion criteria, and a list of these studies was sent to an expert in the field to identify any missed eligible published and/or unpublished data; none were identified. An additional search for articles was conducted by descendency and ascendency through the authors and references of the 10 studies. Finally, a search of the references section in related review and meta-analysis articles were reviewed. Five articles were deemed relevant and read at the abstract level, but were excluded as they did not meet the full inclusion criteria. Articles were evaluated by two independent raters at each successive stage (title, abstract and full text). All differences were resolved through discussion.

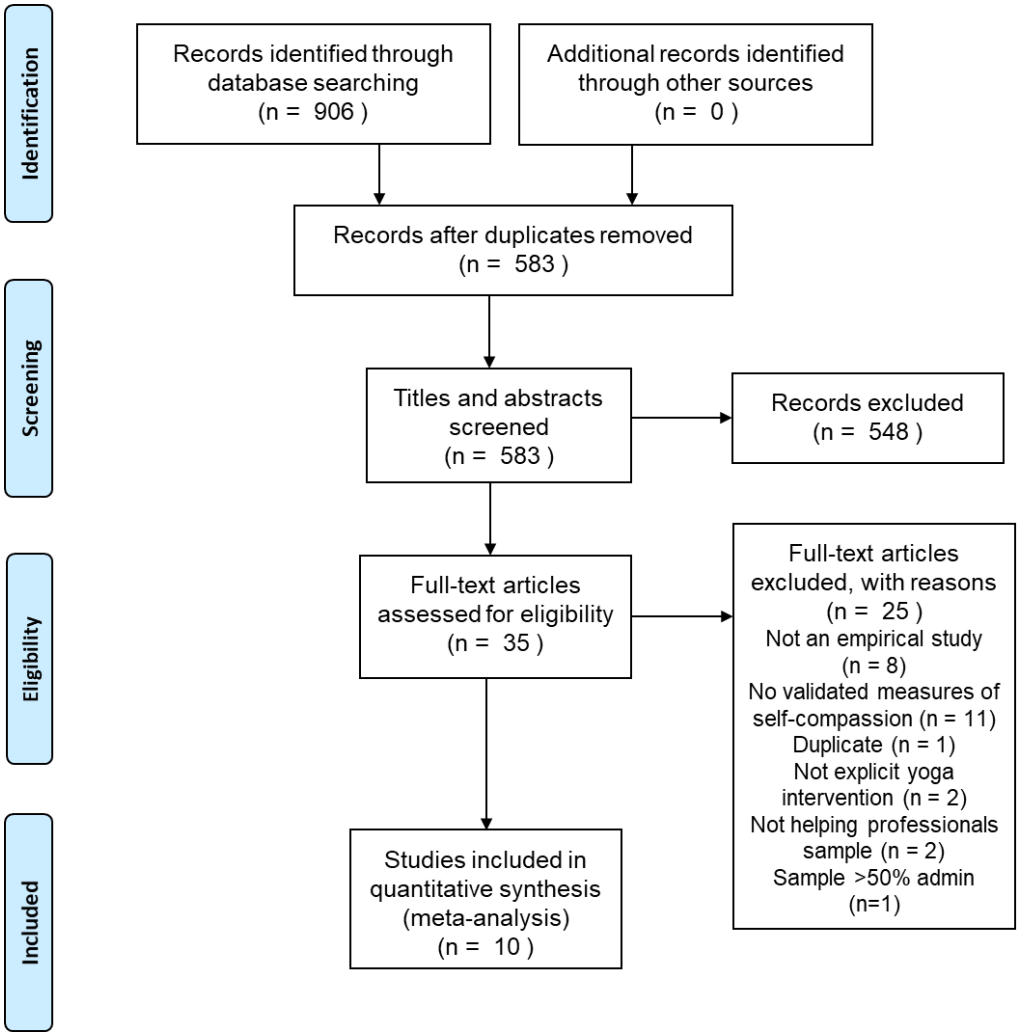

Figure 1.

PRISMA flow diagram (Moher et al., 2009)

1.2.4 Data extraction

The following data was extracted from each paper included in the review (see Table 2 for information): study design; participant characteristics; setting/context; participant characteristics; nature of control (if applicable); self-compassion measure; yoga intervention characteristics; type of analyses and a summary of main findings relevant to the research question. A second reviewer extracted data for all studies, which was crosschecked.

1.2.5 Quality assessment

The Standard Quality Assessment Criteria for Evaluating Primary Research from a Variety of Fields (SQAC; Kmet et al., 2004) was used to assess the quality of the studies. The SQAC assesses methodological rigor in a range of areas including the study design, sample size, participant allocation methods, justification of analyses, sufficiency of results reporting and the validity of conclusions. Each question is rated based on the degree to which the specific criteria is met ('yes' = 2, 'partial' = 1, 'no' = 0); questions not applicable to the study design are marked as 'N/A' and are excluded from the total summary score. To calculate a summary score for each paper, the total score obtained across the applicable items (i.e. 'yes and 'partial' scores) was divided by the total possible scores (i.e.: 28 – (number of "n/a" x 2)). This gave a summary quality score between 0 and 1 for each study; with higher scores indicating a higher methodological standard. Each study rating score was then assessed against the quality rating categories as outlined by Kmet et al. (2004): 0.80> 'strong', 0.70-0.79 'good', 0.50-0.69 'adequate', and 0.50< 'limited' methodological quality. Regardless of quality rating, all studies were included in the review due to the limited research in this area. All studies were independently assessed by a second reviewer to reduce potential bias, and scores were compared and discussed. Cohen's kappa (k = .733) identified there was substantial agreement between the two reviewers. Quality assessment summary scores are presented in Table 2; see Appendix D for a description of quality assessment criteria and Appendix E for a breakdown of scores for each study.

1.2.6 Statistical analyses

Results from the studies were narratively synthesised. Statistical meta-analysis was considered inappropriate due to the variety of study designs, poorly defined interventions, heterogeneous samples and emerging area of research (Popay et al., 2006).

1.3 Results

Table 2.

Key features of the ten studies meeting inclusion criteria

Study No; Author(s) (Year); Journal	Title of Paper (Published Journal / Unpublished, country)	Sample (N; helping profession)	Sample Characteristics Sex; race; age range/ mean(SD)	Study Design & Characteristics	Control Group	Setting/ Context	Yoga Intervention	Yoga Protocol	Self-compassion measure (total score and/or subscales)	Summary of Relevant Main Findings	SQAC Summary Score
001; Beri et al. (2020) Future Science OA.	The effect of living a 'yogic lifestyle' on stress response and self-image in healthcare professionals: a pilot study (Published journal)	N= 15; Healthcare professionals and admin staff	Female n= 11, male n= 4; 38(11) years	Single group pre-post design	No	Healthcare facility, USA	Group sessions, Tantra (yoga philosophy, postures, meditation, mindfulness and mindful eating) Daily home practise encouraged and materials provided.	4 weeks (1 x 1.5 hour per week)	SCS (total and subscales)	The SCS total and subscale scores increased post-intervention ($p < .05$). Total SCS score increased by 17% post-intervention ($p = 0.0004$).	0.85
002; Dyer et al. (2020) Complementary Therapies in Medicine	A pragmatic controlled trial of a brief yoga and mindfulness-based program for psychological and occupational health in	N= 30 (yoga n= 9, control n= 21) (follow-up yoga n= 7, control n= 17); Professional educators	Female n= 30; 93.3% White; 28-63 years	Two group pragmatic controlled trial	Waitlist control	Kripalu Centre, USA	Group sessions, Hatha (postures, breathing, relaxation, meditation/mindfulness, mindful communication, sleep preparation	3 day immersion (5 hours per day)	SCS-SF (total only)	Relative to controls, the yoga group showed significant improvements in self-compassion post intervention and at two month follow-up ($p < .05$). Within group analysis showed improvements in	0.88

Study No; Author(s) (Year); Journal	Title of Paper (Published Journal / Unpublished, country)	Sample (N; helping profession)	Sample Characteristics Sex; race; age range/ mean(SD)	Study Design & Characteristics	Control Group	Setting/ Context	Yoga Intervention	Yoga Protocol	Self-compassion measure (total score and/or subscales)	Summary of Relevant Main Findings	SQAC Summary Score
	education professionals (Published journal)						and mindful eating). Encouraged to practise 10 minutes per day following the retreat.			self-compassion from baseline to post, and baseline to follow-up, ($p < .05$).	
003; Erkin & Aykar (2021) Perspectives in Psychiatric Care	The effect of the yoga course on mindfulness and self-compassion among nursing students (Published journal)	N= 47; Nursing students	Female n= 47; 18-21 years	Single group pre-post design	No	University, West Turkey	Postures, breathing, relaxation, mindfulness meditation, compassionate letter writing, yoga teachings. Daily assignments to develop mindfulness in their daily life.	14 weeks (1 x 1.5 hour per week)	SCS (total and subscales)	There was a statistically significant improvement in self-compassion total score from pre to post ($p = 0.001$). There were also significant improvements on all six subscales of the SCS ($p<.05$).	0.85
004; Kinchen et al. (2020); Journal of Education and Health Promotion	Yoga and perceived stress, self-compassion, and quality of life in undergraduate nursing students (Published journal)	N= 73 (yoga n= 38, control n= 35); Undergraduate nursing students	Female n= 66, male n= 7; 78% White; 19-48 years	Non-randomised, two group pre-post design	Yes	University, USA	Kundalini; Postures, breathing, meditation	12 weeks (1 x 1 hour per week)	SCS (subscales only)	There were no statistically significant within-group differences on all SCS subscales. In the self-kindness subscale, the main effect between groups was significant ($p = 0.013$).	0.77

Study No; Author(s) (Year); Journal	Title of Paper (Published Journal / Unpublished, country)	Sample (N; helping profession)	Sample Characteristics Sex; race; age range/ mean(SD)	Study Design & Characteristics	Control Group	Setting/ Context	Yoga Intervention	Yoga Protocol	Self-compassion measure (total score and/or subscales)	Summary of Relevant Main Findings	SQAC Summary Score
005; Klawonn et al. (2019) International Journal of Yoga Therapy	A 5-week seminar on the biopsychosocial-spiritual model of self-care improves anxiety, self-compassion, mindfulness, depression, and stress in graduate healthcare students (Published journal)	N= 21; Graduate doctors	Female n= 14, male n= 7; 23-29 years	Single group pre-post design	No	University, USA	Yoga philosophy and teachings, meditation, breathing, postures, mindfulness, relaxation	5 weeks; 1 x 1 hour	SCS-SF (total only)	Significant improvements were observed in total self-compassion score at post-intervention compared to first and second-baseline time points ($p < 0.05$).	0.70
006; Mathad et al. (2017); Journal of Clinical and Diagnostic Research	Effect of yoga on psychological functioning of nursing students: a randomized wait list control trial (Published journal)	N=80 (yoga n=40, control n= 40); Nursing and midwifery students	Female n= 80; 100% Indian ; 17-30 years	Randomised waitlist control	Yes	University, India	Krida yoga, postures, breath work, meditation, yogic teachings	8 weeks; 5 days per week x 1 hour	SCS-SF (total only)	Self-compassion scores significantly improved within the yoga group (p= 0.016), but not controls. There was no significant difference between groups post intervention.	0.75
007; Riley et al. (2017) Journal of	Improving physical and mental health in	N= 37; Frontline	Female n= 31, male n=6;	Single group pre-post design	No	Mental Health Centre, USA	Based on Kripalu Centre yoga program.	8 weeks;	SCS (subscales only)	Self-kindness and common humanity subscales significantly	0.75

Study No; Author(s) (Year); Journal	Title of Paper (Published Journal / Unpublished, country)	Sample (N; helping profession)	Sample Characteristics Sex; race; age range/ mean(SD)	Study Design & Characteristics	Control Group	Setting/ Context	Yoga Intervention	Yoga Protocol	Self-compassion measure (total score and/or subscales)	Summary of Relevant Main Findings	SQAC Summary Score
Workplace Behavioral Health	frontline mental health care providers: Yoga-based stress management versus cognitive behavioral stress management (Published journal)	mental health care providers	83.8% White; 41.2(5.7) years				Yogic teachings, postures, breathwork, meditation, reflective journaling and intention setting.			increased post-intervention (p< .05).	
008; Trent et al. (2018) JOEM	Improvements in psychological health following a residential yoga-based program for frontline professionals (Published journal)	N= 29 (follow up n= 22); Frontline professionals (education, health care, human services and corrections)	Female n= 24 male n= 5; 89.1% White; 23-65 years/mean= 42.7	Single group pre-post design	No	Kripalu Centre USA	Group sessions, Hatha (postures, breathing, relaxation, meditation/mindfulness, mindful communication, sleep preparation and mindful eating). Encouraged to practise 10 minutes per day following the retreat.	5 day immersion (5 hours per day)	SCS-SF (total and subscales)	There were no significant changes in self-compassion from baseline to post. Significant improvements in total self-compassion, self-kindness and common humanity subscales were observed at the 2 month follow-up compared with baseline, p< .05.	0.90
009; Trent et al. (2019a)	Improvements in psychological and	N= 44 (follow-up n= 33);	Female n= 42, male n= 2;	Single group pre-post design	No	Kripalu Centre, USA	Group sessions, Hatha (postures,	3 day immersi	SCS-SF (total only)	There were statistically significant improvements	0.80

Study No; Author(s) (Year); Journal	Title of Paper (Published Journal / Unpublished, country)	Sample (N; helping profession)	Sample Characteristics Sex; race; age range/ mean(SD)	Study Design & Characteristics	Control Group	Setting/ Context	Yoga Intervention	Yoga Protocol	Self-compassion measure (total score and/or subscales)	Summary of Relevant Main Findings	SQAC Summary Score
Global Advances in Health and Medicine	occupational well-being following a brief yoga-based program for education professionals (Published journal)	Education professionals (teachers, counsellors, administrators)	83.2% White; 26-66 years/mean= 50.5				breathing, relaxation, meditation/mindfulness, mindful communication, sleep preparation and mindful eating). Encouraged to practise 10 minutes per day following the retreat.	on (5 hours per day)		in self-compassion from baseline to post (p< .001), which were maintained at 2 month follow-up.	
010; Trent et al. (2019b) The Journal of Alternative and Complementary Medicine	Improvements in psychological and occupational well-being in a pragmatic controlled trial of a yoga-based program for professionals (Published Journal)	N= 82 (yoga n = 41, control n = 41; follow up yoga n= 27, control n= 30); Professionals from education, corrections, and social services	Female n= 31 male n= 10; 76.5% White; 22-63 years/mean= 41.4	Two group, pragmatically assigned, pre-post design	Yes, waitlist control	Kripalu Centre, USA	Group sessions, Hatha (postures, breathing, relaxation, meditation/mindfulness, mindful communication, sleep preparation and mindful eating). Encouraged to practise 10 minutes per day following the retreat.	5 day immersion (5 hours per day)	SCS-SF (total only)	At the 2-month follow-up, participants in the RISE group showed significant improvements in self-compassion relative to controls (p< .05).	0.75

Table 3.

Effect sizes for yoga interventions for each study

Study No; Authors	Effect size (Hedge's *g*)		Interpretation	Study	Effect size (Hedge's *g*)		Interpretation
001; Beri et al. 2020	Pre to Post			006; Mathad et al. 2017	Pre to Post		
	Total	0.698	Moderate		Total	0.420	Small
	Self-kindness	0.781	Large				
	Self-judgement	0.589	Moderate				
	Common humanity	0.477	Small				
	Isolation	0.431	Small				
	Mindfulness	0.475	Small				
	Over-identified	0.784	Large				
002; Dyer et al. 2020	No data			007; Riley et al. 2017	Pre to Post		
					Self-kindness	0.526	Moderate
					Common humanity	0.444	Small
003; Erkin & Aykar, 2021	Pre to Post			008; Trent et al. 2018	No data		
	Total	0.601	Moderate				
	Self-kindness	0.554	Moderate				
	Self-judgement	0.456	Small				
	Common humanity	0.546	Moderate				
	Isolation	0.450	Small				
	Mindfulness	0.482	Small				
	Over-identified	0.372	Small				

Study No; Authors	Effect size (Hedge's *g*)	Interpretation	Study	Effect size (Hedge's *g*)		Interpretation
004; Kinchen et al. 2020	No data		009; Trent et al. 2019a	No data		
005; Klawonn et al. 2019	No data		010 ; Trent et al. 2019b	Pre to 2 month follow-up		
				Total	$r^2 = 0.19$	Small

1.3.1 Literature search

The literature search generated 906 articles, of which 10 intervention studies were included in our systematic review to evaluate the effect of yoga on self-compassion in HPs, both qualified and in-training (see Figure 1).

1.3.2 Characteristics of studies

The characteristics and results of each study are summarised in Table 2. The studies were conducted in the United States (n=8), Turkey (n=1) and India (n=1). Six of the studies were single group pre-post designs (Beri et al., 2020; Erkin & Aykar 2021; Klawonn et al., 2019; Riley et al., 2017; Trent et al., 2018; 2019a), three were non-randomised (Dyer et al., 2020; Kinchen et al., 2020; Trent et al., 2019b) and one study was a randomised controlled trial (RCT; Mathad et al., 2017).

1.3.3 Participants

The studies included a total of 321 participants; sample sizes ranged from 9 to 47 with a median sample size of 37.5. Four studies (Erkin & Aykar, 2021; Kinchen et al., 2020; Klawonn et al., 2019; Mathad et al., 2017) consisted of students training in helping professions (nursing or midwifery students n=125, student doctors n=21). The remaining six studies included various types of HPs, including frontline mental health professionals, teachers, counsellors and professionals from corrections (e.g. police) and social services (Beri et al., 2020; Dyer et al., 2020; Riley et al., 2017; Trent et al., 2018; 2019a; 2019b). The sample of two studies (Trent et al., 2018; 2019b) contained frontline professionals working in different services and a breakdown of the different job roles was not provided, therefore it is not possible to report specific sample numbers for each professionals group. Non-healthcare professionals made up approximately 3% of the total sample (n=10), and were mostly administrative staff working in education services. Three

studies included only female participants (Dyer et al., 2020; Erkin & Aykar, 2021; Mathad et al., 2017), and of the studies that included both genders, females made up 87.5% of the total sample (n=281).

1.3.4 Recruitment

All participants across the ten studies volunteered to participate in the yoga interventions. Five studies (Beri et al., 2020; Dyer et al., 2020; Kinchen et al., 2020; Klawonn et al., 2019; Trent et al., 2019a) specified that participants were invited via email and self-selected to participate in the yoga intervention. Erkin and Aykar (2021) invited student nurses to participate in a module called "yoga for a healthy life" and the sample consisted of the students who chose this elective. Mathad et al. (2017) only reported that they recruited students who were "willing to learn yoga". Riley et al. (2017) reported that participants volunteered and Trent et al. (2018; 2019b) said that their samples were recruited via the Kripalu Centre's partnership with local organisations, with no further details of their recruitment method. In terms of control groups, two studies (Dyer et al., 2020; Trent et al., 2019b) had waitlist control groups (pragmatically assigned and at different time points), Kinchen et al. (2020) had a pragmatically assigned no-intervention control (i.e., participants self-selected not to practise yoga) and Mathad et al. (2017) employed a randomised control group (waitlist control). Most studies did not specify inclusion and exclusion criteria. Only two studies excluded participants who were already practising yoga (Beri et al., 2020; Mathad et al., 2017) and one study (Kinchen et al., 2020) attempted to control for current yoga practice by dividing the groups by yoga experience.

1.3.5 Interventions

Different types of yoga interventions and protocols were used (see Appendix F). Four studies described their yoga intervention as based on Hatha yoga principles (Dyer et al., 2020; Riley et al., 2017; Trent et al., 2018; 2019a; 2019b), one on Tantra yoga (Beri et al., 2020) and one

on Kundalini yoga (Kinchen et al., 2020); and the other four studies did not specify the yoga style. All interventions contained postures (*asana*), breathwork (*pranayama*) and meditation (*dharana/dhyana*) and nine of the studies (all except Riley et al., 2020) specified the inclusion of relaxation. Nine studies (all except Kinchen et al., 2020) described including yogic teachings (see Appendix F for the different topics), five studies included mindful eating (Beri et al., 2020; Dyer et al., 2020; Trent et al., 2018; 2019a; 2019b), and one study (Mathad et al., 2017) included Krida yoga (yogic games). Of the ten interventions, four were studies of the RISE program (Dyer et al., 2020; Trent et al., 2018; 2019a; 2019b), which is a residential yoga immersion program based at the Kripalu Centre for Yoga and Health in the US. Attendees are housed on-site for either three or five days and are provided with 5 hours of the yoga program per day. Outside of the RISE program, the duration of the yoga interventions varied from 4 to 14 weeks. The majority of studies had one yoga session per week ranging from 60-90 minutes, one study (Klawonn et al., 2019) had a 60 minute intervention 5 days per week (for 8 weeks) and one study (Riley et al., 2017) did not specify the length of each yoga session. Six studies (Beri et al., 2020; Dyer et al., 2020; Erkin & Aykar, 2021; Trent et al., 2018; 2019a; 2019b) reported that they encouraged students to do home practice and provided them with materials to support this, although the amount of home practice was not recorded or accounted for in the analyses. All studies employed a pre-post design and measured self-compassion at baseline and at the end of the intervention. Only four studies (all RISE program; Dyer et al., 2020; Trent et al., 2018; 2019a; 2019b) collected follow-up data (2 month) and one study collected data at the mid-point of the intervention (Kinchen et al., 2020).

In terms of the descriptions of the yoga interventions, there was great variation between studies. Two studies (Klawonn et al., 2019; Mathad et al., 2017) provided detailed breakdowns of the yoga schedule, specifying postures, breathwork practises, meditations, and time scales for each component. Beri et al. (2020) specified that they included teachings on chakras (yogic energy centres), however the descriptions of meditations, postures and breathwork were vague. Erkin

and Aykar (2021) described the different meditation practices, but did not describe the postures, breathwork or the 'history of yoga' teachings in any detail. Kinchen et al. (2020) specified the practice as based on Kundalini yoga, and defined the meditations and breathwork exercises, but not postures. Riley et al. (2017) stated that their intervention was based on the Kripalu Centre, and defined the meditation practices and breathwork but did not describe the postural aspect. The remaining four studies were completed at the Kripalu Centre, and the RISE yoga intervention was either described in the paper or referenced (Dyer et al., 2020; Trent et al., 2018; 2019a; 2019b). The breathwork practices were specified, however there was no clear description of what was included in the postural practice or meditations. It must be noted that as the RISE program intervention is an immersion, all meals are provided and there are leisure activities available (such as cooking and hiking) outside of the yoga program. Researchers in the RISE program did not control for the confounding effects of the other elements involved in the RISE program.

Regarding the inclusion of the ethics or morals of yoga (yamas and niyamas), none of the studies specified that they incorporated this into their yoga program. In terms of compassion as a component of the yoga intervention, two studies (Erkin & Aykar, 2021; Riley et al., 2017) specified a compassionate focus in the intervention. They identified that they included loving-kindness meditation in the intervention and Erkin and Aykar (2021) specified incorporating compassionate meditations, including a compassionate body scan and a compassionate friend meditation. It should be noted that none of the studies in this review specified whether self-compassion or compassion towards others was explicitly encouraged in the different aspects of the intervention, such as in the postural practice or yogic teachings.

1.3.6 Outcome measures

All studies used either the SCS (Neff, 2003b) or the SCS-SF (Raes et al., 2010) as their measure of self-compassion. Five studies reported the total score only (Dyer et al., 2020; Klawonn et al., 2019; Mathad et al., 2017; Trent et al., 2019a; Trent et al., 2019b), three studies reported

the total score and the six subscales (Beri et al., 2020; Erkin & Aykar, 2021; Trent et al., 2018) and two studies reported the individual subscales only (Kinchen et al., 2020; Riley et al., 2017). No other qualitative or quantitative measure of self-compassion was reported, and no studies measured or explored the effects of self-compassion in the workplace.

1.3.7 Effect of yoga interventions on self-compassion

Of the eight studies that calculated total SCS, self-compassion significantly increased post-intervention in six studies (Beri et al., 2020; Dyer et al., 2020; Erkin & Aykar, 2021; Klawonn et al., 2019; Mathad et al., 2017). Whilst Trent et al. (2018; 2019b) did not find a significant increase in total self-compassion post-intervention, the difference was significant at 2-month follow-up in both studies (p= .05 and p= .001). Two studies found that all six SCS subscales (self-kindness, self-judgement, common humanity, isolation, mindfulness and over-identified) significantly increased post-intervention (p<.05; Beri et al., 2020; Erkin & Aykar, 2021). Two studies (Riley et al., 2017; Trent et al., 2018) reported significant increases in two SCS subscales: self-kindness (p<.01 and p< .001) and common humanity (p< .05). Only one study reported no intervention effects (Kinchen et al., 2020). Refer to Table 2 for further details.

1.3.8 Effect size

One study (Beri et al., 2020) reported a moderate effect size for the improvement in total self-compassion score (Hedge's g=.698) and large effect sizes for self-kindness and over-identified subscales (g=.781, g=.784). Trent et al. (2019b) reported a small effect size (r^2=0.19). No other studies reported effect sizes. The author was able to calculate effect sizes for a further three studies (Erkin & Aykar, 2021; Mathad et al., 2017; Riley et al., 2017) and found small to moderate effect sizes, as calculated by Hedge's g. It was not possible to compute effect sizes for the remaining five studies, as the raw data was not available. Authors were contacted for the missing

data; however, the information was not received. See Table 3 for a breakdown of effect sizes for each study.

1.4 Discussion

1.4.1 Summary of evidence

This systematic review and narrative synthesis found consistent findings in so far as yoga as an intervention increased self-compassion in qualified and student HPs to some extent (e.g., Erkin & Aykar, 2021; Mathad et al., 2017). Self-compassion significantly increased post-intervention or at two month follow-up in all of the intervention studies (p<.05) except Kinchen et al. (2020). Two of these studies calculated all six SCS subscale scores (self-kindness, self-judgement, common humanity, isolation, mindfulness and over-identified) and found that they all significantly increased post-intervention, indicating that overall self-compassion increased (p<.05; Beri et al., 2020; Erkin & Aykar, 2021). Two studies found significant improvements in only the self-kindness and common humanity subscales (Riley et al., 2017; Trent et al., 2018). Kinchen et al. (2020) reported no within-group differences, suggesting that the yoga intervention had no effect on self-compassion.

The main finding that yoga interventions were associated with improved self-compassion in HPs and HP students is consistent with emerging research demonstrating a connection between yoga and self-compassion (Gard et al., 2012; Snaith et al., 2018). In support, Gard et al. (2012) concluded that enhanced wellness and reduced stress, as a result of yoga practice, was mediated by increased self-compassion. Kishida et al.'s (2018) qualitative study explored how yoga practisers perceive intra and interpersonal outcomes of their yoga practice and found the common theme that yoga cultivated self-compassion, particularly the component of self-kindness. Participants reported that through yoga, one was able to cultivate a compassionate nature in oneself, which often translated into their ways of being with others. Interestingly, this

review also found that the self-kindness subscale of the SCS significantly improved post-intervention in the majority of studies (e.g., Riley et al., 2017; Trent et al., 2018). The one study (Kinchen et al., 2020) that did not find within-group effects reported that students were undergoing weekly examinations and had increasing academic expectations, and it is possible that the yoga module added to their stress, due to the obligation to attend. However, the finding that students in the intervention who also practiced yoga outside had significantly higher 'self-kindness' compared to the other groups may support the idea of a 'dose effect' (Cook-Cottone, 2013; Ross et al., 2012).

1.4.2 Theoretical implications

Neff's (2003a) conceptualisation of self-compassion includes three components (self-kindness, common humanity and mindfulness) with bipolar constructs (self-judgement, isolation and over-identification) within each element. Neff argues that self-compassion is a meta-cognitive skill that can be cultivated (Bond et al., 2013; Germer & Neff, 2013). The findings of this review support this, in that yoga interventions led to increased self-compassion as opposed to being an inherent state or trait. Interestingly, when looking at the components of the yoga interventions, only two studies (Erkin & Aykar, 2021; Riley et al., 2017) reported that they incorporated compassion-focused practices (such as loving-kindness meditation or a compassionate body scan). Studies did not describe whether the postural and meditation practices explicitly encouraged participants to take a compassionate approach towards themselves.

In consideration of Gilbert's (2014) three flows of compassion, the findings from this review provide support for the cultivation of self-compassion. However, there was no measure of compassion towards/from others or a measure of patient experience of compassion, therefore it is not possible to infer whether yoga influenced the other flows. In addition, support for Gilbert's model (2009; 2014) is limited, as none of the studies used self-compassion measures designed to

assess his conceptualisation. Furthermore, studies did not employ a physiological measure, such as HRV, to objectively measure the soothing system (Porges, 2007; 2017).

The present study offers preliminary support for the theoretical models of yoga (Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018), such that yoga can potentially enhance self-compassion. However, future research is warranted to explore whether this extends to how people relate interpersonally (i.e., does yoga increase compassionate actions towards others). Furthermore, the findings from this review cannot make suggestions regarding the underlying mechanisms in which yoga may work to enhance self-compassion.

1.4.3 Critique of the literature

Though the results offer preliminary support for yoga interventions influencing self-compassion, the results of quality assessment (Appendix E) indicate that some of these findings should be interpreted with caution. Firstly, this review was limited by the number of eligible studies and overall small sample size. Six studies used a single group design (Beri et al., 2020; Erkin & Aykar 2021; Klawonn et al., 2019; Riley et al., 2017; Trent et al., 2018; 2019a), limiting the ability to interpret intervention effects due to the potential impact of extraneous variables, such as patient selection and placebo effects (Axelrod & Hayward, 2006). Two studies (Dyer et al., 2020; Trent et al., 2019b) employed a waitlist control, however these were non-randomised and were not controlled for time, limiting internal validity (Krasny-Pacini & Evans, 2018). All samples were recruited through convenience sampling, and therefore participants across studies may have had a pre-existing interest in yoga and not be generalisable to the wider HP population (Andrade, 2021). The more robust experimental designs employed self-assignment (Kinchen et al., 2020) and participants volunteered due to their interest in learning yoga (Mathad et al. 2017), therefore the samples are likely biased.

Across the studies, recruitment methods were generally poorly reported and vague in their description, with all studies receiving a score of one for this category in quality assessment, indicating this criterion was only partially met. Research lacked consideration of participant previous and current yoga practice. None of the studies measured and controlled for practice outside of the intervention, although most studies 'encouraged' participants to practise daily. Although there are no accepted standards for therapeutic dosage in yoga research (Cook-Cottone 2013), previous research has highlighted it as critical in affecting regulatory processes (Ross et al., 2012). All studies employed a majority female sample, which was not controlled for within analysis. Research has consistently shown that males tend to possess greater self-compassion compared to females (Yarnell et al., 2015), affecting internal validity. Three studies did not report ethnicity (Beri et al., 2020; Erkin & Aykar 2021; Klawonn et al., 2019) and of the studies which did, the majority were White (mean= 83.9%), affecting generalisability. Furthermore, poor reporting of statistical power and effect size (Cohen, 1992), limits the ability to report on the impact of findings.

The use of only self-report measures is an additional methodological weakness due to the likelihood of reporting biases, such as social desirability and recall bias (Rosenman et al., 2011). Furthermore, the use of a single measure of self-compassion (pre and post) makes it difficult to infer whether the yoga intervention makes any meaningful difference in HPs daily life, such as in the workplace. Furthermore, all studies included in this review measured self-compassion by the SCS (Neff, 2003b) and SCS-SF (Raes et al., 2011). The validity of these measures have been called into question; primarily due to the inclusion of the negatively scored, uncompassionate features (i.e., self-judgement, isolation, and over-identification) in the total score (Muris, 2016). Muris and Petrocchi (2017) found that these negative elements were more strongly associated with psychopathology than the positive dimensions of self-compassion, and argue that their inclusion in the total score is likely to amplify the link with psychopathology. Furthermore, as identified in an article by Sinclair et al. (2017), the clinical relevance of therapeutic interventions designed to

cultivate self-compassion in HPs is unclear. It appears that the yoga interventions did not directly teach self-compassion or if they did, did not clearly define how. Furthermore, whilst one of the claims of the self-compassion literature is the improvement of compassionate care to others (Gilbert, 2005a), none of the studies evaluated this primary outcome (such as patient experience) or measured self-compassion or compassion towards others in the workplace. Therefore it is difficult to assess the practical or clinical value of the yoga interventions (Durlak, 2009).

The findings of this review do not facilitate the recommendation on how yoga should be implemented to benefit HPs, due to the heterogeneity of interventions and the methodological flaws as previously discussed. Mannion (2014) reports that organisational context affects how compassionate care is defined, and suggest that different approaches will likely work in different settings. Unravelling the contexts and populations within which different yoga approaches are effective will enable the development of superior interventions.

1.4.4 Critique of current review

To the best of our knowledge, this is the first systematic review on yoga and self-compassion in the HP population. Strengths of this review include its accordance with the PRISMA guidelines: the thorough and reproducible search strategy, clearly defined inclusion and exclusion criteria, the comprehensive search for evidence, the rigorous appraisal of validity and the consideration of the findings in regard to the dominant theories of compassion and yoga theoretical frameworks. However, this review is not without its limitations. For example, all studies were in English and therefore there is risk of language or cultural bias, as studies that were written in other languages, may not have been identified. The review and search strategy focused on yoga and self-compassion in helping professionals and there was a surprisingly small number of studies despite the growing interest in these areas.

1.4.5 Clinical implications

Self-compassion is considered an important skill for HPs because it allows them to maintain their emotional sensitivity to others (Neff & Germer, 2018). With the growing popularity of yoga as a holistic approach for health and wellbeing (Zhang, 2021), HPs may be more interested in attending yoga classes than other workplace stress management interventions. The results from this review suggest that yoga may be a beneficial practice to help foster self-compassion in qualified and student HPs, although the self-selection bias limits these findings to those already keen or curious about the approach. Although there are likely challenges in applying such interventions, yoga practices and concepts, such as the ethics of yoga and pranayama (yogic breathing) could be integrated into the workplace setting. Yoga practices that emphasise compassion (such as *metta*, loving-kindness meditation) may be particularly beneficial in generating compassion, however the results from this review cannot directly support this hypothesis.

1.4.6 Implications for further research

All studies in this review were published since 2017, with 70% of the studies published in the last two years. This shows that this area of research is new and in the early stages of development. Firstly, future research would benefit from larger sample sizes, randomisation and active control groups to assess its potential in this population. Researchers should thoroughly describe yoga interventions and consider using validated measures to describe their interventions, such as the Essential Properties of Yoga Questionnaire (Park et al., 2018). Future research should consider designing studies to unravel which yoga practices are most useful (including ethics, postures, breathwork and meditation) in cultivating self-compassion, whilst also evaluating yoga in its entirety. Incorporating qualitative research, behavioural observations and physiological measures, such as HRV, in addition to self-report data would strengthen findings.

Research suggests that self-compassion can be enhanced when explicitly taught (Neff & Germer, 2013). Future research should explore the effects of yoga interventions that incorporate the ethics of yoga, explicitly the yogic concept of compassion or ahimsa (non-harm), explicitly teaching self-compassion in the practice. Furthermore, all findings were based on self-compassion as measured by the SCS (Neff, 2003b) or SCS-SF (Raes et al., 2010). The majority of the literature conceptualises self-compassion using Neff's (2003a) framework and future research would benefit from exploring the effects of yoga interventions from Gilbert's (2009; 2014) theoretical perspective, for example through using the Compassionate Engagement and Action Scales (CEAS; Gilbert et al., 2017) to explore all three flows of compassion to inform the potential impact of yoga on compassion to and from others. Furthermore, it has been suggested that receiving compassion from others may reduce distress and potentially burnout, by enhancing the activation of the soothing system (Gilbert, 2010; Irons & Beaumont, 2017). However, this is a particularly under-researched area, which requires future exploration. Importantly, a hypothesised outcome from enhanced self-compassion, is that it should result in improved patient care (Olson & Kemper, 2014). However, none of the studies in this review measured patient experience, which has been highlighted as a limitation in previous studies (Sinclair et al., 2017). Future research would benefit from assessing patient experience to enhance the clinical significance of the research (Mc Ewan et al., 2020).

1.4.7 Conclusion

This study explored the effect of yoga interventions on self-compassion in HPs (qualified and in-training). Given the positive association between self-compassion and HP resilience (Kemper et al., 2015), wellbeing and patient outcomes (Mannion, 2014; Olson & Kemper, 2014), strategies to enhance self-compassion in this population are vital. HPs are under increased levels of stress (Duarte et al., 2016) and are working in environments conducive to fatigue and burnout (Bond et al., 2013). The findings from this review suggest that yoga can potentially be considered

a helpful practice in improving self-compassion in HPs. However, the quality of evidence limits our ability to interpret the results with confidence. Whilst self-compassion scores improved following yoga interventions, the methodological drawbacks discussed, such as not controlling for yoga practice outside the intervention, limit our ability to be confident in the intervention effects. In addition, due to the heterogeneity of yoga interventions across studies, this review does not allow recommendations to be made for what aspects or limbs of yoga are important in yoga interventions or how this might be best implemented for HPs. Furthermore, this reviews does not provide evidence to suggest whether higher self-compassion scores have any practical or clinical significance in the workplace. Lastly, as the literature on yoga and compassion is limited to investigating self-compassion, this study proposes that researchers should explore the impact of yoga on the ability to feel compassion towards others and to receive compassion from others (Gilbert, 2014).

1.5 References

American Psychological Association (2020). https://dictionary.apa.org/helping-professions

Andrade, C. (2021). The inconvenient truth about convenience and purposive samples. *Indian Journal of Psychological Medicine*, *43*(1), 86-88.

Axelrod, D., & Hayward, R. (2006). Nonrandomized interventional study designs (quasi-experimental designs). In D. F. Penson, & J. T. Wei (Eds), *Clinical research methods for surgeons*. (pp. 63-76). New York: Humana Press.

Barnard, L.K., & Curry, J.F. (2011). Self-compassion: Conceptualizations, correlates, and interventions. *Review of General Psychology, 15*, 289–303.

Beaumont, E., Durkin, M., Hollis Martin, C.J., & Carson, J. (2016a). Compassion for others, self-compassion, quality of life and mental well-being measures and their association with compassion fatigue and burnout in student midwives: A quantitative survey. *Midwifery, 34*, 239–244.

Bennetts, A. (2022). How does yoga practice and therapy yield psychological benefits? A review and model of transdiagnostic processes. *Complementary Therapies in Clinical Practice*, 101514.

Beri, K., Menon, V., Guzman, E., Chapa, C., Patel, R., Shariff, M. A., & Kasubhai, M. (2020). The effect of living a 'yogic lifestyle' on stress response and self-image in healthcare professionals: a pilot study. *Future science OA*, *6*(6), FSO473.

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.

Bond, A. R., Mason, H. F., Lemaster, C. M., Shaw, S. E., Mullin, C. S., Hplick, E. A., & Saper, R. B. (2013). Embodied health: the effects of a mind-body course for medical students. *Medical Education Online, 18*, 1–8.

Bowlby, J. (1969). Attachment and loss v. 3 (Vol. 1).

Bowlby, J. (1982). Attachment and loss: retrospect and prospect. *American journal of Orthopsychiatry*, *52*(4), 664.

Bryant, E. F. (2008). *The yoga sutras of Patanjali: A new edition, translation, and commentary*. North Point Press.

Ciezar-Andersen, S. D., Hayden, K. A., & King-Shier, K. M. (2021). A Systematic Review of Yoga Interventions for Helping Health Professionals and Students. *Complementary Therapies in Medicine*, 102704.

Cocchiara, R. A., Peruzzo, M., Mannocci, A., Ottolenghi, L., Villari, P., Polimeni, A., ... & La Torre, G. (2019). The use of yoga to manage stress and burnout in healthcare workers: A systematic review. *Journal of clinical medicine*, *8*(3), 284.

Cohen, J. (1992). Statistical power analysis. *Current Directions in Psychological Science*, *1*(3), 98-101.

Cook-Cottone, C. (2013). Dosage as a critical variable in yoga therapy research. *International Journal of Yoga Therapy Research, 23*(2), 11–12.

Desikachar, T. K. V. (1995). *The heart of yoga: Developing a personal practice*. Rochester: Inner Traditions.

Di Bello, M., Carnevali, L., Petrocchi, N., Thayer, J. F., Gilbert, P., & Ottaviani, C. (2020). The compassionate vagus: a meta-analysis on the connection between compassion and heart rate variability. *Neuroscience and Biobehavioral Reviews, 116*, 21–30.

Duarte, D., El-Hagrassy, M. M., Couto, T. C. E., Gurgel, W., Fregni, F., & Correa, H. (2020). Male and Female Physician Suicidality: A Systematic Review and Meta-analysis. *JAMA Psychiatry, 77*(6), 587–597.

Duarte, J., Pinto-Gouveia, J., & Cruz, B. (2016). Relationships between nurses' empathy, self-compassion and dimensions of professional quality of life: A cross-sectional study. *International Journal of Nursing Studies, 60*, 1–11.

Durlak, J. A. (2009). How to select, calculate, and interpret effect sizes. *Journal of Pediatric Psychology*, *34*(9), 917–928.

Dyer, N. L., Borden, S., Dusek, J. A., & Khalsa, S. B. S. (2020). A pragmatic controlled trial of a brief yoga and mindfulness-based program for psychological and occupational health in education professionals. *Complementary Therapies in Medicine*, *52*, 102470.

Elwy, A. R., Groessl, E. J., Eisen, S. V., Riley, K. E., Maiya, M., Lee, J. P., ... & Park, C. L. (2014). A systematic scoping review of yoga intervention components and study quality. *American Journal of Preventive Medicine*, *47*(2), 220-232.

Erkin, Ö., & Şenuzun Aykar, F. (2021). The effect of the yoga course on mindfulness and self-compassion among nursing students. *Perspectives in Psychiatric Care*, *57*(2), 875-882.

Finlay-Jones, A. L., Rees, C. S., & Kane, R. T. (2015). Self-compassion, emotion regulation and stress among Australian psychologists: Testing an emotion regulation model of self-compassion using structural equation modeling. *PloS one*, *10*(7), e0133481.

Ford, B. C. (2018). 'I felt safe in my body again': The experience of MFTs who practice yoga as self-care [PhD Dissertation]. Alliant International University. Retrieved from ProQuest Digital Dissertations. (ProQuest Number:10749669).

Ford, E. W. (2019). Stress, burnout, and moral injury: the state of the healthcare workforce. *Journal of Healthcare Management, 64*, 125–27.

Gabassi, P. G., Cervai, S., Rozbowsky, P., Semeraro, A., & Gregori, D. (2002). Burnout syndrome in the helping professions. *Psychological reports*, *90*(1), 309-314.

Galantino, M. L., Baime, M. J., Maguire, M. G., & Szapary, P. O. (2005). Comparison of psychological and physiological measures of stress in healthcare professionals during an eight-week mindfulness meditation program. *Stress and Health, 21*(4), 255-261.

Gard, T., Brach, N., Holzel, 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. *Journal of Positive Psychology, 7*, 165–175.

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*, 770.

Germer, C. K., & Neff, K. D. (2013). Self-compassion in clinical practice. *Journal of Clinical Psychology*, *69*(8), 856-867.

Gilbert, P. (1989). *Human nature and suffering*. Hove: Erlbaum.

Gilbert, P. (2000). Social mentalities: Internal 'social' conflicts and the role of inner warmth and compassion in cognitive therapy. In P. Gilbert, & K.G. Bailey (Eds), *Genes on the couch: Explorations in evolutionary psychotherapy* (pp. 118–150). Hove: Brunner-Routledge.

Gilbert, P. (2005a). Compassion and cruelty: A biopsychosocial approach. In P. Gilbert (Ed.), *Compassion: Conceptualisations, research and use in psychotherapy* (pp. 9–74). London: Routledge.

Gilbert, P. (2005b). Social mentalities: A biopsychosocial and evolutionary reflection on social relationships. In M.W. Baldwin (Ed.), *Interpersonal cognition.* (pp. 299–335). New York: Guilford.

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment, 15*, 199–208.

Gilbert, P. (2010). *Compassion focused therapy: The CBT distinctive features series*. London: Routledge.

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology, 53*, 6–41.

Gilbert, P. (2020). Compassion: From its evolution to a psychotherapy. *Frontiers in Psychology, 11,* 586161.

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., … & Basran, J. (2017). The development of compassionate engagement and action scales for self and others. *Journal of Compassionate Health Care, 4*, 1-24.

Haight, W., Sugrue, E. P., & Calhoun, M. (2017). Moral injury among child protection professionals: Implications for the ethical treatment and retention of workers. *Children and Youth Services Review, 82,* 27–41.

Irons, C., & Beaumont, E. (2017). The Compassionate Mind Workbook: A step-by-step guide to developing your compassionate self. London: Little Brown.

Ivtzan, I., & Jegatheeswaran, S. (2014). The yoga boom in Western society: Practitioners' spiritual vs. physical intentions and their impact on psychological wellbeing. *Journal of Yoga & Physical Therapy, 5*(3).

Keidel, G. C. (2002). Burnout and compassion fatigue among hospice caregivers. *American Journal of Hospice and Palliative Care, 19,* 200–205.

Kemper, K.J., Mo, X., & Khayat, R. (2015). Are mindfulness and self-compassion associated with sleep and resilience in health professionals? *Journal of Alternative and Complementary Medicine, 21*(8), 496–503.

Kinchen, E., Loerzel, V., & Portoghese, T. (2020). Yoga and perceived stress, self-compassion, and quality of life in undergraduate nursing students. *Journal of Education and Health Promotion*, *9*, 292.

Kirschner, H., Kuyken, W., Wright, K., Roberts, H., Brejcha, C., & Karl, A. (2019). Soothing your heart and feeling connected: A new experimental paradigm to study the benefits of self-compassion. *Clinical Psychological Science*, *7*(3), 545- 565.

Kishida, M., Mama, S. K., Larkey, L. K., & Elavsky, S. (2018). "Yoga resets my inner peace barometer": A qualitative study illuminating the pathways of how yoga impacts one's relationship to oneself and to others. *Complementary Therapies in Medicine, 40*, 215–221.

Klawonn, A., Kernan, D., & Lynskey, J. (2019). A 5-Week Seminar on the Biopsychosocial-Spiritual Model of Self-Care Improves Anxiety, Self-Compassion, Mindfulness, Depression, and Stress in Graduate Healthcare Students. *International Journal of Yoga Therapy*, *29*(1), 81-89.

Kmet, L. M., Lee, R. C., & Cook, L. S. (2004). *Standard quality assessment criteria for evaluating primary research papers from a variety of fields*. Alberta, CA: Alberta Heritage Foundation for Medical Research.

Krasny-Pacini, A., & Evans, J. (2018). Single-case experimental designs to assess intervention effectiveness in rehabilitation: A practical guide. *Annals of Physical and Rehabilitation Medicine, 61*, 164-179.

Leiter, M. P., Harvie, P., & Frizzell, C. (1998). The correspondence of patient satisfaction and nurse burnout. *Social Science and Medicine, 47*(10), 1611-1617.

Litz, B. T., Stein, N., Delaney, E.,Lebowitz, L., Nash, W. P., Silva, C., & Maguen, S. (2009). Moral injury and moral repair in war veterans: a preliminary model and intervention strategy. *Clinical Psychology Review, 29*, 695-706.

Macbeth, A., & Gumley, A. (2012). Exploring compassion: a meta-analysis of the association between self-compassion and psychopathology: *Clinical Psychology Review, 32*(6), 545-552.

Mannion, R. (2014). Enabling compassion healthcare: perils, prospects and perspectives. *International Journal of Health Policy and Management, 2*(3), 115-117.

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*, *11*(5), KC01.

McEwan, K., Minou, L., Moore, H., & Gilbert, P. (2020). Engaging with distress: Training in the compassionate approach. *Journal of Psychiatric and Mental Health Nursing, 27*, 718–727.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Altman, D., Antes, G., ... & Tugwell, P. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement (Chinese edition). *Journal of Chinese Integrative Medicine*, *7*(9), 889-896.

Morgan, P., Simpson, J., & Smith, A. (2015). Health care workers' experiences of mindfulness training: a qualitative review. *Mindfulness*, *6*(4), 744-758.

Muris, P. (2016). A protective factor against mental health problems in youths? A critical note on the assessment of self-compassion. *Journal of Child and Family Studies, 25*, 1461–1465.

Muris, P., & Petrocchi, N. (2017). Protection or vulnerability? A meta-analysis of the relations between the positive and negative components of self-compassion and psychopathology. *Clinical Psychology and Psychotherapy, 24*, 373–383.

Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2,* 85-101.

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223-250.

Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and personality psychology compass*, *5*(1), 1-12.

Neff, K.D., & Germer, C.K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology, 69*(1), 28–44.

Neff, K., & Germer, C. (2018). *The mindful self-compassion workbook: A proven way to accept yourself, build inner strength, and thrive*. Guilford Publications.

Neff, K. D., Rude, S. S., & Kirkpatrick, K. L. (2007). An examination of self-compassion in relation to positive psychological functioning and personality traits. *Journal of research in personality*, *41*(4), 908-916.

Niuwenhuijsen, N., Bruinvelds, D., & Frings-Dresen, M. (2010). Psychosocial work environment and stress-related disorders, a systematic review. *Occupational Medicine, 60*, 277-286.

Olson, K., & Kemper, K. J. (2014). Factors associated with well-being and confidence in providing compassionate care. *Journal of Evidence-Based Complementary & Alternative Medicine, 19*, 292–296.

Park, C. L., Elwy, A. R., Maiya, M., Sarkin, A. J., Riley, K. E., Eisen, S. V., … & Braun, T. (2018). The Essential Properties of Yoga Questionnaire (EPYQ): Psychometric properties. *International Journal of Yoga Therapy, 28*(1), 23–38.

Payne, N. (2001). Occupational stressors and coping as determinants of burnout in female hospice nurses. *Journal of Advances in Nursing, 33*(3), 396-405.

Popay, J., Roberts, H., Sowden, A., Petticrew, M., Arai, L., Rogers, M., … & Duffy, S. (2006). *Guidance on the conduct of narrative synthesis in systematic reviews. A Product from the ESRC Methods Programme*. Lancaster: Institute of Health Research.

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology, 74*, 116–143.

Porges, S. W. (2017). Vagal pathways: portals to compassion. In E. M. Seppälä, E. Simon-Thomas, S. L. Brown and M. C. Worline (Eds.) *The Oxford handbook of compassion science*. (pp. 189-204).

Raab, K. (2014). Mindfulness, self-compassion, and empathy among health care professionals: a review of the literature. *Journal of health care chaplaincy*, *20*(3), 95-108.

Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2010). Construction and factorial validation of a short form of the self-compassion scale. *Clinical Psychology & Psychotherapy, 18*, 250–255.

Reith, T. P. (2018). Burnout in United States healthcare professionals: A narrative review. *Cureus, 10*(12), e3681.

Riley, K. E., Park, C. L., Wilson, A., Sabo, A. N., Antoni, M. H., Braun, T. D., ... & Cope, S. (2017). Improving physical and mental health in frontline mental health care providers: Yoga-based stress management versus cognitive behavioral stress management. *Journal of Workplace Behavioral Health*, *32*(1), 26-48.

Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural & Healthcare Research*, *2*(4), 320–332.

Ross, A., Friedmann, E., Bevans, M., & Thomas, S. (2012). Frequency of yoga practice predicts health: Results from a national survey of yoga practice. *Evidence-based Complementary and Alternative Medicine, 10*.

Shallit, S. (2018). *Yoga for depression and anxiety among women with eating pathology: Roles of mindfulness and self-compassion* (Doctoral dissertation, Alliant International University).

Shamian, J., Kerr, M. S., Laschinger, H. K., & Thomson, D. (2016). A hospital-level analysis of the work environment and workforce health indicators for registered nurses in Ontario's acute-care hospitals. *The Canadian Journal of Nursing Research, 33*(4), 35–50.

Shanafelt, T. D., Bradley, K. A., Wipf, J. E., & Back, A. L. (2002). Burnout and self-reported patient care in an internal medicine residency program. *JAMA Internal Medicine, 136*(5), 358-367.

Shirey, M. R. (2007). An evidence based solution for minimizing stress and anger in nursing students. *Journal of Nursing Education, 46*, 568–571.

Sibeoni, J., Bellon-Champel, L., Mousty, A., Manolios, E., Verneuil, L., & Revah-Levy, A. (2019). Physicians' perspectives about burnout: A systematic review and metasynthesis. *Journal of General Internal Medicine, 34*(8), 1578–1590.

Sinclair, S., Kondejewski, J., Raffin-Bouchal, S., King-Shier, K. M., & Singh, P. (2017). Can Self-Compassion Promote Healthcare Provider Well-Being and Compassionate Care to Others? Results of a Systematic Review. *Applied Psychology: Health and Well-Being*, *9*(2), 168-206.

Singer, T., & Engert, V. (2019). It matters what you practice: differential training effects on subjective experience, behavior, brain and body in the ReSource project. *Current Opinion in Psychology, 28,* 151–158.

Snaith, N., Schultz, T., Proeve, M., & Rasmussen, P. (2018). Mindfulness, self-compassion, anxiety and depression measures in South Australian yoga participants: implications for designing a yoga intervention. *Complementary Therapies in Clinical Practice*, *32*, 92-99.

Strauss, C., Taylor, B. L., Gu, J., Kuyken, W., Baer, R., Jones, F., & Cavanagh, K. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clinical psychology review*, *47*, 15-27.

Strolin, J., McCarthy, M., & Caringi, J. (2007). Causes and effects of child welfare workforce turnover: Current state of knowledge and future directions. *Journal of Public Child Welfare, 1*(2), 29-52.

Sullivan, M., Erb, M., Schmalzl, L., Moonaz, S., Noggle Taylor, J., & Porges, S. W. (2018). Yoga therapy and polyvagal theory: The convergence of traditional wisdom and contemporary neuroscience for self-regulation and resilience. *Frontiers in Human Neuroscience, 12*, 67.

Trent, N. L., Borden, S., Miraglia, M., Pasalis, E., Dusek, J. A., & Khalsa, S. B. S. (2019a). Improvements in psychological and occupational well-being following a brief yoga-based program for education professionals. *Global Advances in Health and Medicine*, *8*, 2164956119856856.

Trent, N. L., Borden, S., Miraglia, M., Pasalis, E., Dusek, J. A., & Khalsa, S. B. S. (2019b). Improvements in psychological and occupational well-being in a pragmatic controlled trial of a yoga-based program for professionals. *The Journal of Alternative and Complementary Medicine*, *25*(6), 593-605.

Trent, N. L., Miraglia, M., Dusek, J. A., Pasalis, E., & Khalsa, S. B. S. (2018). Improvements in psychological health following a residential yoga-based program for frontline professionals. *Journal of Occupational and Environmental Medicine*, *60*(4), 357-367.

Weng, H. Y., Fox, A. S., Shackman, A. J., Stodola, D. E., Caldwell, J. Z. K., Olson, M. C.,… & Davidson, R. J. (2013). Compassion training alters altruism and neural responses to suffering. *Psychological Science, 24*, 1171–1180.

White, D. B., & Lo, B. (2020). A framework for rationing ventilators and critical care beds during the COVID-19 pandemic. *JAMA, 146*, e61S-e74S.

Yarnell, L. M., Stafford, R. E., Neff, K. D., Reilly, E. D., Knox, M. C., & Mullarkey, M. (2015). Meta-analysis of gender differences in self-compassion. *Self and Identity, 14*(5), 499–520.

Zessin, U., Dickhauser, O., & Garbade, S. (2015). The relationship between self-compassion and well-being: A meta-analysis. *Applied Psychology: Health and Well-Being, 7*(3), 340-364.

Zhang, Y., Lauche, R., Cramer, H., Munk, N., & Dennis, J. A. (2021). Increasing trend of yoga practice among US adults from 2002 to 2017. *The Journal of Alternative and Complementary Medicine, 27*(9).

Chapter 2 Empirical Paper

Title: Are yoga practisers more mindful and compassionate? Exploring the limbs of yoga, wellbeing, self-criticism and the three flows of compassion

Journal specification: The 'Journal of Positive Psychology' has been chosen as a guide in determining the preparation of the paper. Research articles have a word limit of 7,500 words (excluding the reference list)

Word count: 7,554 (excluding references)

Abstract

Evidence supporting yoga for holistic health is growing, however the underlying mechanisms are uncertain. This study explored the differences between yoga practisers (YP) and non-yoga practisers (NYP) on psychological factors. The second part explored YPs and the limbs of yoga, namely ahimsa (ethics), pranayama (breathwork) and dharana (meditation). Using a non-clinical convenience sample, 184 YPs and 275 NYPs completed an online survey. Group comparisons revealed that YPs had significantly higher positive wellbeing, mindfulness, self-compassion and compassion from others, and lower negative wellbeing and self-criticism. In the YP sample, ahimsa significantly positively correlated with the three flows of compassion. Pranayama positively correlated with self-compassion and compassion towards others. Multiple regressions revealed that ahimsa was the strongest predictor of wellbeing and the three flows of compassion. This research highlights the essential consideration of the ethics of yoga in interventions and research. Implications and directions for future research are discussed.

2.2 Introduction

2.2.1 Compassion

Compassion, a concept which has been discussed in ancient spiritual and religious traditions for thousands of years (Goetz et al., 2010; Kirby & Gilbert, 2017) has recently gained significant attention in psychological science (Gilbert, 2014; Singer & Bolz, 2013). Research has consistently shown that higher levels of self-compassion are associated with lower levels of psychopathology (Barnard & Curry, 2011), less negative rumination (Leary et al., 2007) and better psychological and physiological health (Raque-Bogdan et al., 2011). Developing self-compassion has been shown to buffer the effects of self-criticism (Leary et al., 2007) and has been associated with positive interpersonal and social relationships (Yarnell & Neff, 2013). As a consequence of the significant benefits associated with compassion, several compassion-based interventions have developed to specifically cultivate compassion (e.g., Gilbert, 2014; Neff & Germer, 2013; Jazaieri et al., 2013).

Whilst there are many definitions of compassion in the literature (see Strauss et al., 2016), Neff's (2003a) theory of self-compassion has received the most empirical investigation. Neff (2003a) has defined self-compassion as being composed of three main components: self-kindness versus self-judgment, common humanity versus isolation, and mindfulness versus over-identification. Self-kindness refers to being warm and understanding with ourselves when we suffer, fail or feel inadequate, as opposed to being self-judgemental. Common humanity involves recognising that suffering is part of the human condition, as opposed to being in isolation. Finally, mindfulness involves turning towards our suffering and seeing our painful thoughts and emotions, rather than avoid, suppress or over identify with them (Neff, 2003a).

Since the development of the Self-Compassion Scale (SCS; Neff, 2003b), studies (e.g., MacBeth & Gumley, 2012) have examined the link between self-compassion and stress,

depression and anxiety with the consistent finding that self-compassion appears to enhance resilience to negative events (Neff & Germer, 2013). Self-compassion enhances being kind, understanding and supportive towards oneself, as opposed to harshly self-critical (Berking & Whitley, 2014) in response to negative events or failure. However, recently the validity of the SCS has been criticised (Muris et al., 2016), largely due to the inclusion of the uncompassionate features (i.e., self-judgement, isolation, and over-identification) in the scale's total score. It therefore seems fair to propose that there is a need for future research to use other measures of compassion that do not use opposing constructs such as the SCS.

In contrast, Gilbert's (1989; 2000; 2005a; 2005b) approach to compassion is rooted in the evolutionary model of social mentality theory, arguing that social mentalities are internal systems that evolved to guide specific cognitions, emotions and behaviours essential for survival, such as care seeking. Gilbert suggests that specific social mentalities stimulate neurophysiological pathways linked to affect regulatory systems, known as the tripartite model of affect regulation (2005a; 2005b; 2009; 2014). According to the model, humans possess three interacting systems: the threat system (associated with protection and emotions such as anger, anxiety and self-criticism), the drive system (about incentive and resource seeking) and the soothing system (related to feelings of safeness, calm and contentment). When the systems are unbalanced and the threat-based system is disproportionately activated, the soothing system is relatively inactive, leading to psychopathology (Gilbert, 2009; Lawrence & Lee, 2014).

Based on this theory, Gilbert (2009; 2014) developed Compassionate Mind Training (CMT), which was created for people with high shame and self-criticism, who often find self-acceptance and self-warmth difficult and fearsome. Research consistently shows a strong inverse relationship between self-criticism and self-reassurance (Gilbert et al., 2004) and self-criticism is associated with difficulties in generating self-compassion (Gilbert et al., 2006). Through the use of mind and body-based practices, CMT aims to bring the three systems into balance by developing

abilities to generate warmth and self-soothing that can act as an antidote to the sense of threat (see Gilbert, 2009; 2014). Gilbert's (2009) model emphasises that compassion flows in three directions: the ability to feel compassion for others, to receive compassion from others and to be compassionate towards oneself (self-compassion). Gilbert et al. (2017) developed the Compassionate and Engagement and Action Scales (CEAS), which consists of three self-report subscales, which measure each of the three flows of compassion. The CEAS addresses some of the limitations of the SCS by providing a more robust measure of compassion based on his theoretical model of compassion as a social mentality (Gilbert, 1989; 2005a).

2.2.2 Yoga, mindfulness and compassion

Yoga has become increasingly popular in the West as a holistic approach to health and wellbeing (Zhang, 2021), with yoga research demonstrating a number of psychological and physiological benefits of the practice (Barrows & Fleury, 2016; Brinsley et al., 2020; Hendriks et al., 2017). Attempts are being made to integrate yoga into health services, with yoga therapy an evolving practice in complementary and integrative healthcare (Mason et al., 2017). While modern yoga in the West can be heavily focused on the physical aspects, yoga traditionally contains eight limbs or paths of personal and spiritual development (Bryant, 2009). As outlined in Patanjali's *Yoga Sutras* (Bryant, 2009), these eight limbs include ethical considerations *(yamas)*, positive self-discipline *(niyamas)*, physical postures *(asanas)*, breathwork *(pranayama)*, inward attention *(pratyhara)*, focused concentration meditation *(dharana)*, state of consciousness *(dhyana)* and bliss state *(Samadhi;* Iyengar, 1995).

Over the past few decades there has been a surge in research investigating mind-body practices such as yoga and the effects on mindfulness and self-compassion (Birnie et al., 2010; Bond et al., 2013). Mindfulness has been identified as an essential component of yoga and has been linked to positive psychological outcomes (Salmon et al., 2009). Both mindfulness and self-

compassion have been shown to have mediatory effects on outcomes (Baer et al., 2012a; Gard et al., 2012). See Conversano et al. (2020) for a detailed review of mindfulness and the compassion-focused research.

Whilst there are promising findings related to the effectiveness of yoga, review studies have consistently found that many yoga studies lacked valid methods to describe their interventions, leading to inconclusive or inconsistent results (Elwy et al., 2014; Sharma et al., 2016). It has been proposed that the heterogeneity of yoga interventions, in addition to poor reporting methods, has limited the ability for researchers to understand the mechanisms by which yoga affects physical and psychological wellbeing (Riley & Park, 2015). Moreover, the ethical component of yoga (yamas and niyamas) have often been neglected in research, yet yoga experts have advocated its importance (Varambally & Gangadhar, 2016). Recent tools, such as the Essential Properties of Yoga Questionnaire (EPYQ, Park et al., 2018) have been developed to measure and describe the multiple dimensions of yoga interventions, however these have not yet been widely used in the research.

2.2.3 Mechanisms of change in yoga

Evidence regarding the mechanisms through which yoga brings about positive effects remain limited (Riley & Park, 2015) and may be influenced by a combination of elements, including postures, breathwork, meditation, mindfulness and spiritual aspects (Gard et al., 2014). Recent theoretical frameworks have developed to explain how yoga may influence various aspects of self-regulation and wellbeing (see Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018). Bennetts' (2022) model makes theoretical links between the eight limbs of yoga and transdiagnostic processes involved in psychological distress and wellbeing, emphasising the ethics of yoga (yamas and niyamas) as particularly relevant to psychological constructs such as compassion and self-criticism, and drawing links between transdiagnostic therapies and yoga practice. Gard et al. (2014) proposed an integrative model of yoga highlighting both top-down

neurocognitive and bottom-up neurophysiological mechanisms contributing to wellbeing. Bottom-up processes are primarily driven by the movement and breathwork aspects of yoga and the top-down processes are driven by the cognitive process of attention (see Porges, 2017; Sullivan et al., 2018). Incorporating neuroscience and behavioural theory (e.g., Critchley et al., 2004; van Gaal et al., 2011), Gard et al. (2014) suggest that with continued practice, regulatory pathways become more automatic, leading to increased self-regulation and psychological and physical well-being. The model also highlights links between the ethics of ahimsa (non-violence, the first of the yamas) and santosha (contentment) with self-compassion. Furthermore, Kishida et al. (2018) proposed that yoga practice improves wellbeing because of changes in self-compassion, mindfulness and social connectedness, with self-compassion or mindfulness indirectly affecting compassion to others. Whilst the theoretical models specifically consider ahimsa as an ethical principle of particular interest in relation to compassion, further research is need to substantiate this viewpoint.

2.2.4 Yoga philosophy and the flows of compassion

2.2.4.1 Ahimsa, pranayama and dharana

Ahimsa, described as an attitude of relating to the experience of the self and others as welcoming, non-judgemental and caring (Hanson, 2010) is akin to the concepts in Gilbert's (2005a; 2005b; 2009; 2014) theory of compassion as a social motivation (Bennetts, 2022). Pranayama, the fourth limb of yoga, involves regulation of the breath to keep awareness in the present moment (Bryant, 2009), and conceptually may target the threat system by engaging the social safety system, a prerequisite for experiencing or expressing compassion (Porges, 2017). Conscious breathing is central in CMT (Gilbert & Choden, 2013) and has been shown to activate the ventral vagal pathways and improve HRV (Kogan et al., 2014). Dharana, the sixth limb of yoga, involves concentration meditation to de-identify with the mind and observe thoughts and the

present moment more clearly (Iyengar, 1995). Gilbert (2010) suggests that mindfulness is a critical component of compassion and mindfulness practices are central in CMT (Gilbert & Choden 2013).

2.2.5 Rationale for study

The ethics of yoga, in particular ahimsa, whilst central in yoga theory (e.g., Gard et al., 2014), are particularly under-researched (Matko et al., 2021). Yoga and compassion theory (Gilbert, 2009; 2014) share philosophical similarities (Bennetts, 2022), and both have been explicitly utilised as mind/body training programs to work with psychological distress, however very little empirical research has looked at the common aspects of these approaches. As such, this study will provide novel research on the three flows of compassion (Gilbert, 2009) and yoga. Comparative studies (Matko et al., 2021) into the differential effects of the limbs of yoga are limited and have often suffered from poor methodological quality (Riley & Park, 2015). Thus, there have been repeated calls to evaluate the different components of yoga practice (Gard et al., 2014; Riley & Park, 2015), specifically the ethical component (Bennetts, 2022; Matko et al., 2021) on psychological outcomes. This would support the development of more targeted and effective yoga programs tailored to the needs of both clinical and non-clinical populations (Matko et al., 2021). Furthermore, much of the research has focused on self-compassion using the SCS (Neff, 2003b; see Kirschner et al., 2019) and the other flows (compassion towards others and compassion from others) have not been explored.

It is postulated that practising ahimsa during yoga is akin to rehearsing compassion (Bennetts, 2022). Pranayama and dharana are also key components of yoga and CMT and are important for generating the physiological state to experience compassion (Porges, 2017), and have been postulated as akin to components of transdiagnostic therapies (Bennetts, 2022). It would be plausible to suggest that yoga practices that incorporate ahimsa, pranayama and dharana explicitly would therefore be associated with greater compassion and wellbeing. Specifically, this study hypothesised that:

1) Yoga practisers will have greater levels of wellbeing and mindfulness and lower levels anxiety, depression, stress and self-criticism compared to the non-yoga practisers.
2) Yoga practisers will have higher levels of the three flows of compassion (to self, from/to others), compared to non-yoga practisers.
3) In the yoga group, greater practise of ahimsa, pranayama and dharana will be associated with greater levels of all three flows of compassion (self and to/from others).
4) Further exploratory analysis will be conducted to explore the interplay between the three flows of compassion (to self, from/to others), wellbeing and specific aspects of yoga practise (ahimsa, pranayama and dharana).

2.3 Method

2.3.1 Ethical considerations

All study procedures were approved by the University of Southampton Ethics and Research Governance Committee (ERGO Ethics ID: 61031; see Appendix L). Informed consent was gained from all participants who were above the age of 18 years, via an online consent statement (see Appendix M).

2.3.2 Design

The study employed a cross sectional design. For the first and second hypothesis, the between-subjects variable had two levels ('Yoga practiser' vs 'Non-Yoga practiser'). To explore the third and fourth hypothesis, the within-subjects (yoga practisers) variable is the features of their yoga practice (practise of ahimsa, pranayama and dharana). The dependent variables were self-reported measures of the three flows of compassion: compassion to self (CEAS-SC), compassion towards others (CEAS-CtO), and compassion from others (CEAS-CfO), wellbeing (WB), mindfulness

(MF), self-criticism (SC), depression (DASS-D), anxiety (DASS-A) and stress (DASS-S). See Section 2.2.5 for the descriptions of measures.

2.3.3 Power analysis

Power analyses were conducted using G*Power (version 3.1.9.2; Faul et al., 2013) prior to the commencement of the study. Assuming a medium effect size and power of 0.80, a minimum of 33 participants (per group) for a multiple regression with three predictors was suggested.

2.3.4 Participants

In total, 552 individuals logged onto the study and 459 responses were included in analysis (YP n=184, NYP n=275). Participants who were aged over 18 years and fluent in the English language, were deemed eligible for the study. Participants were included in the 'Yoga' group if they self-reported to practise yoga at least twice per month. Individuals were excluded if they were currently undergoing psychological therapy. The majority of participants were female (91.8% YPs and 82.9% NYPs) and White (90.2% YPs, 80.7% NYPs. The mean age of YPs was 25-34 years and NYPs was under 21 years. See Table 4 and Appendix I for further demographic information.

Table 4.

Participant demographics by group

Characteristic	Yoga Practisers	Non-Yoga Practisers	Difference (95% CI)
Demographics	*n* (%)	*n* (%)	
Total (*n*)	184	275	
Age	*Median*= 25-34	*Median*= under 21	
Under 21	29 (15.8)	169 (61.5)	**
21-24	21 (11.4)	36 (13.1)	-
25-34	47 (25.5)	33 (12)	**
35-44	34 (18.5)	21 (7.6)	**
45-54	19 (10.3)	5 (1.8)	**
55-64	21 (11.4)	8 (2.9)	**
65+	13 (7.1)	3 (1.1)	-
Gender			
Female	169 (91.8)	228 (82.9)	**
Male	12 (6.5)	43 (15.6)	**
Ethnicity			
White	166 (90.2)	222 (80.7)	**
Black	2 (1.1)	12 (4.4)	**
Asian	7 (3.8)	23 (8.4)	-
Mixed heritage	7 (3.8)	13 (4.7)	-

Note. CI= confidence interval

** significant at $p<.05$

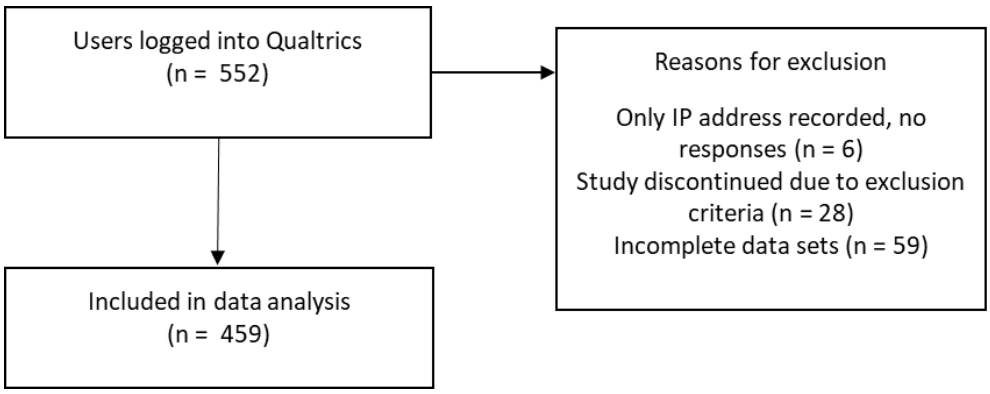

Figure 2.

Consort diagram showing reasons for excluding data sets

2.3.5 Measures

2.3.5.1 Part 1 (completed by all participants)

2.3.5.1.1 Demographic information questionnaire

Demographic information included details of participant's age, gender and ethnicity. Participants were asked about physical activity levels, type of activities and exercise frequency. They were also asked whether they identified as having ever had mental health difficulties and whether they were currently receiving treatment from mental health services or private therapy. If participants identified as practising yoga, they were asked questions about their practice, including yoga style, frequency of practice, years practising and whether they were a yoga teacher or yoga therapist.

2.3.5.1.2 Compassionate Engagement and Action Scales (CEAS; Gilbert et al., 2017)

The three flows of compassion were assessed using this 39 item questionnaire, which is split into three scales; 'compassion *from* others' (CEAS-CfO; e.g. "*Others reflect on and make sense of my feelings of distress*"), 'compassion *towards* others' (CEAS-CtO; e.g. "*I notice and am*

sensitive to distress in others when it arises"), and 'self-compassion' (CEAS-SC; e.g. "*I am emotionally moved by my distressed feelings or situations*"). Each scale divides into two subsections: eight items which evaluate motivation and ability to attend to and engage with suffering (i.e. 'engagement') and five items which measure the motivation to gather the necessary wisdom and skills to alleviate or prevent suffering (i.e. 'action'). Participants rated how each sentence applied to them on a 10-point Likert scale ranging from 1 ('never') to 10 ('always'). This is the only measure of compassion designed to assess the three flows. A review by Lindsey (2017) found that all three CEAS subscales had good internal consistency and test re-test reliability. All subscales had high Cronbach's alpha statistics ranging from .74 to .94, which indicated good reliability (Terwee et al., 2007).

2.3.5.1.3 Forms of Self-criticizing/attacking and Self-reassuring Scale (FSCRS; Gilbert et al., 2004)

This 22-item scale assesses self-to-self relating. Participants rate a series of affirmations on a five-point Likert scale, ranging from 0 ('not at all like me') to 4 ('extremely like me'). This measure is composed by three dimensions: inadequate-self (self-criticising); hated-self (self-attacking); and reassured-self (self-reassuring), which indicates the ability to soothe oneself. Multiple studies have provided support for the construct validity and reliability of the FSCRS in both clinical and non-clinical populations (Baião et al., 2015; Castilho et al., 2015).

2.3.5.1.4 15-item Five-Facet Mindfulness Questionnaire (FFMQ-15; Baer et al., 2012b)

The FFMQ-15 is a short form of the 39-item FFMQ (Baer et al., 2006). It includes the same five facets as the long form, including Observing, Describing, Acting with Awareness, Non-Judging of Inner Experience and Non-Reactivity to Inner Experience. Participants indicate using a five-point Likert-type scale from 1 ('never or very rarely true') to 5 ('very often or always true'), how frequently they have the experience described in each statement. Higher total scores reflect more

trait mindfulness. Gu et al. (2016) examined the psychometric properties, which showed good internal consistency, convergent and discriminant validity, and sensitivity to change (Cronbach's alpha ranging from .64 to .83).

2.3.5.1.5 Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS; Tennant et al., 2007)

This 14-item scale is designed to capture the positive aspects of mental wellbeing including emotions, cognitive evaluations, interpersonal relationships and psychological functioning. Sample items include "*I've been feeling relaxed*" and "*I've been thinking clearly*". Respondents answer on a 5-point Likert scale, ranging from 1 ('none of the time') to 5 ('all of the time'). Scores range from 14 to 70, with a higher score reflecting a higher level of mental wellbeing. The scale was found to be reliable (Cronbach's alpha = 0.92 in population sample), and has been shown to have good validity, internal consistency, and test-retest reliability (Tennant et al., 2007).

2.3.5.1.6 Depression, Anxiety and Stress Scale (DASS-21; Lovibond & Lovibond, 1995)

Depression, anxiety and stress were assessed using this 21-item measure, designed to measure the emotional states of 'depression' (DASS-D; e.g. "*I felt I had nothing to look forward to*"), 'anxiety' (DASS-A; e.g. "*I felt I was close to panic*") and 'stress' (DASS-S; e.g. "*I found I difficult to relax*"). Respondents indicated on a 4-point Likert scale from 0 'did not apply to me at all' to 3 'applied to me very much, or most of the time', the extent to which they experienced each of the symptoms during the previous week. Higher scores indicate greater levels of each subscale. The DASS-21 has been shown to have stable factor structure, good convergent and discriminant validity and high internal consistency (Anthony et al., 1998) in clinical and non-clinical samples across cultural groups (Oei et al., 2013). Cronbach's alpha was .88, .82 and .90 for the depression, anxiety and stress subscales respectively, and .93 for the total scale (Henry & Crawford, 2005).

2.3.5.2 Part 2 (completed by YPs)

2.3.5.2.1 Essential Properties of Yoga Questionnaire (EPYQ; Park et al., 2018)

This measure was developed to allow researchers to objectively characterise yoga interventions. The measure assesses fourteen key dimensions of yoga: acceptance/compassion, breathwork, physicality, active postures (asanas), restorative postures (asanas), body locks (bandhas), body awareness, mental and emotional awareness/release, health benefits, individual attention, social aspects, spirituality, meditation and mindfulness and yoga philosophy. The EPYQ was originally designed for external, objective raters to score yoga interventions. However, permission was granted from the researchers (see Appendix G) to use this tool as a self-report measure of individual yoga practice, as has been done in previous research (Park et al., 2020). The instructions for the measure have been adapted from "*How much did the instructor mention or include...?*" to "*How much does your practice include…?"* Participants rate how much of their yoga practice incorporates the different elements descried above on a 5-point Likert scale from 1 ('not at all') to 5 ('a very large amount').

The individual subscale 'acceptance/compassion' is conceptually akin to the yogic concept of ahimsa and will be used as the measurement of ahimsa practice. The subscale 'breathwork' is akin to pranayama and the 'meditation/mindfulness' subscale is equal to the yogic concept dharana. These three subscales were individually scored and explored in the analysis. Example questions relating to ahimsa include, "*how much of your yoga practice includes: acceptance of one's body while doing yoga?*" Questions relating to pranayama include, "*how much of your yoga practice includes: linking breathing with movement?*" Example questions related to dharana are, "*how much of your yoga practice includes: quieting the mind?*"

Participants completed Part One of the EPYQ, concerning the components of yoga present in their yoga practice. Part Two of the EPYQ and the 'individual attention' subscale from Part One

was not administered as it was not considered relevant to the aims of the current study. The EPYQ demonstrated good reliability, as assessed by internal consistency (Cronbach's alpha between .70 and .90 for all subscales) and test-retest reliability analysis, and evidence suggests that the EPYQ is a valid measure of multiple dimensions of yoga (Park et al., 2018).

2.3.6 Procedure

Participants were recruited by email and online advertisements through online participant pools (such as Survey Circle and Reddit), social media platforms and workplace intranet adverts. The British Wheel of Yoga, Yoga in Healthcare Alliance, The Minded Institute, independent yoga studios and independent yoga teachers were approached to advertise the project on their web pages and mailing lists (see Appendix H). The study was advertised to undergraduate students at the University of Southampton via the e-folio system.

Participants accessed the study by clicking on a link to the online Qualtrics survey. Study details and consent information were presented, and participants were made aware that they could withdraw from the study at any time. Following clicking on the consent link (Appendix M), participants completed Part 1 of the survey. Only yoga practisers (self-identifying as practising yoga at least twice per month) completed Part 2. Following the debrief information (Appendix R), all participants were invited to enter into a prize draw; University of Southampton students were also offered participant credits as compensation for their time. Average time to complete the study was 42.09 minutes for Part 1 and 61.3 minutes for Part 1 and 2.

2.3.7 Analytic strategy

Data analysis was completed using SPSS (v. 27; IBM Corporation). Total scores and subscale scores were calculated for each variable. Prior to analysis, preliminary checks were conducted (Field, 2018) and all assumptions were met, unless otherwise stated. Chi-square test of homogeneity and Fishers exact tests were used to analyse whether there were significant group

differences among the sociodemographic variables (Appendix I). To analyse hypothesis one and two, independent t-tests were calculated to determine whether there were differences between YP and NYP levels of positive wellbeing, mindfulness, anxiety, depression, stress, self-criticism and the three flows of compassion. The anxiety and depression subscales of the DASS-21 were both strongly positive skewed, however as both groups showed similar levels of skew, the sample was large and independent t-tests are considered robust to positive skew, the parametric analysis was still considered the best form of analysis. Welch t-tests were reported when the assumption of homogeneity of variances was violated. Pearson's correlation coefficients using bivariate correlations were produced to investigate hypothesis three. A correlation matrix was computed to assess whether practise of ahimsa, pranayama and dharana were significantly associated with the three flows of compassion. The strength of these relationships were evaluated using Cohen et al.'s (2003) guidelines, in which correlations less than .3 are considered small, .3 to .49 are moderate, and greater than or equal to .5 are strong. For the exploratory analysis, four multiple linear regressions were conducted to explore whether practice of ahimsa, pranayama and dharana predicted the three flows of compassion and positive wellbeing in YPs.

2.4 Results

2.4.1 Participant characteristics

In total, 552 individuals logged into Qualtrics, however 97 responses were removed from the analysis (see Figure 2 for reasons for excluding data). This meant that 459 participants (184 YP and 275 NYP) were included in the analysis for hypothesis one and two. All 184 YP responses were included in the analysis for hypothesis three and four. Post-hoc analysis (z test of two proportions) revealed there were significant differences in probability distributions between YP and NYP participants in age, gender, ethnicity and exercise frequency (see Table 4 and Appendix I). In terms of the YP sample, vinyasa, hatha, restorative, ashtanga and yogic breathing were the most commonly practised styles of yoga. Regarding frequency of practice, 87.5% reported they

practised at least once per week, with 25% practising daily. Of all YP respondents, 39 were yoga teachers and 3 were yoga therapists. See Appendix K for detailed characteristics of YPs.

2.4.2 Hypothesis one

Hypothesis one: YPs will have greater levels of wellbeing and mindfulness and lower levels anxiety, depression, stress and self-criticism compared to the NYPs. Results indicated that YPs reported higher levels of positive wellbeing, $t(457)= 4.603$, $p< .001$, $d= .44$, and mindfulness, $t(457)= 7.642$, $p< .001$, $d= .72$ and lower levels of depression, $t(457)= -3.848$, $p< .001$, $d= .37$, anxiety, $t(457)= -3.855$, $p< .001$, $d= .37$, stress, $t(428.100)= -3.329$, $p< .001$, $d= .31$, and self-criticism, $t(457)= -4.119$, $p< .001$, $d= .39$ than the NYPs. See Table 5 for means, standards deviations and confidence intervals.

Table 5.

Means, standard deviations and confidence intervals

Psychological construct (measure)	YP	NYP	95% CI
	Mean (SD)	Mean (SD)	
Positive wellbeing (WEMBS)	49.71 (7.87)	46.05 (8.67)	2.1, 5.23**
Mindfulness (FFMQ-15)	52.97 (8.14)	47.25 (7.66)	4.25, 7.20**
Depression (DASS-21)	22.4 (8.25)	25.66 (9.28)	-4.92, -1.59**
Anxiety (DASS-21)	19.7 (7.07)	22.41 (7.59)	-4.09, -1.33**
Stress (DASS-21)	26.18 (7.33)	28.66 (8.48)	-3.94, -1.02**
Self-criticism (FSCRS)	33.35 (12.22)	38.16 (12.27)	-7.1, -2.51**
Self-reassurance (FSCRS)	29.04 (6.32)	26.28 (6.53)	1.55, 3.96**

Self-compassion (CEAS-SC)	68.71 (14.61)	63.27 (13.56)	2.83, 8.07**
Compassion *towards* others (CEAS-CtO)	79.33 (11.9)	77.46 (12.86)	-.44, 4.17
Compassion *from* others (CEAS-CfO)	65.41 (13.97)	62.44 (16.19)	.18, 5.76**

Note. **Significant at $p < .01$

2.4.3 Hypothesis two

Hypothesis two: YPs will have higher levels of the three flows of compassion (to self, from/to others), compared to NYPs. Results showed that there was a significant difference in self-compassion, with YPs having higher self-compassion, $t(457) = 4.085$, $p < .001$, $d = .39$ than NYPs. Welch t-tests showed that there was a significant difference in compassion from others, with YPs scoring higher (indicating more compassion from others than NYPs), $t(428.49) = 2.092$, $p < .05$, $d = .20$. There was no significant difference between the two groups on the reported level of compassion towards others.

2.4.4 Hypothesis three

Hypothesis three: In the YP group, greater practise of ahimsa, pranayama and dharana will be associated with greater levels of all three flows of compassion. As displayed in Table 6, there was a statistically significant, moderate positive correlation between ahimsa (as measured by the 'acceptance/compassion' subscale on the EPYQ) and self-compassion, $r = (182) = .449$, $p < .001$. There was a statistically significant, small positive correlation between ahimsa and compassion towards others, $r = (182) = .269$, $p < .001$. There was a statistically significant, small positive correlation between ahimsa and compassion from others, $r = (182) = .232$, $p < .05$.

There was a statistically significant, small positive correlation between pranayama (as measured by the 'breathwork' subscale on the EPYQ) and self-compassion, r=(182)= .192, p< .05. There was a statistically significant, small positive correlation between pranayama and compassion towards others, r= (182)= .253, p< .001. The relationship between pranayama and compassion from others, r= (182)= .135, p= .068 was non-significant. There were no significant relationships between dharana (as measured by the 'meditation' subscale on the EPYQ) and self-compassion, r(182) = .124, p= .093, compassion towards others, r(182) = .039, p= .604 or compassion from others, r(184) = .007, p= .929.

Table 6.

Bivariate correlations between variables

	Ahimsa (EPYQ – acceptance/compassion)	Pranayama (EPYQ-breathwork)	Dharana (EPYQ-meditation)
Self-compassion (CEAS-SC)	.449**	.192**	.124
Compassion towards others (CEAS-CtO)	.269**	.253**	.039
Compassion from others (CEAS-CfO)	.232**	.135	.007

Note. **Correlation significant at p< .01

2.4.5 Exploratory analyses

2.4.5.1 Predicting wellbeing

A multiple linear regression was carried out to see whether the components of yoga practice (ahimsa, pranayama and dharana) predicted positive wellbeing. Results are reported in Table 7, and show that the overall model was significant, $F(3, 180)= 12.816$, $p< .001$, with greater practice of ahimsa, significantly predicting higher scores on wellbeing, but not pranayama or dharana. R^2 for the overall model was 17.6% with an adjusted R^2 of 16.2%, a medium effect size (Cohen, 1988).

Table 7.

Multiple regression results for wellbeing

	B	*95% CI for B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Model						.18	.16**
Constant	37.228	31.01	43.45	3.15			
Ahimsa	3.968	2.50	5.44	.74	.43**		
Pranayama	.441	-1.11	1.99	.79	.04		
Dharana	-1.094	.09	-2.37	.65	-.13		

Note. Model = "Enter" method in SPSS statistics; *B*= unstandardized regression coefficient' *CI*= confidence interval; *LL*= lower limit; *UL*= upper limit, *SE B*= standard error of coefficient; β= standard coefficient; R^2= coefficient determination; ΔR^2= adjusted R^2.

**significant at $p< .001$

2.4.5.2 Predicting self-compassion

A multiple linear regression was carried out to see whether the components of yoga practice (ahimsa, pranayama and dharana) predicted self-compassion. Results are displayed in Table 8, and show that the overall model was significant, $F(3, 180)= 15.529$, $p< .001$, with greater practice of ahimsa significantly predicting greater self-compassion, but not pranayama or dharana. R^2 for the overall model was 20.6% with an adjusted R^2 of 19.2%, a medium effect size (Cohen, 1988).

Table 8.

Multiple regression results for self-compassion

	B	*95% CI for B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Model						.21	.19**
Constant	43.981	32.64	55.32	5.75			
Ahimsa	8.192	5.52	10.87	1.36	.48**		
Pranayama	-.245	-3.07	2.58	1.43	-.01		
Dharana	-1.041	-3.36	1.28	1.78	-.06		

Note. Model = "Enter" method in SPSS statistics; *B*= unstandardized regression coefficient' *CI*= confidence interval; *LL*= lower limit; *UL*= upper limit, *SE B*= standard error of coefficient; β= standard coefficient; R^2= coefficient determination; ΔR^2= adjusted R^2.
**significant at $p< .001$

2.4.5.3 Predicting compassion towards others

A multiple linear regression was carried out to explore whether the components of yoga practice predicted scores in compassion towards others. Results are displayed in Table 9, and show that the overall model was significant, $F(3, 180)= 7.613$, $p< .001$, with greater practice of ahimsa and pranayama significantly predicting greater compassion towards others, but not dharana. R^2 for the overall model was 11.3% with an adjusted R^2 of 9.8%, a small effect size (Cohen, 1988).

Table 9.

Multiple regression results for compassion towards others

	B	*95% CI for B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Model						.11	.098**
Constant	57.883	47.34	68.43	5.35			
Ahimsa	3.529	1.04	6.02	1.26	.24**		
Pranayama	3.077	.45	5.70	1.33	.18*		
Dharana	-1.189	-3.35	.97	1.09	-.08		

Note. Model = "Enter" method in SPSS statistics; *B*= unstandardized regression coefficient' *CI*= confidence interval; *LL*= lower limit; *UL*= upper limit, *SE B*= standard error of coefficient; β= standard coefficient; R^2= coefficient determination; ΔR^2= adjusted R^2.

*significant at $p< .05$, **$p< .001$

2.4.5.4 Predicting compassion from others

A multiple linear regression was carried out to see whether the components of yoga practice predicted scores in compassion from others. Results are displayed in Table 10, and show that the overall model was significant, $F(3, 180)= 4.084$, $p< .05$, with greater practice of ahimsa significantly predicting greater compassion from others, but not pranayama or dharana. R^2 for the overall model was 6.4% with an adjusted R^2 of 4.8%, a small effect size (Cohen, 1988).

Table 10.

Multiple regression results for compassion from others

	B	*95% CI for B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Model						.06	.05*
Constant	52.557	40.79	64.33	5.97			
Ahimsa	4.140	1.36	6.92	1.41	.25*		
Pranayama	.753	-2.18	3.69	1.49	.04		
Dharana	-1.598	-4.01	.81	1.22	-.10		

Note. Model = "Enter" method in SPSS statistics; *B*= unstandardized regression coefficient' *CI*= confidence interval; *LL*= lower limit; *UL*= upper limit, *SE B*= standard error of coefficient; β= standard coefficient; R^2= coefficient determination; ΔR^2= adjusted R^2.
*significant at $p< .05$

2.5 Discussion

2.5.1 Summary of findings

We found that, consistent with hypothesis one, YPs self-reported significantly higher scores on measures of positive wellbeing and mindfulness, and significantly lower scores on depression, anxiety, stress and self-criticism, than NYPs. Whilst these results are cross-sectional, they may support the evidence base that yoga is associated with higher levels of wellbeing (Hendriks et al., 2017) and lower levels of psychopathology (Uebelacker et al., 2010a), stress (Riley & Park, 2015) and self-criticism (Newby, 2014). The difference in mindfulness between YPs and NYPs had a large effect size, providing support for research suggesting yoga practice may be associated with mindfulness (Conboy et al., 2010; Gard et al., 2012). However, it should be noted that the YP and NYP groups were not equivalent in age and gender and thus these may have confounded the results. Furthermore, apart from mindfulness, all other effect sizes for group differences were small.

In terms of the 2nd hypothesis, the findings showed that YPs reported significantly higher levels of two of the three flows of compassion (self and from others) compared to NYPs. There were no group differences in compassion towards others. These results support emerging evidence that yoga has been associated with increased self-compassion (Gard et al., 2012) and self-compassion has been identified as a primary mediator of change in mindfulness-based therapies (Kuyken et al., 2010). The finding that compassion from others was higher in YPs extends the current research base as to our knowledge, this flow of compassion has not been considered in the current yoga research. This finding is in line with theoretical models of yoga (Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018), which identify that yoga enhances intrapersonal and interpersonal aspects of compassion, however none of the models specifically reference the experience of receiving and accepting compassion from other people. The finding that compassion towards others was not significantly higher in YPs is somewhat surprising, and

does not support the model by Kishida et al. (2018) that postulates yoga cultivates self-compassion, which in turn facilitates compassion for others. Kishida et al.'s (2018) model outlines a direct pathway from yoga to self-compassion and an indirect pathway to compassion for others through enhanced mindfulness or self-compassion. It is thus possible that YPs levels of mindfulness and/or self-compassion were not cultivated to such a level to realise the interpersonal benefits of yoga, which would be supported by Gard et al. (2014) and Bennetts (2022), who explicitly describe a duration and immersion effect of yoga.

The second part of our study explored the limbs of YPs yoga practice and whether these elements were associated with the three flows of compassion. The study found that ahimsa practice was significantly positively correlated with self-compassion, compassion towards others and compassion from others. In partial support of hypothesis three, there were small positive correlations between pranayama practice and self-compassion and compassion towards others. However, there was a no significant association between pranayama and compassion from others. Surprisingly, there were no significant associations between dharana practice and the three flows of compassion. The finding that ahimsa, the yogic principle of non-harm, was related to all three flow of compassion was expected given that this practice encompasses kindness towards oneself and others in thought and action (Desikachar, 1995). These findings also support theoretical models of psychological wellbeing and yoga that link the ethical practices with psychological outcomes (Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018).

The finding that there was a small positive relationship between pranayama and self-compassion and compassion towards others supports previous research that has linked conscious breathing to prosocial emotions such as compassion (Kogan et al., 2014). A key practice in CMT (Gilbert, 2009) is soothing rhythm breathing, which aims to improve HRV and vagal nerve functioning by slowing the mind and body (Porges, 2007; Matos et al., 2017). Porges (2017) suggests that conscious breath regulation deactivates the sympathetic nervous system and

engages the parasympathetic nervous system (the social safety system), which is a prerequisite for experiencing compassion towards the self and others. Findings are consistent with yoga theory (Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018), which highlight pranayama as targeting intra and interpersonal factors, including compassion. However, experiencing compassion from others is not explicitly incorporated into yoga theory, therefore the non-significant finding, that pranayama was not associated with compassion from others is difficult to interpret.

The result that there were no significant associations between dharana and the three flows of compassion was unexpected, as previous research has found associations between meditation and increased self-compassion (Burns et al., 2011; Irving et al., 2009). Mindfulness meditation practices are central in CMT to bring awareness, openness and acceptance towards our internal experiences and are a critical component of compassion towards the self and others (Gilbert & Choden, 2013). Meditation has been found to calm the sympathetic nervous system, reduce HRV, reduce blood pressure and activate parasympathetic activity (Rubia, 2009), which are fundamental for experiencing compassion (Porges, 2017). However, Gard et al.'s (2014) and Bennetts' (2022) models both highlight that the beneficial effects of all yoga limbs are moderated by the duration and/or immersion in one's yoga practise. It is possible participants may have been relatively new to meditation practice though having practiced postures for some time, or alternatively may have not been observing ahimsa whilst meditating and thus engaged in self-critical talk during the practice (Bennetts, 2022). There are also many forms of meditation and this study did not collect detailed information on meditation practice, which may in part explain the lack of significant relationships.

Exploratory analysis showed that ahimsa was the strongest predictor of positive wellbeing and self-compassion, with a medium effect size. Ahimsa also significantly predicted compassion towards others and compassion from others, with a small effect size. Pranayama was a significant predictor in compassion towards others only whereas dharana practice was not a significant

predictor in any of the models. These findings provide further support for the importance of considering the ethical components of yoga in both yoga practice and scientific research. As compassion is conceptualised as a skill that can be nurtured with practice (Gilbert, 2020), yoga practice that consciously incorporates ahimsa could potentially have positive influences on the three flows of compassion and wellbeing (Bennetts, 2022). These findings also provide preliminary support for previous research demonstrating that incorporating ethical practice into yoga or mindfulness interventions increased their efficacy (Smith et al., 2011; Chen & Jordan, 2020). Furthermore, these findings support the theoretical models of yoga (Bennetts, 2022; Gard et al., 2014; Kishida et al., 2018) which suggest that the ethics (yamas and niyamas) are a potential mechanism of change in yoga and should be incorporated in yoga interventions and research.

2.5.2 Clinical implications

The findings from this study have potential implications for the cultivation of subjective wellbeing and the three flows of compassion through yoga. Our data suggests that yoga practice that explicitly incorporates ahimsa predicts positive wellbeing and the three flows of compassion and a yoga practice that incorporates pranayama predicts compassion towards others. This has direct implications for the design of yoga interventions, which do not frequently attend to the ethics of yoga in their design and application (Gard et al., 2014; Matko et al., 2021). Whilst our findings are not generalisable to a clinical sample, these findings have clinical applications for the design of yoga interventions in clinical samples, where self-criticism and compassion may be an important underlying factor in psychological distress.

2.5.3 Strengths and limitations

To the authors' knowledge, this is the first study to explore yoga and Gilbert's (2009) three flows of compassion incorporating the CEAS (Gilbert et al., 2017) and EPYQ (Park et al.,

2018), which both have good psychometric properties. This research aimed to address some of the recommendations from review studies (Matko et al., 2021; Riley & Park, 2015), which called for research to look at the specific limbs of yoga in relation to mechanisms of change by incorporating not only validated measures but a large sample size. However, the study also had limitations; firstly, the recruitment was a convenience sample from the general public and student population. The sample were predominantly female and White, which limits external validity as the findings may not represent to the wider population (Andrade, 2020). The NYP sample were significantly younger than YPs and a larger proportion of the NYP sample were undergraduate students, which may have influenced findings, as previous research has identified a positive correlation between self-compassion and age (Neff & Vonk, 2009). Research has shown that women are less self-compassionate than men (Danucalov et al., 2013; Yarnell et al., 2015) and have higher levels of compassion towards others (López et al., 2018), although other studies have found no gender differences in self-compassion (Neff & Pommier, 2013).

Further limitations of this study include the cross-sectional design, limiting our ability to make causal inferences (Wang & Cheng, 2020) and use of entirely self-report data, which can be subject to bias (Rosenman et al., 2011). Whilst the 'acceptance/compassion' subscale of the EPYQ is considered by the author as theoretically comparable to ahimsa, it was not explicitly designed to measure this specific concept. Furthermore, this subscale consists of five questions and is not a comprehensive measure of exactly how ahimsa is incorporated in the yoga practice, limiting our ability to make implications about the underlying mechanisms. An additional limitation is the lack of a physiological measure, such as HRV, to investigate the biological mechanisms, which are highlighted in compassion (Gilbert, 2009; 2014), neuroscientific (Porges, 2007; 2017) and yoga theory (e.g., Gard et al., 2014).

2.5.4 Future directions

Understanding more about ways in which yoga improves wellbeing and compassion and which aspects of yoga most affect these mechanisms will support the design of yoga interventions (Elwy et al., 2014; Riley & Park, 2015). Given the findings that levels of self-compassion and psychological wellbeing is higher in YPs, and specifically greater practice of ahimsa is correlated with the three flows of compassion and wellbeing, further investigation into the three flows of compassion and ahimsa through yoga practice is warranted. Developing understanding of these processes means that yoga interventions could be designed to stimulate different contributing processes to compassion, such as physiology, cognitions and behavioural practices. Interventions could be targeted depending on what factors are underlying distress, such as clients with greater self-criticism, those with more fear of compassion, those with lower HRV and difficulties feeling safe in their body (Gilbert, 2020). Furthermore, as yoga is often delivered in a group setting, well designed yoga interventions targeting transdiagnostic processes involved in psychological distress (such as compassion and self-criticism; see Bennetts, 2022), could offer effective treatments for the cultivation of positive mental health, with fewer side effects and less cost than medications or individual talking therapies (Li & Goldsmith, 2012; Riley & Park, 2015).

Future research would benefit from enhanced methods for assessing the nature and scope of individual's practice and recording immersion and duration of the yoga limbs separately. Research should examine different combinations of ethical education, postures, breathwork, and meditation techniques, in addition to adding physiological measures, such as HRV to strengthen findings. Self-report measures that are designed to map directly onto the eight limbs of yoga including the yamas and niyamas would be beneficial. This study used a non-clinical sample and future research would benefit from investigating ahimsa and compassion in a clinical sample, such as those experiencing high self-criticism and shame, incorporating the CEAS (Gilbert et al., 2017) to explore the three flows of compassion.

2.5.5 Conclusion

This study contributed to the existing literature highlighting a positive association between yoga and wellbeing, mindfulness, self-compassion and compassion from others and a negative association with psychopathology and self-criticism. However, a significant limitation of this study is that the YP and NYP groups were not equivalent for age and gender, impacting our ability to confidently interpret group differences. This study also provided intriguing evidence of positive associations between ahimsa (yogic concept of 'non-harm') and the three flows of compassion and pranayama ('breathwork') and self-compassion and compassion towards others. Furthermore, ahimsa was consistently the strongest predictor of wellbeing and the three flows of compassion. This research provided support for the importance of considering the ethics of yoga in future interventions and scientific research (Bennetts, 2022; Gard et al., 2014; Matko et al., 2021). Given the increasing popularity of yoga (Yoga Alliance, 2016), the growing evidence of its benefits (Hendriks et al., 2017), in addition to the protective effects of self-compassion on psychopathology (MacBeth & Gumley, 2012); further empirical research in this area is warranted.

2.7 References

Andrade, C. (2021). The inconvenient truth about convenience and purposive samples. *Indian Journal of Psychological Medicine*, *43*(1), 86-88.

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the Depression Anxiety Stress Scales in clinical groups and a community sample. *Psychological Assessment*, *10*(2), 176.

Baer, R. A., Carmody, J. & Hunsinger, M. (2012b). Weekly Change in Mindfulness and Perceived Stress in a Mindfulness-Based Stress Reduction Program. *Journal of Clinical Psychology, 68*(7), 755-765.

Baer, R. A., Lykins, E. L. B., & Peters, J. R. (2012a). Mindfulness and self-compassion as predictors of psychological wellbeing in long-term meditators and matched non-meditators. *Journal of Positive Psychology, 7*(3), 230–238.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J. & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*(1), 27-45.

Baião, R., Gilbert, P., McEwan, K., & Carvalho, S. (2015). Forms of self-criticising/attacking & self-reassuring scale: Psychometric properties and normative study. *Psychology and Psychotherapy: Theory, Research and Practice*, *88*(4), 438-452.

Barnard, L.K., & Curry, J.F. (2011). Self-compassion: Conceptualizations, correlates, and interventions. *Review of General Psychology, 15*, 289–303.

Barrows, J. L., & Fleury, J. (2016). Systematic review of yoga interventions to promote cardiovascular health in older adults. *Western Journal of Nursing Research, 38*(6), 753–781.

Bennetts, A. (2022). How does yoga practice and therapy yield psychological benefits? A review and model of transdiagnostic processes. *Complementary Therapies in Clinical Practice*, 101514.

Berking, M., & Whitley, B. (2014). *Affection regulation training: A practitioner's manual*. New York: Business Media.

Birnie, K., Speca, M., & Carlson, L.E. (2010). Exploring self-compassion and empathy in the context of mindfulness-based stress reduction (MBSR). *Stress and Health, 26*, 359–371.

Bond, A. R., Mason, H. F., Lemaster, C. M., Shaw, S. E., Mullin, C. S., Hplick, E. A., & Saper, R. B. (2013). Embodied health: the effects of a mind-body course for medical students. *Medical Education Online, 18*, 1–8.

Brinsley, J., Schuch, F., Lederman, O., Girard, D., Smout, M., Immink, M. A., … & Rosenbaum, S. (2020). Effects of yoga on depressive symptoms in people with mental disorders: a systematic review and meta-analysis. *British Journal of Sports Medicine,* 1–10.

Burns, J., Lee, R., & Brown, L. (2011). The effect of meditation on self-reported measures of stress, anxiety, depression, and perfectionism in a college population. *Journal of College Student Psychotherapy, 25*, 132-144.

Bryant, E. A. (2009). *The history of yoga. The Yoga Sūtras of Patañjali*. New York: North Point Press.

Castilho, P., Pinto-Gouveia, J., & Duarte, J. (2015). Exploring self-criticism: Confirmatory factor analysis of the FSCRS in clinical and nonclinical samples. *Clinical Psychology & Psychotherapy*, *22*(2), 153-164.

Chen, S., & Jordan, C. H. (2020). Incorporating ethics into brief mindfulness practice: effects on well-being and prosocial behavior. *Mindfulness 11*, 18–29.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences*. New York: Routledge Academic.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioural sciences (3rd ed.).* Mahwah: Lawrence Erlbaum Associates.

Conboy, L. A., Wilson, A., & Braun, T. (2010). Moving beyond health to flourishing: the effects of yoga teacher training. *The Scientific World Journal*, *10*, 788-795.

Conversano, C., Ciacchini, R., Orrù, G., Di Giuseppe, M., Gemignani, A., & Poli, A. (2020). Mindfulness, self-compassion, and empathy among health care professionals. What's new? A systematic review. *Frontiers in Psychology, 11*, 1683.

Critchley, H. D., Wiens, S., Rotshtein, P., Ohman, A., & Dolan, R. J. (2004). Neural systems supporting interoceptive awareness. *Nature Neuroscience*, 7, 189–195.

Danucalov, M. A. D., Kozasa, E. H., Ribas, K. T., Galduróz, J. C. F., Garcia, M. C., Verreschi, I. T. N., … & Leite, J. R. (2013). A yoga and compassion meditation program reduces stress in familial caregivers of Alzheimer's disease patients. *Evidence-Based Complementary and Alternative Medicine*, 513149.

Desikachar, T. K. V. (1995). *The heart of yoga: Developing a personal practice*. Rochester: Inner Traditions.

Elwy, R. A., Groessl, E. J., Eisen, S. V., Riley, K. E., Maiya, M., Lee, J. P., … & Park, C. L. (2014). A systematic scoping literature review of yoga intervention components and intervention quality. *American Journal of Preventative Medicine, 47*, 220–232.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2013). G*Power Version 3.1.7 [computer software]. Uiversität Kiel, Germany. Retrieved from http://www.psycho.uni-duesseldorf.de/abteilungen/aap/gpower3/download-and-register

Field, A. P. (2018). *Discovering statistics using IBM SPSS statistics*. London: SAGE Publications.

Ford, B. C. (2018). 'I felt safe in my body again': The experience of MFTs who practice yoga as self-care [PhD Dissertation]. Alliant International University. Retrieved from ProQuest Digital Dissertations. (ProQuest Number:10749669).

Gard, T., Brach, N., Holzel, 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. *Journal of Positive Psychology, 7*, 165–175.

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*, 770.

Gilbert, P. (1989). *Human nature and suffering*. Hove: Erlbaum.

Gilbert, P. (2000). Social mentalities: Internal 'social' conflicts and the role of inner warmth and compassion in cognitive therapy. In P. Gilbert, & K.G. Bailey (Eds), *Genes on the couch: Explorations in evolutionary psychotherapy* (pp. 118–150). Hove: Brunner-Routledge.

Gilbert, P. (2005a). Compassion and cruelty: A biopsychosocial approach. In P. Gilbert (Ed.), *Compassion: Conceptualisations, research and use in psychotherapy* (pp. 9–74). London: Routledge.

Gilbert, P. (2005b). Social mentalities: A biopsychosocial and evolutionary reflection on social relationships. In M.W. Baldwin (Ed.), *Interpersonal cognition.* (pp. 299–335). New York: Guilford.

Gilbert, P. (2009). Introducing compassion-focused therapy. *Advances in Psychiatric Treatment, 15*, 199–208.

Gilbert, P. (2014). The origins and nature of compassion focused therapy. *British Journal of Clinical Psychology, 53*, 6–41.

Gilbert, P. (2020). Compassion: From its evolution to a psychotherapy. *Frontiers in Psychology, 11,* 586161.

Gilbert, P., Baldwin, M., Irons, C., Baccus, J., & Clark, M. (2006). Self-criticism and self-warmth: An imagery study exploring their relation to depression. *Journal of Cognitive Psychotherapy, 20*, 183–200.

Gilbert, P., Catarino, F., Duarte, C., Matos, M., Kolts, R., Stubbs, J., … & Basran, J. (2017). The development of compassionate engagement and action scales for self and others. *Journal of Compassionate Health Care, 4*, 1-24.

Gilbert, P., & Choden, E. (2013). *Mindfulness compassion*. London: Robinson.

Gilbert, P., Clarke, M., Kempel, S., Miles, J.N.V., & Irons, C. (2004). Criticizing and reassuring oneself: An exploration of forms style and reasons in female students. *British Journal of Clinical Psychology, 43,* 31–50.

Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An evolutionary analysis and empirical review. *Psychological Bulletin, 136,* 351–374.

Gu, J., Strauss, C., Crane, C., Barnhofer, T., Karl, A., Cavanagh, K., & Kuyken, W. (2016). Examining the factor structure of the 39-item and 15-item versions of the Five Facet Mindfulness Questionnaire before and after mindfulness-based cognitive therapy for people with recurrent depression. *Psychological Assessment*, *28*(7), 791.

Hanson, M. (2010). *Ahimsa* and Awareness: Core Principles Overlooked in Yoga Therapy. *International Journal of Yoga Therapy, 20*(1), 80–82.

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. *The Journal of Alternative and Complementary Medicine, 23*(7), 505–517.

Henry, J. D., & Crawford, J. R. (2005). The short-form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 44*, 227–239.

Irving, J. A., Dobkin, P. L., & Park, J. (2009). Cultivating mindfulness in health care professionals: A review of empirical studies of mindfulness-based stress reduction (MBSR). *Complementary Therapies in Clinical Practice*, *15*(2), 61-66.

Iyengar, B. K. S. (1995). *Light on Yoga: Yoga Dipika*. New York, NY: Schocken.

Jazaieri, H., Jinpa, T., McGonigal, K., Rosenberg, E. L., Finkelstein, J., Simon-Thomas, E., … & Goldin, P. R. (2013). Enhancing compassion: A randomized controlled trial of a compassion cultivation training program. *Journal of Happiness Studies, 14*, 1113–1126.

Kirby, J. N., & Gilbert, P. (2017). The emergence of the compassion focused therapies. In P.Gilbert (Ed.), *Compassion: concepts, research and applications* (pp. 258–285). London: Routledge.

Kirschner, H., Kuyken, W., Wright, K., Roberts, H., Brejcha, C., & Karl, A. (2019). Soothing Your Heart and Feeling Connected: A New Experimental Paradigm to Study the Benefits of Self-Compassion. *Clinical Psychological Science*, *7*(3), 545- 565.

Kishida, M., Mama, S. K., Larkey, L. K., & Elavsky, S. (2018). "Yoga resets my inner peace barometer": A qualitative study illuminating the pathways of how yoga impacts one's relationship to oneself and to others. *Complementary Therapies in Medicine, 40*, 215–221.

Kogan, A., Oveis, C., Carr, E. W., Gruber, J., Mauss, I. B., Shallcross, A., & Keltner, D. (2014). Vagal activity is quadratically related to prosocial traits, prosocial emotions, and observer perceptions of prosociality. *Journal of Personality and Social Psychology, 107*, 1051–1063.

Kuyken, W., Watkins, E., Holden, E., White, K., Taylor, R. S., Byford, S., … & Dalgleish, T. (2010). How does mindfulness-based cognitive therapy work? *Behaviour Research and Therapy, 48,* 1105-1112.

Lawrence, V. A., & Lee, D. (2014). An exploration of people's experiences of compassion-focused therapy for trauma, using interpretative phenomenological analysis. *Clinical Psychology & Psychotherapy, 21*(6), 495-507.

Leary, M. R., Tate, E. B., Adams, C. E., Allen, A. B., & Hancock, J. (2007). Self-compassion and reactions to unpleasant self-relevant events: The implications of treating oneself kindly. *Journal of Personality and Social Psychology, 92*, 887–904.

Li, A. W., & Goldsmith, C.-A. W. (2012). The effects of yoga on anxiety and stress. *Alternative Medicine Review, 17*, 21–35.

Lindsey, S. (2017). Examining the psychometric properties of the compassionate engagement and action scales in the general population. Other thesis: University of Essex.

López, A., Sanderman, R., Ranchor, A. V., & Schroevers, M. J. (2018). Compassion for others and self-compassion: Levels, correlates, and relationship with psychological well-being. *Mindfulness*, *9*(1), 325-331.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335-343.

Macbeth, A., & Gumley, A. (2012). Exploring compassion: a meta-analysis of the association between self-compassion and psychopathology: *Clinical Psychology Review, 32*(6), 545-552.

Mason, H., Schnackenberg, N., & Monro, R. (2017). Yoga and healthcare in the United Kingdom. *International Journal of Yoga Therapy, 27*(1), 121-126.

Matko, K., Bringmann, H. C., & Sedlmeier, P. (2021). The effects of different components of yoga: a review of comparative studies and meta-analyses. PsyArXiv. doi: 10.31234/osf.io/e5mh9

Matos, M., Duarte, C., Duarte, J., Pinto-Gouveia, J., Petrocchi, N., Basran, J., & Gilbert, P. (2017). Psychological and physiological effects of compassionate mind training: a pilot randomised controlled study. *Mindfulness,* 1–14.

Muris, P. (2016). A protective factor against mental health problems in youths? A critical note on the assessment of self-compassion. *Journal of Child and Family Studies, 25*, 1461–1465.

Muris, P., Otgaar, H., & Petrocchi, N. (2016). Protection as the mirror image of psychopathology: further critical notes on the Self-Compassion Scale. *Mindfulness, 7,* 787–790.

Neff, K. D. (2003a). Self-compassion: An alternative conceptualization of a healthy attitude toward oneself. *Self and Identity, 2,* 85-101.

Neff, K. D. (2003b). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223-250.

Neff, K.D., & Germer, C.K. (2013). A pilot study and randomized controlled trial of the mindful self-compassion program. *Journal of Clinical Psychology, 69*(1), 28–44.

Neff, K. D., & Pommier, E. (2013). The relationship between self-compassion and other-focused concern among college undergraduates, community adults, and practicing meditators. *Self and Identity*, *12*(2), 160-176.

Neff, K. D., & Vonk, R. (2009). Self-compassion versus global self-esteem: Two different ways of relating to oneself. *Journal of Personality*, *77*(1), 23-50.

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

Oei, T. P. S., Sawang, S., Goh Y. W., & Mukhtar, F. (2013). Using the Depression Anxiety Stress Scale 21 (DASS-21) across cultures. *International Journal of Psychology*, *48*(6), 1018-1029.

Park, C. L., Elwy, A. R., Maiya, M., Sarkin, A. J., Riley, K. E., Eisen, S. V., … & Braun, T. (2018). The Essential Properties of Yoga Questionnaire (EPYQ): Psychometric properties. *International Journal of Yoga Therapy, 28*(1), 23–38.

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.

Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology, 74*, 116–143.

Porges, S. W. (2017). Vagal pathways: portals to compassion. In E. M. Seppälä, E. Simon-Thomas, S. L. Brown and M. C. Worline (Eds.) *The Oxford handbook of compassion science*. (pp. 189-204).

Raque-Bogdan, T.L., Ericson, S.K., Jackson, J., Martin, H.M., & Bryan, N.A. (2011). Attachment and mental and physical health: Self compassion and mattering as mediators. *Journal of Counselling Psychology, 58,* 272 - 278.

Riley, K., & Park, C. (2015). How does yoga reduce stress? A systematic review of mechanisms of change and guide to future inquiry. *Health Psychology Review, 9*(3), 1–18.

Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural & Healthcare Research*, *2*(4), 320–332.

Rubia, K. (2009). The neurobiology of meditation and its clinical effectiveness in psychiatric disorders. *Biological Psychology*, *82*(1), 1-11.

Salmon, P., Lush, E., Jablonski, M., & Sephton, S. E. (2009). Yoga and mindfulness: clinical aspects of an ancient mind/body practice. *Cognitive and Behavioural Practice, 16*(1), 59–72.

Sharma, M., Lingham, V. C., & Nahar, V. K. (2016). A systematic review of yoga interventions as integrative treatment in breast cancer. *Journal of Cancer Research and Clinical Oncology, 142*, 2523-2540.

Shelov, D. V., Suchday, S., & Friedberg, J. P. (2009). A pilot study measuring the impact of yoga on the trait of mindfulness. *Behavioural and Cognitive Psychotherapy, 37*(5), 595.

Singer, T., & Bolz, M. (2013). *Compassion: Bridging practice and science*. Munich: Max Planck Society.

Smith, J. A., Greer, T., Sheets, T., & Watson, S. (2011). Is there more to yoga than exercise? *Alternative Therapies in Health & Medicine, 17*(3), 22–29.

Strauss, C., Taylor, B. L., Gu, J., Kuyken, W., Baer, R., Jones, F., & Cavanagh, K. (2016). What is compassion and how can we measure it? A review of definitions and measures. *Clinical Psychology Review, 47*, 15-27.

Sullivan, M., Erb, M., Schmalzl, L., Moonaz, S., Noggle Taylor, J., & Porges, S. W. (2018). Yoga therapy and polyvagal theory: The convergence of traditional wisdom and contemporary neuroscience for self-regulation and resilience. *Frontiers in Human Neuroscience, 12*, 67.

Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., ... & Stewart-Brown, S. (2007). The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health and Quality of life Outcomes*, *5*(1), 1-13.

Terwee, C. B., Bot, S. D., de Boer, M. R., van der Windt, D. A., Knol, D. L., Dekker, J., ... & de Vet, H. C. (2007). Quality criteria were proposed for measurement properties of health status questionnaires. *Journal of Clinical Epidemiology, 60*(1), 34-42.

Uebelacker, L. A., Epstein-Lubow, G., Gaudiano, B. A., Tremont, G., Battle, C. L., & Miller, I. W. (2010). Hatha yoga for depression: critical review of the evidence for efficacy, plausible mechanisms of action, and directions for future research. *Journal of Psychiatric Practice, 16*(1), 22-33.

Van Gaal, S., Lamme, V. A., Fahrenfort, J. J., & Ridderinkhof, K. R. (2011). Dis-sociable brain mechanisms underlying the conscious and unconscious control of behavior. *Journal of Cognitive Neuroscience, 23*, 91–105.

Varambally, S., & Gangadhar, B. N. (2016). Current status of yoga in mental health services. *International Review of Psychiatry, 28*, 233-235.

Wang, X., & Cheng, Z. (2020). Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*, *158*(1), S65-S71.

Yarnell, L.M., & Neff, K.D. (2013). Self-compassion, interpersonal conflict resolutions, and well-being. *Self and Identity, 12*(2), 1–14.

Yarnell, L.M., Stafford, R.E., Neff, K.D., Reilly, E.D., Knox, M.C., & Mullarkey, M. (2015). Meta-analysis of gender differences in self-compassion. *Self and Identity, 14*(5), 499–520.

Yoga Alliance. (2016). *Yoga in America study conducted by Yoga Journal and Yoga Alliance reveals growth and benefits of the practise.* https://www.yogaalliance.org/Portals/0/YIAS%20Press%20Release%20with%20Y%20contact%20info.pdf (accessed September 2021)

Zhang, Y., Lauche, R., Cramer, H., Munk, N., & Denniw, J. A. (2021). Increasing trend of yoga practice among U.S. adults from 2002 to 2017. *The Journal of Alternative and Complementary Medicine, 27*(9), 778-785.

Appendix A Individual Search Strategy (Syntax) for each Database

Database	Search Syntax	Articles retrieved
CINAHL Plus with Full Text (via EBSCO) Searched 12/01/2021	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*" OR Yoga or Yoga pose MH AND compassion* OR (self N1 compassion*) OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care" or empath* OR Compassion MH or compassion fatigue MH or Empathy MH	130 With academic subject headings, still 130
MEDLINE (via EBSCO)	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*" OR Yoga MH AND compassion* OR (self N1 compassion*) OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care" OR empath* OR compassion fatigue MH OR empathy MH	91 With academic subject headings, still 91
PsycINFO (via EBSCO)	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*" OR Yoga DE AND compassion* OR (Self N1 compassion*) OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care" OR empath* Self-compassion, Compassion fatigue DE	94 With academic subject headings, still 94
Web of Science	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*" AND compassion* OR (Self NEAR/1 compassion) OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care"	97
EMBASE (via OVID) 1974 – Jan 11 2021	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*"	163

Appendix A

Database	Search Syntax	Articles retrieved
	Academic SH - Yoga AND compassion* OR (Self ADJ1 compassion) OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care" OR empath* Academic SH – Compassion fatigue OR Empathy	
ProQuest for Dissertations and Theses	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*" AND compassion* OR (self NEAR/1 compassion) OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care" OR empath*	59 (searched document title)
Cochrane Library	Yoga OR yogic OR "yoga training" OR "yoga exercise" OR "yoga practice" OR "yoga therap*" AND compassion* OR (Self NEAR/1 compassion) OR "compassion* to self" OR "compassion for other*" OR "compassion* to other*" OR "compassion* toward* other*" OR "compassion* care" OR empath*	60
TRIP	Yoga and compassion	136
NHS Evidence	Yoga and compassion	75

Note. The following Boolean operators were used. AND = to combine search terms and identify references containing all search terms entered; OR = to identify studies containing any of the search terms identified; N1 and NEAR/1 = to find both words together, either in order, or with one word between them.

Appendix B Template PICOSS Screening Tool

Review Question: Do yoga interventions increase self-compassion in the "helping professions"?		
Reviewer name:		
Author name:		
Title:		
Patient population	**Include** ☐ Helping professionals or trainees/students of that profession ☐ Over 18 and any gender (*NB: A helping profession is defined as "a professional interaction with a client, initiated to nurture the growth of, or address the problems of, a person's physical, psychological, intellectual, or emotional constitution (Graf, Sator, & Spranz-Fogasy, 2014). Examples of helping professionals include doctors, nurses, occupational therapists, psychotherapists, counsellors, social workers, teachers and psychologists).*	**Exclude** ☐ Entire study population not explicitly identified as falling within the definition of helping professional, or students of the professions *(NB: Studies where administrative staff have been included in the sample of helping professionals will be included if they make up less than 50% of the sample.)* ☐ Participants aged under 18 years
Interventions	**Include** ☐ Explicitly defined as 'yoga' ☐ Yoga interventions must encompass at least three elements (limbs of yoga) including: asana (physical postures), pranayama (breath work), and meditation/mindfulness ☐ Any duration or frequency of intervention ☐ Interventions administered online or 'in-person'	**Exclude** ☐ Studies that are similar to, but not explicitly defined as yoga ☐ Studies in which yoga has been included as part of a wider non-yoga intervention ☐ Studies in which specific aspects of yoga (e.g. yogic breathing) is the focus of the intervention to the exclusion of other elements
Comparators	**Include** ☐ Not applicable	**Exclude** ☐ No exclusion criteria based on comparative or control interventions, providing all other inclusion criteria are satisfied

Outcomes	**Include** □ At least one self-report validated measure of self-compassion. □ Outcome measures administered pre and post yoga intervention (and follow up, if measured) with a comparison made between the measures, with sufficient data for computation of effect sizes(s) □ Qualitative studies which also have a validated measure of self-compassion included in the study NB: Examples of measures may include: Self-Compassion Scale (Neff, 2003) and Compassionate Engagement and Action Scale (Gilbert et al., 2017)	**Exclude** □ Does not report on outcome specified in inclusion criteria □ Does not provide pre and post outcome measures with sufficient data for computation of effect sizes(s) □ Qualitative studies, which do not include a validated quantitative measure of self-compassion
Setting	**Include** □ Any setting	**Exclude**
Study design	**Include** □ Studies evaluating a yoga intervention explicitly for helping professionals or trainees, where there is a validated measure of self-compassion pre and post intervention (and follow up if reported). □ Original empirical studies □ All types of quantitative studies (e.g. cross sectional studies, correlational studies, randomised control trials (RCT's), non-RCT's, single case studies and case-control studies) □ Qualitative studies which include a pre/post quantitative measure of self-compassion □ Studies published in peer-reviewed journals or unpublished manuscript/dissertations □ Only manuscripts written in English with findings available	**Exclude** □ Non empirical studies □ Qualitative studies which do not include a pre/post quantitative measure of self-compassion □ Manuscripts not available in English □ Manuscripts without findings available
Overall decision	□ **INCLUDED**	□ **EXCLUDED**
Notes		

Appendix C Reasons for Excluding Studies at Full-Text Screening Stage

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
Braun, Deeb, Carrico & Kinser (2019)	Brief yoga intervention for dental and dental hygiene students: a feasibility and acceptability study						No measure of self-compassion					
Butterfield (2016)	Yoga and Mental Health				An article, not an empirical study							
de Bruin, Valentin, Baartma	Mindful2Work the next steps: Effectiveness of		Not explicitly helping professionals			Yoga as part of wider intervention						

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
ns, Blok & Bogels (2020)	a program combining physical exercise, yoga and mindfulness, adding a wait-list period, measurements up to one year later and qualitative interviews					incorporating physical exercise and work-related stress relief practises						
Dyer, Bordena, Duseka & Khalsa (2020)	Results of multiple iterations of a yoga based training program for education and health-care professionals on				Abstract for oral presentation, not empirical paper							

Appendix C

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
	psychological health											
Dyer, Bordena, Duseka & Khalsa (2020)	A 3-day yoga-based program for education professionals improves psychological health: A pragmatic randomized controlled trial				Conference abstract, not empirical paper							
Falsafi & Leopard (2015)	Use of Mindfulness, Self-Compassion, and Yoga Practices With Low-Income and/or		Sample not helping professionals									

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
	Uninsured Patients With Depression and/or Anxiety											
Khalsa, Klatt & Park (2018)	Yoga in occupational setting: Efficacy research studies				Abstract for symposium not empirical paper							
Lynes (2019)	Can laughter yoga provide stress relief for clinical nurses?				Magazine article, not empirical paper							
Vliet, Jong & Jong (2017)	Long-term benefits by a mind–body medicine skills course on perceived stress and empathy					Not explicitly a yoga intervention	No measure of self-compassion					

Appendix C

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
	among medical and nursing students											
Shelov (2010)	The impact of yoga on cardiovascular reactivity, empathy and mindfulness						No measure of self-compassion					
Trent, Miraglia, Dusek, Pasalis, & Khalsa (2018)	Improvements in Psychological Health Following a Residential Yoga-Based Program for Frontline Professionals								Duplicate article			
Trent, Miraglia,	Immediate and sustained				Abstract submitted							

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
Dusek, Pasalis, & Khalsa (2017)	improvements in psychological health and well-being following a 5-day residential yoga-based program for frontline professionals				for conference, not empirical paper							
Trent, Miraglia, Dusek, Pasalis, & Khalsa (2018)	Improvements in psychological well-being following a residential yoga-based program for professionals: A pragmatic clinical trial				Study registration, not empirical paper						Duplicate	

Appendix C

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
Van der Meulen, Valentin, Bögels & de Bruin (2020)	Mindfulness and self-compassion as mediators of the Mindful2Work Training on perceived stress and chronic fatigue					Yoga as part of a wider intervention incorporating physical exercise						
Wright (2018)	Evaluation of a Web-Based Holistic Stress Reduction Pilot Program Among Nurse-Midwives						No measure of self-compassion					
Gancio & Earle (2015)	Yoga in a palliative care suite: Promoting self-care amongst						No measure of self-compassion					

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
	nurses and practitioners											
Clark (2018)	A Radical RN- BS Nursing Class: Outcomes from an Integrative Yoga Elective						No measure of self-compassion					
Steinberg, Klatt & Duchemin (2016)	Feasibility of a Mindfulness-Based Intervention for Surgical Intensive Care Unit Personnel						No measure of self-compassion					
Riley, Park, Wilson, Sabo,	Improving physical and mental health in frontline mental health care					Yoga as part of a wider intervention combining						

Appendix C

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
Antoni, Braun, Harrington, Reiss, Pasalis, Harris & Cope (2017)	providers: Yoga-based stress management versus cognitive behavioral stress management					yoga and aspects of cognitive stress management						
Gregory (2015)	Yoga and Mindfulness Program: The Effects on Compassion Fatigue and Compassion Satisfaction in Social Workers						No measure of self-compassion					
Taylor, McLean, Richards,	Personalised yoga for burnout and						No measure of self-compassion					

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
& Glozier (2020)	traumatic stress in junior doctors											
Murphy Mark D. Stauffer, Ph.D Deborah J. Rubel (2013)	A Yoga Intervention for Counselor's with Compassion Fatigue: An Exploratory Single Case Study (ProQuest Dissertation)						No measure of self-compassion					
Trent, Reeves, Dusek, Pasalis & Khalsa (2020)	Qualitative Evaluation of a Residential Yoga-based Program for Frontline Professionals			Abstract submitted for conference – full paper not published/ available								

Appendix C

Authors	Title	18+ Years Old	Helping Professionals (both qualified and unqualified)	Written in English	Original Empirical Study	Explicit Yoga Intervention (including three core elements)	Validated Measure of Compassion	Includes Pre/post Quantitative Analyses	Sufficient Data to Compute Effect Size(s)	Findings Available	Full Text Available	Duplicate
Ofei-Dodoo, Cleland-Leighton, Nilsen, Cloward & Casey (2020); JOEM	Impact of a Mindfulness-Based, Workplace Group Yoga Intervention on Burnout, Self-Care, and Compassion in Health Care Professionals: A Pilot Study						No measure of self-compassion					

Appendix D Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a Variety of Fields (Kmet et al., 2004)

Appendix A: Manual for Quality Scoring of Quantitative Studies

Definitions and Instructions for Quality Assessment Scoring

How to calculate the summary score

- **Total sum** = (number of "yes" * 2) + (number of "partials" * 1)
- **Total possible sum** = 28 – (number of "N/A" * 2)
- **Summary score:** total sum / total possible sum

Quality assessment

1. *Question or objective sufficiently described?*

   Yes: Is easily identified in the introductory section (or first paragraph of methods section). Specifies (where applicable, depending on study design) *all* of the following: purpose, subjects/target population, and the *specific* intervention(s) /association(s)/descriptive parameter(s) under investigation. A study purpose that only becomes apparent after studying other parts of the paper is *not* considered sufficiently described.

   Partial: Vaguely/incompletely reported (e.g. "describe the effect of" or "examine the role of" or "assess opinion on many issues" or "explore the general attitudes"...); *or* some information has to be gathered from parts of the paper other than the introduction/background/objective section.

   No: Question or objective is not reported, or is incomprehensible.

   N/A: Should not be checked for this question.

2. *Design evident and appropriate to answer study question?*

   (If the study question is not given, infer from the conclusions).

   Yes: Design is easily identified and is appropriate to address the study question / objective.

   Partial: Design and /or study question not clearly identified, but gross inappropriateness is not evident; *or* design is easily identified but only partially addresses the study question.

   No: Design used does not answer study question (e.g., a comparison group is required to answer the study question, but none was used); *or* design cannot be identified.

   N/A: Should not be checked for this question.

3. *Method of subject selection (and comparison group selection, if applicable) or source of information/input variables (e.g., for decision analysis) is described and appropriate.*

   Yes: Described and appropriate. Selection strategy *designed* (i.e., consider sampling frame and strategy) to obtain an unbiased sample of the relevant target population or the entire target population of interest (e.g., consecutive patients for clinical trials, population-based random sample for case-control studies or surveys). Where applicable, inclusion/exclusion criteria are described and defined (e.g., "cancer" -- ICD code or equivalent should be provided). *Studies of volunteers:* methods and setting of recruitment reported. *Surveys:* sampling frame/ strategy clearly described and appropriate.

   Partial: Selection methods (and inclusion/exclusion criteria, where applicable) are not completely described, but no obvious inappropriateness. Or selection strategy is not ideal (i.e., likely introduced bias) but did not likely seriously distort the results (e.g., telephone survey sampled from listed phone numbers only; hospital based case-control study identified all cases admitted during the study period, but recruited controls admitted during the day/evening only). Any study describing participants only as "volunteers" or "healthy volunteers". *Surveys:* target population mentioned but sampling strategy unclear.

   No: No information provided. *Or* obviously inappropriate selection procedures (e.g., inappropriate comparison group if intervention in women is compared to intervention in men). *Or* presence of selection bias which likely seriously distorted the results (e.g., obvious selection on "exposure" in a case-control study).

   N/A: Descriptive case series/reports.

4. *Subject (and comparison group, if applicable) characteristics or input variables/information (e.g., for decision analyses) sufficiently described?*

   Yes: Sufficient relevant baseline/demographic information clearly characterizing the participants is provided (or reference to previously published baseline data is provided). Where applicable, reproducible criteria used to describe/categorize the participants are clearly defined (e.g., ever-smokers, depression scores, systolic blood pressure > 140). If "healthy volunteers" are used, age and sex must be reported (at minimum). *Decision analyses:* baseline estimates for input variables are clearly specified.

   Partial: Poorly defined criteria (e.g. "hypertension", "healthy volunteers", "smoking"). *Or* incomplete relevant baseline / demographic information (e.g., information on likely confounders not reported). *Decision analyses:* incomplete reporting of baseline estimates for input variables.

   No: No baseline / demographic information provided.
   Decision analyses: baseline estimates of input variables not given.

   N/A: Should not be checked for this question.

5. *If random allocation to treatment group was possible, is it described?*

   Yes: True randomization done - requires a description of the method used (e.g., use of random numbers).

   Partial: Randomization mentioned, but method is not (i.e. it may have been possible that randomization was not true).

   No: Random allocation not mentioned although it would have been feasible and appropriate (and was possibly done).

   N/A: Observational analytic studies. Uncontrolled experimental studies. Surveys. Descriptive case series / reports. Decision analyses.

6. *If interventional and blinding of investigators to intervention was possible, is it reported?*

   Yes: Blinding reported.

   Partial: Blinding reported but it is not clear who was blinded.

   No: Blinding would have been possible (and was possibly done) but is not reported.

   N/A: Observational analytic studies. Uncontrolled experimental studies. Surveys. Descriptive case series / reports. Decision analyses.

7. *If interventional and blinding of subjects to intervention was possible, is it reported?*

   Yes: Blinding reported.

   Partial: Blinding reported but it is not clear who was blinded.

   No: Blinding would have been possible (and was possibly done) but is not reported.

   N/A: Observational studies. Uncontrolled experimental studies. Surveys. Descriptive case series / reports.

8. *Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?*

   Yes: Defined (or reference to complete definitions is provided) and measured according to reproducible, "objective" criteria (e.g., death, test completion – yes/no, clinical scores). Little or minimal potential for measurement / misclassification errors. *Surveys:* clear description (or reference to clear description) of questionnaire/interview content and response options. *Decision analyses:* sources of uncertainty are defined for all input variables.

   Partial: Definition of measures leaves room for subjectivity, *or* not sure (i.e., not reported in detail, but probably acceptable). *Or* precise definition(s) are missing, but no evidence or problems in the paper that would lead one to assume major problems. *Or* instrument/mode of assessment(s) not reported. Or misclassification errors may have occurred, but they did not likely seriously distort the results (e.g., slight difficulty with recall of long-ago events; exposure is measured only at baseline in a long cohort study). *Surveys:* description of

questionnaire/interview content incomplete; response options unclear. *Decision analyses:* sources of uncertainty are defined only for some input variables.

No: Measures not defined, or are inconsistent throughout the paper. *Or* measures employ only ill-defined, subjective assessments, e.g. "anxiety" or "pain." *Or* obvious misclassification errors/measurement bias likely seriously distorted the results (e.g., a prospective cohort relies on self-reported outcomes among the "unexposed" but requires clinical assessment of the "exposed"). *Surveys:* no description of questionnaire/interview content or response options. *Decision analyses:* sources of uncertainty are not defined for input variables.

N/A: Descriptive case series / reports.

9. *Sample size appropriate?*

Yes: Seems reasonable with respect to the outcome under study and the study design. When statistically significant results are achieved for major outcomes, appropriate sample size can usually be assumed, unless large standard errors (SE > ½ effect size) and/or problems with multiple testing are evident. *Decision analyses:* size of modeled cohort / number of iterations specified and justified.

Partial: Insufficient data to assess sample size (e.g., sample seems "small" and there is no mention of power/sample size/effect size of interest and/or variance estimates aren't provided). *Or* some statistically significant results with standard errors > ½ effect size (i.e., imprecise results). *Or* some statistically significant results in the absence of variance estimates. *Decision analyses:* incomplete description or justification of size of modeled cohort / number of iterations.

No: Obviously inadequate (e.g., statistically non-significant results and standard errors > ½ effect size; or standard deviations > _ of effect size; or statistically non-significant results with no variance estimates and obviously inadequate sample size). *Decision analyses:* size of modeled cohort / number of iterations not specified.

N/A: Most surveys (except surveys comparing responses between groups or change over time). Descriptive case series / reports.

10. *Analysis described and appropriate?*

Yes: Analytic methods are described (e.g. "chi square"/ "t-tests"/"Kaplan-Meier with log rank tests", etc.) and appropriate.

Partial: Analytic methods are not reported and have to be guessed at, but are probably appropriate. *Or* minor flaws or some tests appropriate, some not (e.g., parametric tests used, but unsure whether appropriate; control group exists but is not used for statistical analysis). *Or* multiple testing problems not addressed.

No: Analysis methods not described and cannot be determined. *Or* obviously inappropriate analysis methods (e.g., chi-square tests for continuous data, SE given where normality is highly unlikely, etc.). *Or* a study with a descriptive goal / objective is over-analyzed.

N/A: Descriptive case series / reports.

11. *Some estimate of variance (e.g., confidence intervals, standard errors) is reported for the main results/outcomes (i.e., those directly addressing the study question/objective upon which the conclusions are based)?*

    Yes: Appropriate variances estimate(s) is/are provided (e.g., range, distribution, confidence intervals, etc.). *Decision analyses:* sensitivity analysis includes all variables in the model.

    Partial: Undefined "+/-" expressions. *Or* no specific data given, but insufficient power acknowledged as a problem. *Or* variance estimates not provided for all main results/outcomes. *Or* inappropriate variance estimates (e.g., a study examining change over time provides a variance around the parameter of interest at "time 1" or "time 2", but does not provide an estimate of the variance around the difference). *Decision analyses:* sensitivity analysis is limited, including only some variables in the model.

    No: No information regarding uncertainty of the estimates. *Decision analyses:* No sensitivity analysis.

    N/A: Descriptive case series / reports. Descriptive surveys collecting information using open-ended questions.

12. *Controlled for confounding?*

    Yes: Randomized study, with comparability of baseline characteristics reported (or non-comparability controlled for in the analysis). *Or* appropriate control at the design or analysis stage (e.g., matching, subgroup analysis, multivariate models, etc). *Decision analyses:* dependencies between variables fully accounted for (e.g., joint variables are considered).

    Partial: Incomplete control of confounding. *Or* control of confounding reportedly done but not completely described. *Or* randomized study without report of comparability of baseline characteristics. *Or* confounding not considered, but not likely to have seriously distorted the results. *Decision analyses:* incomplete consideration of dependencies between variables.

    No: Confounding not considered, and may have seriously distorted the results. *Decision analyses:* dependencies between variables not considered.

    N/A: Cross-sectional surveys of a single group (i.e., surveys examining change over time or surveys comparing different groups should address the potential for confounding). Descriptive studies. Studies explicitly stating the analysis is strictly descriptive/exploratory in nature.

13. *Results reported in sufficient detail?*

    Yes: Results include major outcomes and all mentioned secondary outcomes.

    Partial: Quantitative results reported only for some outcomes. *Or* difficult to assess as study question/objective not fully described (and is not made clear in the methods section), but results seem appropriate.

No: Quantitative results are reported for a subsample only, or "n" changes continually across the denominator (e.g., reported proportions do not account for the entire study sample, but are reported only for those with complete data -- i.e., the category of "unknown" is not used where needed). *Or* results for some major or mentioned secondary outcomes are only qualitatively reported when quantitative reporting would have been possible (e.g., results include vague comments such as "more likely" without quantitative report of actual numbers).

N/A: Should not be checked for this question.

14. *Do the results support the conclusions?*

Yes: All the conclusions are supported by the data (even if analysis was inappropriate). Conclusions are based on all results relevant to the study question, negative as well as positive ones (e.g., they aren't based on the sole significant finding while ignoring the negative results). Part of the conclusions may expand beyond the results, if made *in addition to* rather than instead of those strictly supported by data, and if including indicators of their interpretative nature (e.g., "suggesting," "possibly").

Partial: Some of the major conclusions are supported by the data, some are not. *Or* speculative interpretations are not indicated as such. *Or* low (or unreported) response rates call into question the validity of generalizing the results to the target population of interest (i.e., the population defined by the sampling frame/strategy).

No: None or a very small minority of the major conclusions are supported by the data. *Or* negative findings clearly due to low power are reported as definitive evidence against the alternate hypothesis. *Or* conclusions are missing. *Or* extremely low response rates invalidate generalizing the results to the target population of interest (i.e., the population defined by the sampling frame/strategy).

N/A: Should not be checked for this question.

Appendix E Standard Quality Assessment Criteria Ratings for each Study

Study No; Author (year)	1. Question/ objective sufficiently described	2. Study design evident and appropriate	3. Method of subject/ comparison group selection described and appropriate	4. Subject characteristics sufficiently described	5. Random allocation to treatment group possible and described.	6. Blinding of investigators reported	7. Blinding of subjects reported.	8. Outcome well defined and robust to measurement/misclassification bias?	9. Sample size appropriate	10. Analytic methods described / justified and appropriate	11. Some estimate of variance reported for the main results.	12. Controlled for confounding.	13. Results reported in sufficient detail.	14. Conclusions supports by results	Total score	Summary Score
001 Beri et al. 2020	2	1	1	2	N/A	N/A	N/A	2	2	2	2	N/A	2	1	17	0.85
002 Dyer et al. 2020	2	2	1	2	N/A	N/A	2	2	1	2	2	1	2	2	21	0.88
003 Erkin & Aykar, 2021	2	2	1	1	N/A	N/A	N/A	2	2	2	1	N/A	2	2	17	0.85
004 Kinchen et al. 2020	1	2	1	2	N/A	N/A	N/A	2	1	1	2	1	2	2	17	0.77
005 Klawonn et al. 2019	2	2	1	1	N/A	N/A	N/A	2	1	2	1	N/A	1	1	14	0.70

Appendix E

Study No; Author (year)	1. Question/ objective sufficiently described	2. Study design evident and appropriate	3. Method of subject/ comparison group selection described and appropriate	4. Subject characteristics sufficiently described	5. Random allocation to treatment group possible and described.	6. Blinding of investigators reported	7. Blinding of subjects reported.	8. Outcome well defined and robust to measurement/misclassification bias?	9. Sample size appropriate	10. Analytic methods described / justified and appropriate	11. Some estimate of variance reported for the main results.	12. Controlled for confounding.	13. Results reported in sufficient detail.	14. Conclusions supports by results	Total score	Summary Score
006 Mathad et al. 2017	2	2	1	2	1	0	0	2	2	2	2	2	2	1	21	0.75
007 Riley et al. 2017	2	2	1	1	N/A	N/A	N/A	2	1	2	1	N/A	2	1	15	0.75
008 Trent et al. 2018	2	2	1	2	N/A	N/A	N/A	2	2	2	1	N/A	2	2	18	0.90
009 Trent et al. 2019a	1	2	1	2	N/A	N/A	N/A	2	2	2	1	N/A	1	2	16	0.80
010 Trent et al. 2019b	1	2	1	2	N/A	0	2	2	2	2	2	1	2	2	21	0.75
Total	17/20	19/20	10/20	17/20	1/2	0/4	4/6	20/20	16/20	19/20	15/20	5/8	18/20	16/20	Mean(SD)= 17.7(2.54)	Mean(SD)= 0.8(0.06)

Appendix F Description of Yoga Interventions for each Study

Study No. Author (year)	Yoga style	Yoga philosophy/ teachings	Yoga ethics/ morals (*yamas/ niyamas*)	Concentration/ meditation/ mindfulness (*dharana/dhyana/ pratayaharas*)	Relaxation	Postures (*asana*)	Breath work (*pranayama*)	Explicitly teach self-compassion	Other
001 Beri et al. (2020)	Tantra Yoga	+ Chakras, mindful eating	-	+ Visualisations based on chakras, mindful meditation	+	+	+	-	
002 Dyer et al. (2020b)	Hatha Yoga	+ Mindful communication, sleep preparation and eating.	Unclear	+ Concentrative meditation, mindful listening	+	+	+ Three part breath, sun breath, letting go breath	-	
003 Erkin & Aykar (2021)	-	+ History of yoga	+ Compassion	+ Walking meditation, mindfulness meditation	+	+	+	+ Loving-kindness meditation, compassionate friend, compassionate body scan	
004 Kinchen et al. (2020)	Kundalini Yoga	-	-	+ Progressive relaxation, kirtan kriya, tattva balance, eye focus, mudras	+	+ body locks	+ Alternate nostril breathing, three part breath, bee breath	-	

Appendix F

Study No. Author (year)	Yoga style	Yoga philosophy/ teachings	Yoga ethics/ morals (*yamas/ niyamas*)	Concentration/ meditation/ mindfulness (*dharana/dhyana/ pratayaharas*)	Relaxation	Postures (*asana*)	Breath work (*pranayama*)	Explicitly teach self-compassion	Other
005 Klawonn et al. (2019)	-	+ Yogic koshas philosophy	-	+ Body scan, guided meditation, yoga nidra (yogic sleep)	+	+	+ Diaphragmatic breath, alternate nostril, bee breath, breath of fire	-	
006 Mathad et al. (2017)	-	Lecture session 10 mins once per month (no description)	-	+ 5 mins once per month	+	+	+	-	Krida yoga (yogic games)
007 Riley et al. (2017)	-	+ Mindfulness education, intention setting, acceptance, awareness	+ Self-observation without judgement	+ Body scan, mindfulness, visualisations		+	+ Alternate nostril breathing	+ Loving kindness meditation	Reflective journaling
008 Trent et al. (2018)	Hatha Yoga	+ Mindful communication, sleep preparation and eating.	-	+ Concentrative meditation, mindful listening	+	+	+ Three part breath, sun breath, letting go breath	-	
009 Trent et al. (2019a)	Hatha Yoga	+ Mindful communication, sleep preparation and eating.	-	+ Concentrative meditation, mindful listening	+	+	+ Three part breath, sun breath, letting go breath	-	

Study No. Author (year)	Yoga style	Yoga philosophy/ teachings	Yoga ethics/ morals (*yamas/ niyamas*)	Concentration/ meditation/ mindfulness (*dharana/dhyana/ pratayaharas*)	Relaxation	Postures (*asana*)	Breath work (*pranayama*)	Explicitly teach self-compassion	Other
010 Trent et al. (2019b)	Hatha Yoga	+ Education about mindful communication, sleep preparation and eating.	-	+ Concentrative meditation, mindful listening	+	+	+ Three part breath, sun breath, letting go breath	-	

Appendix G Email with Permission to use EPYQ (Park et al., 2018)

Email sent 30/03/2020:

Hi Crystal,

Myself and my colleagues (copied in to this email) are currently designing a project using self-report measures only. We would ideally like to adapt Part One of the scale for self-report use. Therefore, the 14 dimensions would still be rated on the likert scale you propose (0 "Not at all" to 4 "A very large amount"), but these dimensions would be rated on a self-report basis by those practising as opposed to an external observer of the class. We appreciate that the scale has not been validated for use in this way.

Would you and your colleagues be happy for us to use the scale in this way and to proceed with the user agreement as per the site you direct me to below?

Any feedback greatly received. I do hope you and those around you are safe and well given the current conditions.

With best wishes,

Alison

Dr Alison Bennetts
Senior Teaching Fellow
Doctorate in Clinical Psychology

Email received 31/03/2020:

Hi Alison,

Yes, of course, you can use the EPYQ this way. Everyone will rate it from their own perspective so you won't be getting the measure of the class but rather everyone's interpretations of it. We have used it this way and it corresponds sort of with the class ratings done by raters (see the validation article in IJYT) Keep me posted on what you find; good luck!

Crystal Park

Appendix H Recruitment Strategy

Date	Action
09/12/20	Study advertised via Instagram and Facebook – snowballing method as people re-shared
10/12/20	Study emailed to The Minded Institute, The British Wheel of Yoga, Yoga in Healthcare Alliance
11/12/20	Study shared with yoga Facebook groups and emailed to several yoga schools and yoga teachers
14/12/20	Study advertised to University of Southampton students via e-folio
Jan 21	Study advertised and shared on Twitter
Jan 21	Study shared on Survey Circle, participant pool website
Jan 21	Study advertised via Southampton Psychology University Twitter account
Jan 21	Study advertised on Reddit and Reddit Yoga sites
Feb 21	Study shared on Clinical Psychologist's Facebook page
Feb 21	Study re-shared on Twitter, tagging The Minded Institute, Yoga In Healthcare Alliance, The Yoga Journal, Men's Yoga, YogaGlo, DharmaYoga, Yoga with Adrienne, Yoga Works

Appendix I Analysis of Participant Demographics

Characteristic	Yoga Practisers	Non-Yoga Practisers	Difference (95% CI)
Demographics	*n* (%)	*n* (%)	
Total (*n*)	184	275	
Age	*Median*= 25-34	*Median*= under 21	
Under 21	29 (15.8)	169 (61.5)	**
21-24	21 (11.4)	36 (13.1)	-
25-34	47 (25.5)	33 (12)	**
35-44	34 (18.5)	21 (7.6)	**
45-54	19 (10.3)	5 (1.8)	**
55-64	21 (11.4)	8 (2.9)	**
65+	13 (7.1)	3 (1.1)	-
Gender			
Female	169 (91.8)	228 (82.9)	**
Male	12 (6.5)	43 (15.6)	**
Non-binary	2 (1.1)	3 (1.1)	-
Not reported	1 (0.5)	1 (0.4)	-
Ethnicity			
White	166 (90.2)	222 (80.7)	**
Black	2 (1.1)	12 (4.4)	**
Asian	7 (3.8)	23 (8.4)	-
Arab	-	3 (1.1)	**
Mixed heritage	7 (3.8)	13 (4.7)	-
Other	2 (1.1)	2 (0.7)	-
Historical or current mental health problems	79 (42.9)	92 (33.1)	-
Yes	59 (32.1)	91 (33.5)	-
No	46 (25.0)	92 (33.5)	-
Unsure			
Undergoing mental health treatment	10 (5.4)	13 (4.7)	-
Yes	115 (62.5)	171 (62.2)	-

Characteristic	Yoga Practisers	Non-Yoga Practisers	Difference (95% CI)
No			
Exercise Frequency	*Median*= three times per week	*Median*= three times per week	
Less than once per month	1 (0.5)	21 (7.6)	**
Up to three times per month	3 (1.6)	36 (13.1)	**
Once per week	12 (6.5)	45 (16.4)	**
Twice per week	22 (12)	64 (23.3)	**
Three times per week	71 (38.6)	68 (24.7)	**
Daily	75 (40.8)	41 (14.9)	**

Note. Group differences analysed using Chi-square test of homogeneity and Fisher's exact tests;

CI= confidence interval

** significant at $p<.05$

Appendix J Analytic Strategy including Tests of Assumptions

Outliers were assessed using histograms, boxplots and Q-Q plots (Field, 2013). Normality of distribution was assessed through visually inspecting histograms and QQ-plots. Descriptive statistics relating to skewness and kurtosis were also assessed to identify potential skewed data. Linearity and homoscedasticity were examined by plotting standardised residuals against standardised predicted values within scatterplots as suggested by Field (2013). Multicollinearity was assessed inspecting variance inflation factors (VIF) tolerance scores as recommended by Field (2013). Independence of residuals was assessed by a Durbin-Watson statistic. In the CEAS-CtO subscale, two outliers were considered extreme (i.e., three standard deviations from the means). Removing the two outliers significantly altered findings, therefore it was decided to replace the outliers with the next highest value (Field, 2018).

Appendix K Detailed Characteristics of Yoga Practisers

Demographics	*n* (%)
Types of Yoga Practice	
Ashtanga	45 (24.5)
Bikram	6 (3.3)
Chair	8 (4.3)
Hatha	81 (44)
Integral	5 (2.7)
Iyengar	17 (9.2)
Jivamukti	4 (2.2)
Kundalini	7 (3.8)
Laughter	6 (3.3)
Power	24 (13)
Partner	1 (0.5)
Restorative	57 (31)
Sivananda	3 (1.6)
Tantric	6 (3.3)
Tibetan	4 (2.2)
Vinyasa	86 (46.7)
Yin	46 (25)
Yoga Nidra	33 (17.9)
Yoga Breathing	72 (39.1)
Scaravelli	2 (1.1)
Frequency of practice	*Median*= twice per week
Twice per month	12 (6.5)
Three times per month	11 (6)
Once per week	44 (23.9)
Twice per week	28 (15.2)
Three times per week	43 (23.4)
Daily	46 (25)
Total years practising	*Median*= 1-5 years
< 1 year	33 (17.9)
1-5 years	77 (41.8)
5-10 years	32 (17.4)
10-20 years	22 (12)
20-30 years	11 (6)
30+ years	9 (4.9)

Yoga teacher or therapist	
No	142 (77.2)
Yoga teacher	39 (21.2)
Yoga therapist	1 (0.5)
Both	2 (1.1)

Appendix L ERGO Ethics Approval

UNIVERSITY OF Southampton

ERGO II – Ethics and Research Governance Online https://www.ergo2.soton.ac.uk

Submission ID: 61031
Submission Title: Yoga, compassion, self-criticism and wellbeing: Exploring mechanisms of change
Submitter Name: Laura Pick

Your submission has now been approved by the Faculty Ethics Committee. You can begin your research unless you are still awaiting any other reviews or conditions of your approval.

Comments:

- Not an ethical point per se, but it is helpful to put the study end date on your online advert so potential participants know when the survey will be closed.

  good luck with this interesting study

-

Click here to view the submission

TId: 23011_Email_to_submitter___Approval_from_Faculty_Ethics_committee__cat_B___C_ Id: 330988

L.A.Pick@soton.ac.uk coordinator

Appendix M Online Participant Information Sheet and Consent

Study Title: Yoga, compassion, self-criticism and wellbeing: Exploring mechanisms of change

Researchers: Laura Pick, Dr Margo Ononaiye and Dr Alison Bennetts

ERGO Number: 61031

You are being invited to take part in the above research study. To help you decide whether you would like to take part or not, it is important that you understand why the research is being done and what it will involve. Please read the information below carefully and ask questions if anything is not clear or you would like more information before you decide to take part in this research. You may like to discuss it with others but it is up to you to decide whether or not to take part. If you are happy to participate you will be asked for your consent online.

What is the research about?

This research is being undertaken as part of a doctoral qualification in Clinical Psychology at the University of Southampton. There is growing evidence to support the benefits of yoga as a health intervention and as an adjunct treatment in mental health care. Yoga has been associated with increased levels of mindfulness and self-compassion and improvements in anxiety, depression and self-esteem. However, evidence regarding the mechanisms through which yoga brings about positive effects remains limited. Emerging research has identified that self-compassion may be an important component underlying the benefits of contemplative practices such as yoga, in addition to being a critical protective factor against many mental health difficulties. This study is interested in exploring compassion in people who do and do not practise yoga. For participants who do practise yoga, the second part of the study is interested in the different elements of yoga practise and their relationship to compassion and wellbeing factors.

Why have I been asked to participate?

We are inviting all participants who do and do not practise yoga. As long as you are over 18 and have a good comprehension of the English language, you are welcome to take part.

What will happen to me if I take part?

If you decide to take part, you will be asked to complete a series of short questionnaires related to the themes of compassion, self-criticism and wellbeing. The first part of the study should take approximately 15 minutes. If you are a yoga practiser, you will be invited to answer an additional questionnaire about your yoga practise, which should take approximately 5 minutes. You will also be invited to answer three free-text questions about your experience of compassion and practising yoga.

Are there any benefits in my taking part?

By taking part in this research, you will have the opportunity to contribute to the latest psychological research into mind-body therapies. This research is vital for developing our understanding of the different elements of yoga practise and how it links with psychological theory and wellbeing. As a thank you for participating, there is also a chance of winning one of four £50 Amazon vouchers, by entering a free prize draw at the end of the survey, where you will be asked for your name and email address. If you are a University of Southampton student, you will have the option to receive up to 5 participation points for your time.

Are there any risks involved?

We will be asking you about your wellbeing, experiences of compassion and self-criticism. We do not anticipate any serious discomfort, however if any emotional difficulties do arise from the content of the questions, please check out the following resources and websites for information and support:

- The Compassionate Mind Foundation (https://www.compassionatemind.co.uk/)
- Mind – the mental health charity (https://www.mind.org.uk/)
- The Samaritans – emergency helpline (https://www.samaritans.org/)
- NHS Improving Access to Psychological Therapies (https://www.nhs.uk/service-search/other-services/Psychological-therapies-%28IAPT%29/LocationSearch/10008)

If you are a University of Southampton student, you can access support from Enabling Services. Use the following link for contact information: https://www.southampton.ac.uk/edusupport/index.page

What data will be collected?

Electronic data (survey responses) will be collected online and will be kept strictly confidential. This will include collection of personal data that is special category data according to Data Protection (this includes information on age, gender identity and ethnicity). This personal data will be handled securely during collection, analysis, storage and transfer using encryption and password protected access.

Will my participation be confidential?

Your participation and the information we collect about you during the course of the research will be kept strictly anonymous, as the survey is designed to be anonymous at the point you take part. Only members of the research team and responsible members of the University of Southampton may be given access to the data for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your data. All of these people have a duty to keep your information, as a research participant, strictly confidential.

To protect your anonymity, if you do choose to enter the prize draw at the end of the study, your first name and email address will be stored securely and separately from your survey responses. Electronic data will be encrypted and stored in a password-protected database only accessible by the research team. All data will be deleted according to the University of Southampton guidelines.

In accordance with University Data Storage guidance, your anonymous data will be deposited in the university data repository along with the resulting thesis. Future research projects may request ethics permissions to run secondary research projects using the data set.

Do I have to take part?

No, it is entirely up to you to decide whether or not to take part. If you decide you want to take part, you will need to provide consent by ticking the checkboxes below to show you have agreed to take part.

What happens if I change my mind?

You have the right to change your mind and withdraw at any time without giving a reason and without your participant rights being affected. If you wish to withdraw at any point during the study, please do so by exiting the survey. Please note that in anonymous surveys **it is not possible for participants to withdraw their data retrospectively**. If at any time during the study you decide to withdraw from the survey, you can do so by simply exiting the survey. Responses will be saved upon the completion of the study.

What will happen to the results of the research?

Your personal details will remain strictly confidential if you wish to take part in the prize draw. The project will be written up as part of doctoral thesis, disseminated at conferences and submitted for publication in a peer-reviewed journal. Research findings made available in any reports or publications will not include information that can directly identify you. The data may be used for future studies. Anonymised data will be held by the university in a password protected file.

Where can I get more information?

If you have any more queries or would like to know more about this study, please do not hesitate to get in touch , details of the research team are provided below.

Chief Investigator: Laura Pick (lp2n18@soton.ac.uk)

Research supervisor: Dr Alison Bennetts (a.bennetts@soton.ac.uk)

What happens if there is a problem?

If you have a concern about any aspect of this study, you should speak to the researchers who will do their best to answer your questions. If you remain unhappy or have a complaint about any aspect of this study, please contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).

Data Protection Privacy Notice

The University of Southampton conducts research to the highest standards of research integrity. As a publicly-funded organisation, the University has to ensure that it is in the public interest when we use personally-identifiable information about people who have agreed to take part in research. This means that when you agree to take part in a research study, we will use information about you in the ways needed, and for the purposes specified, to conduct and complete the research project. Under data protection law, 'Personal data' means any information that relates to and is capable of identifying a living individual. The University's data protection policy governing the use of personal data by the University can be found on its website (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page).

This Participant Information Sheet tells you what data will be collected for this project and whether this includes any personal data. Please ask the research team if you have any questions or are unclear what data is being collected about you.

Our privacy notice for research participants provides more information on how the University of Southampton collects and uses your personal data when you take part in one of our research projects and can be found at http://www.southampton.ac.uk/assets/sharepoint/intranet/ls/Public/Research%20and%20Integrity%20Privacy%20Notice/Privacy%20Notice%20for%20Research%20Participants.pdf

Any personal data we collect in this study will be used only for the purposes of carrying out our research and will be handled according to the University's policies in line with data protection law. If any personal data is used from which you can be identified directly, it will not be disclosed to anyone else without your consent unless the University of Southampton is required by law to disclose it.

Data protection law requires us to have a valid legal reason ('lawful basis') to process and use your Personal data. The lawful basis for processing personal information in this research study is for the performance of a task carried out in the public interest. Personal data collected for research will not be used for any other purpose.

For the porposes of data protection law, the University of Southampton is the 'Data Controller' for this study, which means that we are responsible for looking after your information and using it properly. The University of Southampton will keep identifiable information about you for 10 years after the study has finished after which time any link between you and your information will be removed.

To safeguard your rights, we will use the minimum personal data necessary to achieve our research study objectives. Your data protection rights – such as to access, change, or transfer such information - may be limited, however, in order for the research output to be reliable and accurate. The University will not do anything with your personal data that you would not reasonably expect.

If you have any questions about how your personal data is used, or wish to exercise any of your rights, please consult the University's data protection webpage (https://www.southampton.ac.uk/legalservices/what-we-do/data-protection-and-foi.page) where you can make a request using our online form. If you need further assistance, please contact the University's Data Protection Officer (data.protection@soton.ac.uk).

Thank you for taking the time to read the information and consider taking part in the research.

Please check the boxes below if you agree with the statements and wish to proceed to the study:

I have read and understood the online consent and participation information (version 2, dated 09.11.20) and have had the opportunity to ask any questions (should I need to).

I understand that my participation is voluntary and I may withdraw at any time during the online survey for any reason without my participation rights being affected.

I understand that by checking this box in the information and consent form I am giving my consent to taking part in this survey and agree for my data to be used for the purpose of this study.

Appendix N Online Recruitment Advert

Appendix O Demographic Information Questionnaire

- How old are you?

Under 21	
21-24	
25-34	
35-44	
45-54	
55-64	
65 and over	

- What gender do you best identify with?

Female	
Male	
Non-binary	
Transgender	
Prefer not to say	
Other (Please state)	

- How would you describe your ethnicity?

White: White British, White Irish, Any other white background	
Asian or Asian British: Indian, Pakistani, Bangladeshi, Chinese, Any other Asian background	
Black or Black British: African, Caribbean, Any other Black background	
Mixed heritage background	

Arab	
Other (please specify)	

Do you consider yourself to have ever had any mental health difficulties?

No	
Yes	

- Are you currently receiving any treatment for mental health issues or having private therapy?

No	
Yes	

- If yes, what are you receiving for your mental health issues?

Private therapy	
Therapy via NHS	
Medication	
Other, please state	

- Do you do any of the following forms of exercise?

Brisk walking	
Cycling	
Dancing	
Football	
Gymnastics	
HIIT (high intensity) workouts	
Other cardio	
Pilates	
Running	
Tennis	

Water sports	
Weight training	
Other (please state)	

- How many times per week do you exercise?

Less than once per month	
Once per month	
Twice per month	
Three times per month	
Once a week	
Twice per week	
Three to five times per week	
Daily	

- Do you practise yoga?

Yes	
No	

- What type/s of yoga do you practise?

Ashtanga Yoga	
Bikram Yoga	
Chair Yoga	
Hatha Yoga	
Integral Yoga	
Iyengar Yoga	
Jivamukti Yoga	
Kundalini Yoga	
Laughter Yoga	
Power Yoga	
Partner Yoga	

Restorative Yoga	
Sivananda Yoga	
Tantric Yoga	
Tibetan Yoga	
Vinyasa	
Yin Yoga	
Yoga Nidra	
Yogic Breathing	
Other	
Don’t know	

- On average, how much do you practise yoga?

Less than once per month	
Once per month	
Twice per month	
Three times per month	
Once a week	
Twice per week	
Three to five times per week	
Daily	

- How many years have you been practising yoga?

Less than 1 year	
1-3 years	
3-5 years	
5-10 years	
10-20 years	
20-30 years	
30+ years	

- Are you a yoga teacher or yoga therapist?

No	
Yes, a yoga teacher	
Yes, a yoga therapist	

Appendix P Part 1 Self-report Measures

The Compassionate Engagement and Action Scales

1. Self-compassion

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, we may cope with these in different ways. We are interested in the degree to which people can **be compassionate with themselves**. We define compassion as "a sensitivity to suffering in self and others with a commitment to try to alleviate and prevent it." This means there are two aspects to compassion. The *first* is the ability to be motivated to engage with things/feelings that are difficult as opposed to trying to avoid or supress them. The *second* aspect of compassion is the ability to focus on what is helpful to us. Just like a doctor with his/her patient. The first is to be motivated and able to pay attention to the pain and (learn how to) make sense of it. The second is to be able to take the action that will be helpful. Below is a series of questions that ask you about these two aspects of compassion. Therefore read each statement carefully and think about how it applies to you if you become distressed. Please rate the items using the following rating scale:

Section 1 – These are questions that ask you about how motivated you are, and able to engage with distress when you experience it. So:

When I'm distressed or upset by things…

1. I am *motivated* to engage and work with my distress when it arises

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

2. I *notice,* and am *sensitive* to my distressed feelings when they arise in me.

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

3. I avoid thinking about my distress and try to distract myself and put it out of my mind

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

4. I am *emotionally moved* by my distressed feelings or situations

1 Never	2	3	4	5	6	7	8	9	10 Always

5. I *tolerate* the various feelings that are part of my distress

1 Never	2	3	4	5	6	7	8	9	10 Always

6. I *reflect on* and *make sense* of my feelings of distress

1 Never	2	3	4	5	6	7	8	9	10 Always

7. I do not tolerate being distressed

1 Never	2	3	4	5	6	7	8	9	10 Always

8. I am *accepting, non-critical and non-judgemental* of my feelings of distress

1 Never	2	3	4	5	6	7	8	9	10 Always

Section 2 – These questions relate to how you actively cope in compassionate ways with emotions, thoughts and situations that distress you. So:

When I'm distressed or upset by things…

1. I direct my *attention* to what is likely to be helpful to me

1 Never	2	3	4	5	6	7	8	9	10 Always

2. I *think* about and come up with helpful ways to cope with my distress

1 Never	2	3	4	5	6	7	8	9	10 Always

3. I don't know how to help myself

1 Never	2	3	4	5	6	7	8	9	10 Always

4. I take the *actions* and do the things that will be helpful to me

1 Never	2	3	4	5	6	7	8	9	10 Always

5. I create inner feelings of *support, helpfulness and encouragement*

1 Never	2	3	4	5	6	7	8	9	10 Always

2. Compassion to others

When things go wrong for other people and they become distressed by setbacks, failures, disappointments or losses, we may cope with their distress in different ways. We are interested in the degree to which people can be **compassionate to others**.

Therefore read each statement carefully and think about how it applies to you when **people in your life** become distressed. Please rate the items using the following rating scale:
Section 1 – These are questions that ask you about how motivated you are, and able to engage with other people's distress when they are experiencing it. So:

When others are distressed or upset by things…

1. I am *motivated* to engage and work with other peoples' distress when it arises

1 Never	2	3	4	5	6	7	8	9	10 Always

2. I *notice* and *am sensitive* to distress in others when it arises

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

3. I avoid thinking about other peoples' distress, try to distract myself and put it out of my mind

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

4. I am *emotionally moved* by expressions of distress in others

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

5. I *tolerate* the various feelings that are part of other people's distress

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

6. I *reflect on* and *make sense* of other people's distress

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

7. I do not tolerate other peoples' distress

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

8. I am *accepting, non-critical and non-judgemental* of others people's distress

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

Section 2 – These questions relate to how you actively respond in compassionate ways when other people are distressed. So:

When others are distressed or upset by things…

1. I direct *attention* to what is likely to be helpful to others

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

2. I *think about and come up* with helpful ways for them to cope with their distress

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

3. I don't know how to help other people when they are distressed

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

4. I take the *actions* and *do the things* that will be helpful to others

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

5. I express feelings of *support, helpfulness and encouragement* to others

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

3. Compassion from others

When things go wrong for us and we become distressed by setbacks, failures, disappointments or losses, others may cope with our distress in different ways. We are interested in the degree to which you feel that **important people in your life can be compassionate to your distress**.

Therefore read each statement carefully and think about how it applies to the **important people in your life** when you become distressed. Please rate the items using the following rating scale:
Section 1 – These are questions that ask you about how motivated you think others are, and how much they engage with your distress when you experience it.

When I'm distressed or upset by things…

1. Other people are actively *motivated* to engage and work with my distress when it arises

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

2. Others *notice* and *are sensitive* to my distressed feelings when they arise in me

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

3. Others avoid thinking about my distress, try to distract themselves and put it out of their mind

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

4. Others are *emotionally moved* by my distressed feelings

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

5. Others *tolerate* my various feelings that are part of my distress

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

6. Others *reflect on* and *make sense* of my feelings of distress

1 Never	2	3	4	5	6	7	8	9	10 Always

7. Others do not tolerate my distress

1 Never	2	3	4	5	6	7	8	9	10 Always

8. Others are *accepting, non-critical and non-judgemental* of my feelings of distress

1 Never	2	3	4	5	6	7	8	9	10 Always

Section 2 – These questions relate to how others actively cope in compassionate ways with emotions and situations that distress you. So:

When I'm distressed or upset by things…

1. Others direct their *attention* to what is likely to be helpful to me

1 Never	2	3	4	5	6	7	8	9	10 Always

2. Others *think about* and come up with helpful ways for me to cope with my distress

1 Never	2	3	4	5	6	7	8	9	10 Always

3. Others don't know how to help me when I am distressed

1 Never	2	3	4	5	6	7	8	9	10 Always

4. Others take the *actions* and do the things that will be helpful to me

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

5. Others treat me with feelings of *support, helpfulness and encouragement*

1 Never	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 Always**

Appendix P

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21)

Please read each statement and rate how much the statement applied to you **over the past week**.

There are no right or wrong answers. Do not spend too much time on any statement.

	0 **Did not apply to me at all**	**1** **Applied to me to some degree or some of the time**	**2** **Applied to me to a considerable degree or a good part of time**	**3** **Applied to me very much or most of the time**
I found it hard to wind down				
I was aware of dryness of my mouth				
I couldn't seem to experience any positive feeling at all				
I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)				
I found it difficult to work up the initiative to do things				
I tended to over-react to situations				
I experienced trembling (e.g. in the hands)				
I felt that I was using a lot of nervous energy				
I was worried about situations in which I might panic and make a fool of myself				

I felt that I had nothing to look forward to				
I found myself getting agitated				
I found it difficult to relax				
I felt down-hearted and blue				
I was intolerant of anything that kept me from getting on with what I was doing				
I felt I was close to panic				
I was unable to become enthusiastic about anything				
I felt I wasn't worth much as a person				
I felt that I was rather touchy				
I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat)				
I felt scared without any good reason				
I felt that life was meaningless				

Appendix P

The Warwick–Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the last 2 weeks

	1 None of the time	2 Rarely	3 Some of the time	4 Often	5 All of the time
I've been feeling optimistic about the future					
I've been feeling useful					
I've been feeling relaxed					
I've been feeling interested in other people					
I've had energy to spare					
I've been dealing with problems well					
I've been thinking clearly					
I've been feeling good about myself					
I've been feeling close to other people					
I've been feeling confident					
I've been able to make up my own mind about things					
I've been feeling loved					
I've been interested in new things					
I've been feeling cheerful					

FFMQ-15: 15-item Five-Facet Mindfulness Questionnaire

Instructions

Please use the 1 (never or very rarely true) to 5 (very often or always true) scale provided to indicate how true the below statements are of you. Circle the number in the box to the right of each statement which represents your own opinion of what is generally true for you. For example, if you think that a statement is often true of you, circle '4' and if you think a statement is sometimes true of you, circle '3'. Never or very rarely true

	Never or very rarely true 1	**Rarely true 2**	**Sometimes true 3**	**Often true 4**	**Very often or always true 5**
1. When I take a shower or a bath, I stay alert to the sensations of water on my body.					
2. I'm good at finding words to describe my feelings					
3. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.					
4. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.					
5. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.					
6. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.					
7. I have trouble thinking of the right words to express how I feel about things.					

8. I do jobs or tasks automatically without being aware of what I'm doing.					
9. I think some of my emotions are bad or inappropriate and I shouldn't feel them.					
10. When I have distressing thoughts or images I am able just to notice them without reacting.					
11. I pay attention to sensations, such as the wind in my hair or sun on my face.					
12. Even when I'm feeling terribly upset I can find a way to put it into words.					
13. I find myself doing things without paying attention.					
14. I tell myself I shouldn't be feeling the way I'm feeling.					
15. When I have distressing thoughts or images I just notice them and let them go.					

THE FORMS OF SELF-CRITICISING/ATTACKING & SELF-REASSURING SCALE (FSCRS)

When things go wrong in our lives or don't work out as we hoped, and we feel we could have done better, we sometimes have *negative and self-critical thoughts and feelings*. These may take the form of feeling worthless, useless or inferior etc. However, people can also try to be supportive of themselves. Below are a series of thoughts and feelings that people sometimes have.

Read each statement carefully and identify the number that best describes how much each statement is true for you.

When things go wrong for me:

	0 Not at all like me	**1 A little bit like me**	**2 Moderately like me**	**3 Quite a bit like me**	**4 Extremely like me**
I am easily disappointed with myself					
There is a part of me that puts me down					
I am able to remind myself of positive things about myself					
I find it difficult to control my anger and frustration at myself					
I find it easy to forgive myself					
There is a part of me that feels I am not good enough					
I feel beaten down by my own self-critical thoughts					
I still like being me					
I have become so angry with myself that I want to hurt or injure myself					
I have a sense of disgust with myself					
I can still feel lovable and acceptable					
I stop caring about myself					
I find it easy to like myself					
I remember and dwell on my failings					
I call myself names					
I am gentle and supportive with myself					
I can't accept failures and setbacks without feeling inadequate					
I think I deserve my self-criticism					
I am able to care and look after myself					
There is a part of me that wants to get rid of the bits I don't like					
I encourage myself for the future					
I do not like being me					

Appendix Q Part 2 Self Report Measures

The Essential Properties of Yoga Questionnaire (Part A)

The following questions relate to your yoga practise. Bring to mind your usual class or session.

HOW MUCH does your practise include...?

1	2	3	4	5
Not at all	A little bit	A moderate amount	Quite a bit	A very large amount

1. Setting intentions or goals for the class?
2. Acceptance of one's body while doing yoga?
3. General thoughts of gratitude, love, kindness, etc.?
4. Self-compassion (kindness / warmth towards oneself)?
5. Acceptance of things as they are?
6. Placing one's focus on the breath?
7. Deep breathing (full inhalation and exhalation)?
8. Linking breathing with movement?
9. Instruction of a breathing technique (Pranayama)?
10. Instruction of why breathing is important?
11. Physical balance?
12. Physical flexibility?
13. Physical strength?
14. Vigorous activity or physical exertion?

2 HOW MUCH does your practice include...?

1	2	3	4	5
Not at all	A little bit	A moderate amount	Quite a bit	A very large amount

15. Being in constant motion (vinyasa or flow)?
16. Challenging one's physical balance ("finding one's edge" in regards to physical balance)?
17. Challenging one's physical flexibility ("finding one's edge" in regards to physical flexibility)?

18. Challenging one's physical strength ("finding one's edge" in regards to physical strength)?
19. Alignment, form, and/or correct posture?
20. Modifications to increase the difficulty of a pose?
21. Holding poses (longer than a few seconds)?
22. Inverted poses (poses where the head is below the heart or hips)?
23. Resting between poses?
24. Modifications to make a pose easier?
25. Recovery type poses (poses used to rest or recover after more difficult poses)?
26. Restorative yoga poses (totally supported / relaxing poses typically held for a longer period of time)?
27. Savasana (Corpse Pose / the final lying down resting pose)?
28. Engaging muscles at the pelvic floor / region (engaging Mula Bandha)?

3. HOW MUCH does your practise include...?

1	2	3	4	5
Not at all	A little bit	A moderate amount	Quite a bit	A very large amount

29. Engaging muscles at the core / abdominal region (engaging Uddiyana Bandha)?
30. Engaging Jalandhara Bandha (drawing the chin back and lengthening the back of the neck)?
31. Body awareness / paying attention to one's body?
32. Asking students to concentrate on postural alignment?
33. Asking students to concentrate on bodily sensations (such as tightness, softness, and muscle awareness)?
34. Allowing or being present to emotions or feelings that come up while doing yoga?
35. Physical relaxation ("letting go" of physical tensions)?
36. Mental relaxation ("letting go" of mental tensions, worries, or mental stress)?
37. Emotional release ("letting go" of emotions)?
38. Visualization or guided imagery?
39. Physical health benefits of yoga?
40. Emotional health benefits of yoga?
41. Mental health benefits of yoga?
42. Spiritual benefits of yoga?

4 HOW MUCH did the instructor mention or include...?

1	2	3	4	5
Not at all	A little bit	A moderate amount	Quite a bit	A very large amount

46. Partner yoga (two or more persons connecting / touching in a posture)?
47. Time for introductions or greetings?
48. Teacher facilitated social interaction during the session?
49. Chanting and/or reciting mantras or saying "OM"?
50. Spiritual readings, quotes, sayings, teachings, or ideas?
51. Energy (prana, chakras, energy meridians, or nadis)?
52. Reference to a connection to a higher power or something greater than oneself (Spirit, God, Universe)?
53. Quieting the mind?
54. Mindfulness (non-judgmental awareness of one's thoughts, feelings, or movements)?
55. Meditation during the session?

5 HOW MUCH did the instructor mention or include...?

1	2	3	4	5
Not at all	A little bit	A moderate amount	Quite a bit	A very large amount

56. Meditation (Dhyana: deep absorptive meditation)?
57. Withdrawal of the senses (Pratyhara: directing the attention from the external toward an internal awareness)?
58. Concentration (Dharana: a state of complete absorption or concentration / focus of the mind)?
59. Ethical principles (Yamas: compassion, truthfulness, non-stealing, moderation, non-greediness)?
60. Personal observances [Niyamas: purity / cleanliness (includes diet / nutrition), diligence / focused effort, contentment, self-study, attuning oneself to the Divine]?
61. Union with the Divine or "pure awareness" (Samadhi)?
62. How yoga teachings / practice can be used in life outside of class?

Appendix R Online Debriefing Statement

UNIVERSITY OF Southampton

Yoga, compassion, self-criticism and wellbeing: Exploring mechanisms of change

Debriefing Statement
ERGO ID: 61031

The aim of this research was to explore whether compassion, self-criticism and wellbeing differed between people that do and do not practise yoga. It is expected that individuals who practise yoga will have greater levels of compassion and wellbeing and lower levels of self-criticism. We also aim to investigate whether pranayama (breath work), dharana (focused meditation) and ahimsa (the practise of non-harm) may be related to these outcomes.

Once again, results of this study will not include your name or any other identifying characteristics. The research did not use deception.

If you feel that you need any support for your mental health and wellbeing or you would like to find out more about resources associated with a compassionate approach to mental health, please check out the following resources and websites for information and support:

- The Compassionate Mind Foundation (https://www.compassionatemind.co.uk/)
- Mind – the mental health charity (https://www.mind.org.uk/)
- The Samaritans – emergency helpline (https://www.samaritans.org/)
- NHS Improving Access to Psychological Therapies (https://www.nhs.uk/service-search/other-services/Psychological-therapies-%28IAPT%29/LocationSearch/10008)

If you are a University of Southampton student, you can access support from Enabling Services via the following link: https://www.southampton.ac.uk/edusupport/index.page

If you would like a copy of this summary or you have any further questions please contact me, Laura Pick on lp2n18@soton.ac.uk.

Thank you very much for your participation. My research would not have been possible without your valuable time and contribution.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the University of Southampton Research Integrity and Governance Manager (023 8059 5058, rgoinfo@soton.ac.uk).