Doctoral Thesis

Submitted in partial fulfilment of the Lancaster University Doctorate in Clinical Psychology

Factors associated with the mental wellbeing of medical professionals.

Doctorate in Clinical Psychology

Lancaster University

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2019 intake

March 2022

Word Count

Section	Main text	Appendices	Total
Abstract	250	-	250
Literature Review	7950	8332	16,282
Empirical Paper	7987	5531	13,518
Critical Appraisal	4000	990	4990
Ethics Proposal	2692	5853	8545
Total	22,879	20,706	38,595

Note: [a] includes References, Figures and Tables

Thesis Abstract

This doctoral thesis explores several important factors relating to the poor psychological health reported in medical professionals and highlights opportunities to intervene. Section one reports a quantitative systematic literature review exploring the relationship between self-compassion and mental wellbeing in doctors and medical students. Four databases were searched (CINAHL, MEDLINE, PsycINFO and PubMed) and thirteen studies were included. High self-compassion was significantly associated with a reduced risk of burnout and stress and increased levels of work engagement, emotional wellbeing and compassion satisfaction. Effect sizes were comparable to those reported in other healthcare professionals. Two interventions were efficacious in increasing self-compassion and improving mental health. To advance on the findings of this review, further research is needed to understand the nature of the relationship and to explore interventions in controlled trials.

Section two reports an empirical study investigating the relationship between perfectionistic concerns, psychological safety, and mental wellbeing in doctors. Participants ($N = 121$) completed an online survey comprising of self-report measures. In a regression model, low perfectionistic concerns and high psychological safety predicted better mental wellbeing, accounting for 44.5% of the variance. Psychological safety was not found to moderate the relationship between the other two variables, though this could be due to a type-II error. The findings highlight two important factors that could be targeted for mental wellbeing initiatives, although further research is needed to understand the relationship further.

Section three includes a reflection of the challenges and decisions made during the thesis process, and reflections on my positionality.

Declaration

This thesis documents research undertaken for the Doctorate in Clinical Psychology at the Division for Health Research, Lancaster University. The work presented here is the author's own, except where due reference is made. The work has not been submitted for the award of a high degree anywhere else.

Name: Corinna Milroy

Date: 11th March 2022 (with corrections 20th August 2022)

Acknowledgements

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Section Four: Ethics Proposal

Section One: Systematic Literature Review

A systematic review of self-compassion and mental wellbeing in medicine

Word count (excluding references, tables and appendices): 7950

Abstract:192

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Abstract

Poor psychological health is prevalent in medical professionals and identifying associated factors is important in targeting interventions. Self-compassion is an acquired skill of warmth and acceptance towards oneself. The aim of this paper was to review the relationship between self-compassion and mental wellbeing in doctors and medical students.

The databases MEDLINE, CINAHL, PsycINFO and PubMed were systematically searched for eligible papers. Quantitative studies analysing the relationship between self-compassion and mental wellbeing in an isolated sample of doctors and/or medical students, were included and assessed on quality.

Thirteen studies were included: eight cross-sectional studies; three papers are part of a large prospective cohort study; and two experimental/quasi-experimental papers. High self-compassion was associated with positive mental wellbeing and found to protect from burnout and stress, with mainly moderate effect sizes. Coaching and mindfulness-based interventions were found to improve both mental health and self-compassion.

The observed relationships were comparable to those reported in other healthcare workers and emphasises the potential role of self-compassion as a target for intervention.

Future research should aim to use longitudinal and experimental study designs or model-testing, to understand the relationship better.

Keywords: Doctors, medical students, self-compassion, wellbeing, systematic review

A systematic review of self-compassion and mental wellbeing in medicine

A career in medicine has extensive demands due to the intense training required, the harsh working conditions coupled with the expectation to deliver compassionate, safe, and professional care. Although the profession may be rewarding, such demands can affect the mental wellbeing of clinicians with consequent implications for staff retention, patient care and medical errors (GMC, 2021; Hall et al., 2016; West et al., 2006; Williams et al., 2007). Even prior to the COVID-19 pandemic, there were concerns over doctors' psychological health. A UK systematic review reported that 17-52% of doctors were 'burned out' or in 'psychological distress' (Imo, 2017). Meta-analyses in medical students have shown high rates of burnout (>40%) (Frajerman et al., 2019) and depression (28%) (Lasheras et al., 2020).

There has been a call for doctors' working conditions worldwide to improve, with working hours, lack of support and unhelpful organisational cultures being cited (Wallace et al., 2009; Wilkinson, 2015). However, the ability to manage complex and uncertain situations is a fundamental skill of the vocation. The dearth of education in adaptive coping strategies targeting stress has been highlighted and, as a response, education programmes and initiatives have been developed (Wasson et al., 2016), mainly in the form of 'resilience training'. This aims to promote the ability to adapt to stress, bounce back and even grow in the face of adversity, though it has faced criticism for removing the responsibility from organisations (Oliver, 2017). Others call for the need of medical schools to promote mental health awareness (Hope & Henderson., 2014) and the teaching of positive adaptive strategies, such as mindfulness, emotional intelligence, and self-compassion (Shakir et al., 2017).

Self-Compassion

Self-compassion is an emotion-orientated coping skill described by Neff (2003a) as a warm and accepting stance towards oneself and one's life comprising three main

subcomponents. Self-kindness represents the ability to be kind and understanding in instances of suffering or perceived inadequacy. Secondly, common humanity, recognises that such experiences are unavoidable and part of the shared human experience. Finally, the mindfulness dimension describes the ability to be aware of one's emotions with a balanced and non-judgemental stance, coupled with the ability to confront them. Gilbert describes self-compassion as "a deep awareness of the suffering of oneself coupled with the wish to alleviate it" and views it through an evolutionary lens and as a basis for Compassion Focused Therapy (CFT) (Gilbert, 2010a, p.13).

Although moderately associated with self-esteem (Neff, 2003b), self-compassion is a separate construct that demonstrates a unique relationship to various personality factors and wellbeing (Leary et al., 2007; Neff & Vonk, 2009). Traits such as agreeableness, extroversion and conscientiousness have all been positively associated with self-compassion, whereas an inverse relationship exists with neuroticism and perfectionism (Neff, Rude, et al., 2007; Stoeber et al., 2020). Men have been shown to report slightly higher self-compassion (Neff, 2003b; Neff et al., 2005; Neff & McGehee, 2010), however how the skill varies with age is still unclear, with mixed findings being reported (Neff & McGehee, 2010; Neff & Vonk, 2009)

The increasing interest in self-compassion may be due to its teachability and its association with positive outcomes in various domains of life, such as enhanced task engagement and performance (Mills & Chapman, 2016), and an increased interest in learning and healthier attitudes following academic failure (Neff et al., 2005). It has also been linked with higher motivation (Neff, Kirkpatrick, et al., 2007; Neff, Rude, et al., 2007), increased social connection (Barnard & Curry, 2011; Crocker & Canevello, 2008; Neff & Pommier, 2013; Neff, Rude, et al., 2007) and higher engagement with emotion-based rather than avoidant-based coping strategies (Neff et al., 2005).

Self-Compassion and Mental Wellbeing

High self-compassion has consistently been found to predict better psychological wellbeing (Barnard & Curry, 2011; Leary et al., 2007; MacBeth & Gumley, 2012; Neff & Vonk, 2009), whereas reduced self-compassion has been found to be a powerful predictor of psychological distress. Macbeth and Gumley's (2012) meta-analysis found a large overall effect size ($r = -0.54$) between it and depression, anxiety, and stress, in 20 student and community samples.

Several authors have theorised self-compassion's protective role. Gilbert's CFT model proposes that engagement in self-compassion stimulates the parasympathetic nervous system, reducing the neuro-physiological effects of stress and associated experiences (Gilbert, 2010b). Allen and Leary (2010) propose that self-compassion encourages positive cognitive restructuring and reduces avoidant safety behaviours. Akin to this, others have suggested that self-compassion mitigates worry, rumination, and catastrophic thinking (Raes, 2010; Watkins, 2008) or halts the development of feelings of worthlessness, shame and guilt from unmet self-expectations (Shapira & Mongrain, 2010). Alternatively, Neely et al. (2009) suggest that it enhances the ability to disengage from unhelpful pursuits, redirecting energy towards alternative goals that may prove more fruitful.

Self-compassion in healthcare

Self-compassion's positive relationship to altruistic behaviours such as empathic concern, compassion to others (Neff & Pommier, 2013) and emotional intelligence (Heffernan et al., 2010; Şenyuva et al., 2014) has rendered it of interest in healthcare specialisms. Relationships between self-compassion and mental wellbeing in healthcare workers are comparable to those reported in community samples, with an inverse correlation to burnout (Beaumont, Durkin, et al., 2016a, 2016b; Durkin et al., 2016; Montero-Marin et

al., 2016), stress (Crary, 2013) and compassion fatigue (Beaumont, Durkin, et al., 2016b; Duarte et al., 2016).

Despite this consistency, the mechanisms of such relationships are yet to be completely understood, with some authors investigating further. Emotional regulation was found to mediate the relationship between stress and self-compassion (Finlay-Jones et al., 2015), while another found that self-compassion acted as a mediator between empathic concern and stress (Duarte et al., 2016). Alternatively, self-compassion has been shown to moderate the relationship between self-critical perfectionism and psychological distress in trainee psychologists (Richardson et al., 2020) and in other populations (Abdollahi et al., 2020; Ferrari et al., 2018).

To date, no systematic literature review has explored the relationship specifically in medical professionals. Despite being part of the healthcare profession there are several distinctions that may change the relationship in this population. Doctors and medical students face career-long academic pressure, together with high accountability and the risk of making harmful mistakes. Unlike other professions, such as nursing (Degeling et al., 2001; Horsburgh et al., 2006), doctors may frequently work in isolated environments with little emotional support from peers. Self-compassion can sometimes be misinterpreted as selfishness, which inherently opposes a key value of medicine; altruism (Feldman, 2017). Some suggest that doctors traditionally learn to avoid emotions and internal experiences (Kerasidou & Horn, 2016), instead cultivating a culture of silence and stigma. Finally, those attracted to a career in medicine may possess some personality traits (perfectionism, workaholism, type-A personality characteristics) (Firth-Cozens & King, 2006; Peters & King, 2012; Wallace et al., 2009) that may predispose to psychological distress and potentially mitigate effective coping strategies, such as self-compassion.

Aims of this Review

This systematic review aims to explore the relationship(s), if any, between self-compassion and mental wellbeing in doctors and medical students. Given the research investigating self-compassion in doctors is limited, the broad concept of 'mental wellbeing' was chosen, so as not to restrict the review by focusing on a specific mental health conceptualisation. The World Health Organization (2001, p. 1) defines mental health as "the state of well-being in which the individual realises their own abilities, can cope with normal stresses of life, can work productively and fruitfully, and contribute to their community". By focusing on well-being, this review aims not only to explore the presence or absence of signs of distress, but also the broader spectrum of psychological health and functioning.

This review aims to answer the following questions:

1) Is there a relationship between self-compassion and mental wellbeing in doctors and medical students?

2) Are there demographic, occupational, individual or psychological factors that are associated with the relationship between self-compassion and mental wellbeing in doctors and/or medical students?

Method

This systematic review was conducted in accordance with the guidelines and criteria laid out by the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) statement and checklist (Stewart et al., 2015). As this review aimed to appraise the associations between self-compassion and well-being / distress and to summarise and critique the evidence for salience of self-compassion, a systematic review approach was adopted. In addition, the evaluation of the potential impact of other salient variables required a similar approach. The aim was to identify all relevant studies, appraise the approaches to gathering such data and synthesise the resultant evidence (Munn et al., 2018). This

methodology was in keeping with other similar reviews (Conversano et al., 2020; Sinclair et al., 2017).

Exclusively quantitative studies were to be explored, as their methodologies allow for accurate reporting of the nature and strength of relationships, unlike qualitative papers. Studies where correlations were reported, despite not being the primary aim (e.g. interventional studies) were included. Omitting such studies could be excluding valuable data relating to the research question.

Initial Search

Scoping searches were initially performed using Google Scholar and OneSearch (a university-based library database) to determine the suitability of the review topic and if a similar literature review existed. To our knowledge, there are no systematic literature reviews published in English exploring the relationship between self-compassion and mental wellbeing in doctors and/or medical students. Two previous systematic reviews of healthcare professionals did not report analysis on the individual professions and medical professionals made up low percentages of the samples (Conversano et al., 2020; Sinclair et al., 2017).

Inclusion and Exclusion Criteria

Inclusion criteria

Studies were deemed eligible for inclusion if they met the following criteria:

- Included primary source quantitative empirical data

- Be published in English language

- Be peer reviewed

- Measured the level of self-compassion in participants

- Measured the mental wellbeing of participants (see search criteria for more information on what is considered 'mental wellbeing')

- Analysed and reported the relationship(s) between self-compassion and mental wellbeing. This includes interventional studies which reported the relationship at baseline and/or post-treatment.

- Participants included doctors and/or medical students and reported the data separate from any other studied professionals

Exclusion criteria

Studies were excluded if they met any of the following criteria:

- Unpublished articles, conference papers, theses, dissertations, reviews, or non-empirical papers

- Duplicate studies reporting analyses of the entirely same sample used in another eligible study. Consideration of which study to include was based on the relevance and quality of the data analytical strategies employed.

Search Strategy

A systematic search of four databases was conducted following discussion with an academic librarian: CINHAHL, MEDLINE, PsycINFO and PubMed. The final search was performed on 23rd December 2021 using Boolean operators to increase specificity. Full search terms are shown in Table 1.

[TABLE 1 ABOUT HERE]

Duplicates were removed from the search results, and the remaining papers' details exported into a spreadsheet. The titles of papers were read, followed by the abstracts of potential papers. Papers that satisfied the inclusion criteria were deemed eligible, and those that met the exclusion criteria were removed. Two strategies were employed to identify further appropriate papers: forward-reference searching key relevant papers and manually searching reference lists of included studies.

Data Extraction

The information extracted included: the author(s), title, and year of the study, where the study was conducted; study aims; study design; participant demographics and characteristics; variables investigated, including measure(s) used (Table 2); results; and study outcomes. Effect sizes were reported based on correlation coefficients, and when required calculated based on Cohen's (1988) rule of thumb.

[TABLE 2 ABOUT HERE]

Quality Assessment

The methodological quality of each study was assessed using Kmet et al.'s (2004) quality appraisal tool, aiming to remove the risk of poorly designed studies potentially skewing the overall findings. This tool was selected because of its suitability for various study designs, its detailed scoring manual and its prior use in mental health-related systematic reviews. No papers were excluded due to quality, though higher scoring papers were weighted more strongly in terms of evidence. Use of the tool also allowed for consistent strengths and weaknesses to be identified across the literature.

Using Kmet's tool, studies are assessed on 14 items (Appendix A1), including appropriateness of study design, internal validity, the extent to which conduct, and analyses/biases were minimised, reporting of results, and the extent to which the results supported the conclusions. For each item, a study received a score based on how successfully specific criteria ("no" = 0, "partial" = 1, "yes" = 2) were met. A total score was calculated by adding up applicable items. To assess item 9, G*Power was used to calculate whether studies were adequately powered for the analysis. In studies where the exploration of the relationship was a secondary outcome (e.g. interventional studies), adequate power was assumed if a statistically significant result was reported. Percentage scores were calculated for comparison of papers with different study designs. Scoring was carried out independently by the author.

A sub-sample of the papers (*n* = 7) was independently scored by a colleague. Two discrepancies were found, which were then discussed and revised (or not) accordingly.

Results

Study Selection

A flow chart of the study selection and exclusion process can be seen in Figure 1, as per the PRISMA guidelines. Initial searches identified 1898 papers, of which 58 were duplicates. Of the remaining 1840 papers, titles and/or abstracts were reviewed, identifying 26 potential papers. Following full-text review against the inclusion and exclusion criteria, 10 papers were found to be suitable. A manual search of the reference lists of these studies, identified a further two papers. One additional paper was found as it cited an eligible paper.

[FIGURE 1 ABOUT HERE]

Of the papers rejected following full-text review, nine papers were omitted due to the lack of statistical analysis of the relationship between self-compassion and wellbeing. Five papers were excluded due to the sample failing to distinguish doctors and/or medical students from other occupations, and one paper was not available in English. Finally, one other study was ineligible as it included the exact same data set as another included study with no extension of analysis.

Study Characteristics

A full list of the studies included can be found in Table 2. All studies were published between 2014 and 2020. Eight were cross-sectional in nature; one study was an unblinded randomised controlled study of a mindfulness-based intervention and one utilised a quasi-experimental study design of a coaching intervention. Three of the included papers are part of the same prospective cohort study undertaken by the Paediatric Resident Burnout-Resilience Study Consortium (PRB-RSC, (n.d.)). Although these studies have different sample sizes, it is recognised that there will be a considerable overlap in the participant sample: many of the

participants' data will be represented in more than one paper and at different time points, given its prospective design. After careful consideration, all three papers were included due to the varying focus of each paper and no clear way of distinguishing which data were duplicated.

Sample sizes varied from 12 participants to 2241 (the 2018 data from Kemper et al. (2020)), with the mean sample size being 685, not including participants from the 2018 and 2019 PRB-RSC papers. The total sample size across all papers was 12,629. Eight studies used a sample of doctors, two focused on medical students, two had a mixed cohort of medical students and doctors, and one study explored doctors, medical students, and nurses reporting analysis for each sub-cohort. Five studies included samples of relatively equal male and female participants (41-59%), whereas the remaining eight studies had predominantly female samples (>60%). The three PRB-RSC studies had a strong female bias, ranging from 71.9 – 72.6%. As expected, the mean age of medical students was younger (23.5-24.1 years) than of the doctors (28.8 – 36.5 years). Five studies specifically focused on paediatric doctors in the United States (three of these being part of the PRB-RSC).

Regarding mental wellbeing outcomes, ten papers explored burnout (one of which also explored compassion satisfaction and secondary traumatic stress). Five studies investigated stress; two papers investigated work engagement, and two papers explored life satisfaction/ quality of life. One study each explored 'mental health' and 'emotional wellbeing'.

[TABLE 3 ABOUT HERE]

Quality Appraisal

Each study's quality appraisal score (as per Kmet's quality assessment tool) can be found in Appendix A2. Quality percentage scores ranged from 70-100%, with a mean score of 89.97%. Six papers dropped at least one point reporting participant selection, mainly due

to the risk of volunteer bias or poor descriptions of recruitment methodology. Finally, four

papers dropped marks relating to sample size, either being inadequately powered when

assessed using G*Power. Both studies using an experimental study design were adequately

powered for their primary analysis and reported statistically significant relationships between

self-compassion and a measure of wellbeing.

Outcome Measures

Self-compassion

All of the included studies used a variation of the Self Compassion Scale (SCS) (Neff,

2003b). The full 26-item SCS, was used in three studies (Erogul et al., 2014; Olson &

Kemper, 2014; Sabir et al., 2018) and measures six subscales, three positively scored (self-

kindness, common humanity, mindfulness) and three negatively scored (self-judgement,

isolation, over-identification). Eight studies used the 12-item short-form (SCS-SF),

measuring the same six subscales (Raes et al., 2011). The SCS and SCS-SF have shown good

internal consistency (see Table 2) and have both been validated in numerous populations.

However, the short-form is less reliable in reporting subscale scores due to the reduced item

number (Raes et al., 2011). Solms et al. (2019) and (2021) reported using six-items from the

SCS, however only specified three of them and reported no internal consistency. For details

on validated measures reported in this review see Appendix B.

Psychological wellbeing

Ten studies explored burnout and self-compassion, with six using the Maslach

Burnout Inventory (MBI). Four of these used the 22-item MBI–Human Services Survey

(MBI-HSS), exploring three subscales; emotional exhaustion, depersonalisation and personal

accomplishment (Maslach et al., 1996). Two studies used 10 items from the Dutch version of

the MBI-General Survey (MBI-GS), measuring two of its subscales; exhaustion and cynicism

(akin to depersonalisation) (Maslach et al., 1996). They reported good internal consistency for both subscales in each paper (Solms et al., 2021; Solms et al., 2019).

The Oldenburg Burnout Inventory (OLBI) and OLBI-student version (Demerouti & Bakker, 2008) were used to measure burnout in two Canadian studies. The measures consist of 16-items and two subscales exhaustion and work disengagement, although in both studies they report the latter scale in reverse (work engagement). Addressing criticisms of the MBI, the OLBI uses balanced wording and includes no personal accomplishment component. A New Zealand study (Dev et al., 2020) used the Copenhagen Burnout Inventory (CBI), measuring elements of exhaustion, negative job attitudes and a loss of concern/ feelings for patients (Kristensen et al., 2005). Lastly, Richardson et al. (2016) used the 30-item Professional Quality of Life Scale (PROQOL) V.5 scale to measure burnout (exhaustion and frustration), secondary traumatic stress and compassion satisfaction (satisfaction derived from work) (Stamm, 2010).

Three of the four studies investigated stress and self-compassion using the 10-item Perceived Stress Scale (PSS-10) (Cohen et al., 1983), measuring the degree to which individuals appraise situations as stressful. Work-related stress was measured in Dev et al.'s (2020) study with three author-developed items relating to patient caseload, workload, and perception of work-stress.

Work engagement, as a separate construct, was explored in Solms et al.'s (2019) and (2021) studies, using the 9-item Utrecht Work Engagement Scale (UWES-9) measuring vigour, dedication, and absorption (Schaufeli et al., 2002). Two papers used the 5-item Satisfaction with Life Scale (SWLS) to measure quality of life/ 'professional' life satisfaction (Diener et al., 1985) and another study used the 12-item Scale of Positive and Negative Experience (SPANE) to measure emotional wellbeing (Diener et al., 2010). Finally, Olson and Kemper's small (2014) study used the PROMIS global mental and physical health scale

(Hays et al., 2009), although it is unclear which items were used, raising issues regarding

reliability and validity. Except for the latter scale, all measures reported good internal

consistencies in the studies or in previous literature.

Study Results

Self-Compassion

All but one study (Kemper et al., 2018), reported mean scores of self-compassion for

either the whole sample or subgroups, and at baseline all fell within the 'moderate' range of

2.50 – 3.50 (Neff, 2003b). In cases where the total SCS score was given, mean scores were

calculated as per Neff's (2003a) recommendations. Mean SCS scores (standard deviation)

ranged from 2.99 (0.65) in medical students (Richardson et al., 2016) to 3.39 (0.6) in doctors

(Babenko et al., 2019). Subsample mean scores range from 2.85 (0.67) in female medical

students/doctors (Richardson et al., 2016) to 3.7 (0.53) in medical students following a

mindfulness intervention.

Burnout

Of the ten papers exploring burnout, five cited a criterion to be considered 'burnt-out',

which varied between papers. Burnout prevalence ranged from 40 – 58.3% in doctors, and

23.9% in Richardson et al.'s (2016) mixed sample. Only one paper used such criteria for their

statistical analysis, which reported that 'burned out' individuals were significantly more

likely to report lower self-compassion in all three surveyed cohorts (Kemper et al., 2020).

Correlations between self-compassion and burnout, or its various subdimensions,

were reported in most studies (see Table 3). Of those, four papers explored 'burnout' as a

single dimension and reported medium effect sizes, with correlation coefficients ranging from

- .40 to - .52 (Dev et al., 2020; Kemper et al., 2018; Kemper et al., 2019). MBI

subdimensions of exhaustion (or emotional exhaustion) also showed moderate to moderately

strong correlations (r = - .35 - - .55) in three papers (Olson et al., 2015; Solms et al., 2019;

Solms et al., 2021), whereas cynicism's relationship varied from small ($r = -.26$ and $-.29$) to moderately strong ($r = .50$) (Solms et al., 2019; Solms et al., 2021). Depersonalisation and personal accomplishment were not statistically significantly associated with self-compassion in one study, though this may have been due to a lack of statistical power (Olson et al., 2015). In the two studies using the OLBI, self-compassion was found to be positively associated with work engagement ($r = .31 - -.32$) and negatively associated with work exhaustion ($r = -.25 - -.41$) (Babenko et al., 2018; Babenko et al., 2019). Richardson et al.'s study reported correlations between self-compassion and burnout ($r = -.41$), compassion satisfaction ($r = .29$) and secondary traumatic stress ($r = -.29$).

Regression analytical methods were used in several studies, with low self-compassion consistently being found to predict burnout, or its various subdimensions. Other predictive factors were found to be reduced experience, greater stress and gender. To determine if self-compassion was predictive of burnout in subsequent years, the PRB-RSC used longitudinal regression analyses to explore this in two papers, with the hypothesis being supported in 2017, but not in 2018 (Kemper et al., 2019; Kemper et al., 2020).

[INSERT TABLE 3 ABOUT HERE]

Stress

Perceived stress was measured using the PSS, or shortened version in three studies with scores ranging from 13.5 to 18.3 (see Table 4). Moderately strong to strong relationships ($r = -.47 - -.79$) were reported (Erogul et al., 2014; Kemper et al., 2019; Olson & Kemper, 2014), though the largest reported effect size should be interpreted with caution due to the small number of participants (Olson & Kemper, 2014). Stress was measured with three author-developed questions relating to workload, caseload and subjective stress in one study (Dev et al., 2020). Weak relationships with self-compassion were reported in doctors ($r = -0.20$) and medical students ($r = -0.21$). They found that self-compassion did not moderate the

relationship between stress and burnout/quality of life in medical professionals, yet did in

nurses, though in the opposite direction to what was hypothesised (at higher levels of stress,

self-compassion was less effective at buffering burnout).

In Erogul et al.'s (2014) randomised unblinded controlled study, mindfulness-based

stress reduction programme (MBSR) was found effective in reducing stress and increasing

self-compassion in medical students. Interestingly, the association between the change in

stress and self-compassion scores (pre- and post-intervention) was only significant in the

intervention group, highlighting that the intervention may have strengthened the relationship.

Longitudinal analyses found that low self-compassion scores predicted increased stress a year

later, when controlling for baseline stress ($\beta = - 0.16$, $p < .001$).

[INSERT TABLE 4 ABOUT HERE]

Positive aspects of psychological wellbeing

Two studies used the SWLS to measure quality of life or 'professional' life

satisfaction, with moderate relationships being reported with self-compassion ($r = .32 – 3.39$)

in two studies (Babenko et al., 2019; Dev et al., 2020) (see Table 5). Greater self-compassion

predicted higher quality of life in medical professionals, with other factors contributing to the

regression models in doctors (less clinical experience, male gender) and medical students

(less clinical experience, female gender). Burnout, conceptualised as work engagement and

work exhaustion contributed to the regression model in Babenko et al.'s (2019) study with

the two factors playing a mediatory role between self-compassion and quality of life.

Other positive aspects of psychological wellbeing were found to correlate with self-

compassion, with work engagement (measured using the UWES-9) and emotional wellbeing

(measured using the SPANE) showing small effect sizes (Sabir et al., 2018; Solms et al.,

2019). Olson and Kemper's small (2014) study reported a strong correlation between mental

health (measured using the PROMIS) and self-compassion, though its small sample size should be noted.

Other demographic, personality or psychological factors

Gender played an inconsistent yet significant role in accounting for wellbeing in several studies. Being a female medical student or male doctor was found to be associated with positive psychological health (Dev et al., 2020; Sabir et al., 2018). Though self-compassion scores were reduced in females in one study, this was found to be an erroneous finding once accounting for the large confidence intervals (Richardson et al., 2016).

Less clinical experience was found to predict greater stress and burnout (Dev et al., 2020), though the impact of seniority showed varying results. The strength of associations were similar between samples of different seniority (e.g. medical students and doctors), with a few exceptions. Samples with higher seniority showed observably stronger associations between self-compassion and cynicism (Solms et al., 2019) and exhaustion (Solms et al., 2020), though this variance was not statistically tested. Contrary to this, high self-compassion was found to negatively predict work-engagement in more senior doctors, yet not in more junior residents (Solms et al., 2019).

High self-compassion was found to significantly correlate with mindfulness, resilience, achievement goals, confidence in delivering compassionate care and low empathic personal distress. Emotional intelligence showed no statistically significant relationship with self-compassion (Olson et al., 2015). Viewed as a 'personal resource' in the Job Demands-Resource (JD-R) model, self-compassion was found to be negatively associated with job demands (e.g. job insecurity) and positively related to job resources (e.g. colleague support) in two studies (Solms et al., 2021; Solms et al., 2019).

[INSERT TABLE 5 ABOUT HERE]

Discussion

Summary of Results

This review aimed to explore the relationship between self-compassion and mental wellbeing in samples of doctors and medical students. Thirteen studies were included, all reporting statistically significant relationships between self-compassion and some measure of mental wellbeing. As expected, high self-compassion was found to be inversely related to psychological distress and be positively associated with good psychological health. Effect sizes were similar to those reported in other samples (MacBeth & Gumley, 2012; Sinclair et al., 2017), with stress and burnout being the most strongly associated.

Reported burnout prevalence was consistent with previous studies, with higher levels than in the general population (Imo, 2017). Kemper et al.'s (2020) study analysed three consecutive years of cross-sectional data from paediatric residents in the United States, finding that those considered 'burned out' had significantly lower self-compassion scores (Kemper et al., 2020). This finding was supported by all included papers exploring burnout, with relationships comparable to those reported in other healthcare professionals (Sinclair et al., 2017). Exhaustion and self-compassion inversely correlated in all relevant studies (Olson et al., 2015; Solms et al., 2021; Solms et al., 2019), however the other subdomains of the MBI were less consistent. Cynicism's relationship with self-compassion was variable (Solms et al., 2019) and no significant relationship was observed with personal accomplishment or depersonalisation, though the small sample size may have increased the risk of a type-II error (Olson et al., 2015). This suggests that self-compassion's role may work via its relationship with exhaustion, although the exact mechanism of this needs further exploration.

Studies using the PSS-10 found moderate to strong relationships between self-compassion and stress (Erogul et al., 2014; Kemper et al., 2019; Olson & Kemper, 2014), whereas a weak relationship was reported in a study using three self-developed questions (Dev et al., 2020), perhaps due to the small item number reducing the score variability. Both

life satisfaction and work engagement (defined as a separate construct), were found to have moderate positive relationships with self-compassion (Babenko et al., 2019; Dev et al., 2020; Solms et al., 2021; Solms et al., 2019), whereas emotional wellbeing and compassion satisfaction were found to be weakly positively associated (Richardson et al., 2016; Sabir et al., 2018). Although a strong relationship was found between self-compassion and mental health in Olson and Kemper's (2014) study, the poor study design and sample size questions whether this finding is generalisable.

Correlations and regression analyses were frequently used to describe the relationships, however several studies extended upon cross-sectional designs. Using longitudinal analysis, Kemper et al. (2019) observed that self-compassion scores predicted burnout and stress the following year, whilst controlling for scores the previous year. Two papers were experimental (Erogul et al., 2014), (or quasi-experimental) in design (Solms et al., 2021), exploring the effectiveness of mindfulness and coaching interventions, respectively. A mindfulness-based intervention improved stress and self-compassion scores in accordance with another, with the relationship being significant (Erogul et al., 2014). However, this was simply reported, with no further mediation analyses performed to assess if a change in self-compassion score was responsible for the reduction in stress (or vice versa).

Interestingly there were some variations in the relationships based on level of experience. Self-compassion and work engagement (as part of burnout) was found to be more strongly associated in doctors (Babenko et al., 2019) than in the authors' preceding study of medical students (Babenko et al., 2019). This suggests that self-compassion may be perceived or experienced differently depending on experience and/or the nature of the work demands. It could be that self-compassionate medical students may prioritise engaging in pursuits outside of medicine, whereas qualified doctors may invest more in their work / career. Interestingly, Solms et al.'s (2019) study found that following path analysis, self-compassion was

negatively associated with work engagement in more senior doctors and reported a weaker relationship between cynicism and self-compassion in junior doctors. The authors propose that with greater experience, self-compassionate doctors learnt to disengage with work as a form of self-protection, which may in turn be experienced as cynicism for the job.

Theoretical Implications

It is evident that self-compassion and wellbeing are associated in the medical profession with similar strength relationships observed in other healthcare staff and the general population. However, there is more to be established in relation to the direction and nuances of such a relationship. None of the included studies attempted to assess causality, although this has previously been explored. A 2015 meta-analysis found that both state self-compassion manipulations (Hedges' $g = - 0.90$, $p = .03$) and trait self-compassion interventions (Hedges' $g = - 0.36$, $p < .01$) showed a statistically significant causal effect on wellbeing in five and nine studies, respectively (Zessin et al., 2015). Another possibility is that the relationship between wellbeing and self-compassion is bi-directional in that individuals may also find it easier to be self-compassionate at times of increased wellbeing. This second hypothesis fits with Conservation of Resources (COR) theory (Hobfoll, 1989), which posits that those in good mental health are better able to seek resources (e.g., support) to maintain that state.

Within this review, four studies explored indirect relationships between self-compassion and psychological wellbeing. Work engagement and work exhaustion mediated the relationship between self-compassion and life satisfaction (Babenko et al., 2018). Self-compassion was not found to buffer the relationship between stress and burnout in doctors and medical students, however in nurses the opposite relationship was found (Dev et al,, 2020). Self-compassion's protective effect was reduced at higher levels of stress, in concordance with the COR model. The authors suggest this may be due to the female bias in

nursing, the variation in job roles or the perception of self-compassion within the profession. They proposed that nurses may more accurately report self-compassion compared to their medical colleagues. Alternatively, it could be due to the larger sample of nurses used for the moderation analysis.

Solms and colleagues used the JD-R model to explore how variables are related to burnout and engagement and categorised them as job demands (aspects of work that require effort or skill), job resources (aspects that help achieve goals or reduce stress) (Demerouti et al., 2001) or personal resources (characteristics that are related to resilience and the ability to influence work environment). How the latter situates itself into the model is still unclear (Schaufeli & Taris, 2014), though Solms et al. (2019; 2021) attempted to do so using self-compassion. They found it to be positively associated with some job resources (support from colleagues and supervisors) and inversely related to job demands (job insecurity, work-family conflict), though they failed to explore this more extensively with moderation or mediation analyses.

Many occupational factors that are associated with poor wellbeing may be a barrier to acting self-compassionately (e.g. workload, safety culture). Previously, self-compassion has been implicated as a moderating factor between such job demands and distress (Anjum et al., 2020; Willems et al., 2021), although another study found no such relationship (Monaghan et al., 2020). In other studies, self-compassion has mediated the relationship between job demands (Willems et al., 2021) and job resources (Wilson et al., 2020) with wellbeing. Self-compassion was found to moderate the relationship between maladaptive perfectionism and stress in psychology trainees (Richardson et al., 2020) and mediate the relationship in medical and dentistry students (Pereira et al., 2022). The relationship between these variables is likely complex and perhaps a result of direct and indirect pathways (Willems et al., 2021).

Of interest, many of the studies explored work-related mental health outcomes (e.g. burnout, work engagement). This raises several questions of how self-compassion may be related to other aspects of wellbeing, such as relationships and hobbies. Considering the poor work-life balance found in doctors (Parida et al., 2021), and how this is one of the predominant risk factors for psychological distress (Kinman & Teoh, 2018), it warrants further research. The way in which self-compassion is associated with positive health may not be associated with how they manage job demands or seek resources, but how they maintain their wellbeing in other domains or in career decisions (e.g., part-time working).

Clinical and Organisational Implications

Even preceding COVID-19, medical schools, healthcare services and regulatory bodies had all recognised the need for more to be done to protect the profession's mental health. Given the consistent findings that self-compassion is linked to improved wellbeing, such organisations could aim to cultivate the skill in the profession. In this review, the level of self-compassion scores remained consistent between papers and within moderate ranges (Neff, 2003b). This supports previous research that doctors are not deficient in psychological resources (e.g. grit, resilience), but the challenges associated with the profession may require much greater levels of them to maintain wellbeing (Halliday et al., 2017; McCain et al., 2018; Murray et al., 2017). Facing rigorous assessments, working alone, making high risk-decisions, and working within a reported stigmatising and blaming culture, may increase the need for compassion to come from within. Alternatively, maybe those with self-compassion scores at either end of the spectrum are no longer practising medicine, perhaps leaving due to poor mental health or as a form of self-kindness. In addition, more may be needed to buffer determinant personal characteristics that are thought to be prevalent in doctors (e.g., perfectionism, workaholism) (Lemaire & Wallace, 2014; Peters & King, 2012).

The findings from this review support the view that university and staff psychological support teams could expand their therapeutic repertoire to target self-compassion. A recent meta-analysis of mindfulness-based interventions found a strong effect size for pre-treatment to follow-up self-compassion scores in 27 studies of healthcare professionals (Wasson et al. 2020). Such initiatives have been found effective in reducing levels of stress and burnout in doctors (Romcevich et al., 2018; Verweij et al., 2018; Wietmarschen et al., 2018) and medical students (Bond et al., 2013; Danilewitz et al., 2016; Moore et al., 2020). Their adaptability for virtual and group platforms (Danilewitz et al., 2018) make them an accessible option for time-constrained doctors or medical students. Other benefits of such training include increased resilience and compassionate care (Galante et al., 2018; Erogul et al., 2014).

Mindful self-compassion programmes in students have been found to be effective in increasing self-compassion, reducing burnout (Eriksson et al., 2018), perceived and biological stress (via electrophysiological measures) and negative perfectionistic tendencies (Beck et al., 2017). CFT-based courses and compassion cultivation training have shown similar results in various healthcare workers (Beaumont et al., 2021; Beaumont, Irons, et al., 2016; Rayner et al., 2021, Scarlet et al., 2017) and US medical students (Weingartner et al., 2019). Students in the latter study reported increased work engagement and the acquisition of useful stress coping skills.

 Despite the growing awareness that more is needed to support medics, inclusion of such interventions is infrequent, and instead a reliance on 'resilience building' exists (Wright & Richmond Mynnet, 2019). There are several reasons why this may be. Firstly, adequate time and resources are needed, which may detract from traditional learning content or work demands. Secondly, the underlying concept of such initiatives challenges the culture and stigma prevalent in medicine. It has been suggested that doctors see burnout as "a badge of

honour" (Clough et al., 2019, p.425) and they therefore may perceive self-compassion as a weakness or a distraction from their role. As well, self-compassion's inverse relationship to self-criticism challenges the perfectionistic culture reported in the profession (Peters & King, 2012). Organisations and educators need to encourage workplace conditions that cultivate, rather than stifle self-compassionate attitudes. Cultures where compassion is lacking can lead to significant failings and safety issues for patients (Francis, 2013), or self-critical practices, that can lead to reluctance to disclose errors or defensive medicine (Peters & King, 2012). Finally, the research field is somewhat disjointed, relying on pilot initiatives utilising flawed designs and small sample sizes. More robust research methods are required to adequately support and direct the medical profession and healthcare organisation into prioritising self-care and compassion.

Limitations and Quality of Studies

The heavy reliance on cross-sectional data was a major limitation and consequently, only associations, not causality, could be inferred. However, one study explored the relationship longitudinally and two evaluated interventions aimed to increase self-compassion and wellbeing. The pervasive use of self-report questionnaires can also be criticised, due to the increased risk of social desirability bias, though this may be compensated by reports that doctors under-report 'symptoms' due to perceived stigma (Hayes et al., 2017). Similarly, those with the extreme scores of wellbeing and/or self-compassion may not be represented due to having left the profession or being off work. Regression analysis (or modelling using regression analysis) was used in most studies, determining the relationship, and controlling for other variables, though several studies simply reported correlation coefficients (Kemper, et al., 2018; Olson & Kemper, 2014; Solms et al., 2021).

Several studies had limitations related to sample selection and demographics, with many participants being self-selected, carrying a risk of volunteer bias, and therefore limiting

the generalisability of findings. Only Erogul et al.'s (2014) study had a randomised sample, in both the intervention and control groups. In addition, there was a gender bias in the total sample, with 72% of the PRB-RSC study participants and 59.8% of the remaining study participants being female. This gender disparity is not reflective of the medical workforce, with percentages assumed to be relatively equal, and may be a consequence of the preference to study paediatric trainees. As females are thought to report lower self-compassion than their male counterparts (Neff, 2003b; Neff et al., 2005), and higher rates of mental health difficulties (Kinman & Teoh, 2018), this could influence the findings of this review, although as mentioned, reported gender differences were inconclusive.

All thirteen studies utilised a variation or extract of the SCS, with reported good internal consistency and test-retest reliability (Neff, 2003a). However, the bivalency of its components (aimed to reduce response bias), may inflate the observed relationship between self-compassion and wellbeing (Muris & Petrocchi, 2017). Some argue that the negatively weighted items (isolation, self-judgement, and over-identification) are more significantly associated with poor mental health than a lack of the positive items (Barnard & Curry, 2011; Muris & Petrocchi, 2017) and recommend researchers to report analysis for both positive and negative attributes. This is important when understanding who would benefit from interventions, as some have found the reduction in burnout to be associated only with a change in negative items (Eriksson et al., 2018). Only Richardson et al.'s (2016) study analysed the SCS subcomponents, finding similar associations between the negative and positive items. However, a lack of association between common humanity and wellbeing was observed, which has previously been reported (Barnard & Curry, 2011).

The varying psychological wellbeing measurement scales were largely validated and reliable tools, used commonly in mental health literature, excluding the self-developed scale, used to measure stress in one study (Dev et al., 2020). Six studies used the MBI, which

conceptualises burnout to be constructed as three separate, but linked, components (emotional exhaustion/exhaustion, depersonalisation/cynicism, and personal accomplishment). Despite its popularity in research, the measure has been criticised due to the circular nature of the definition (Kristensen et al., 2005) and the lack of validity behind the three subdomains (Paris & Hoge, 2009). In the included studies, personal accomplishment was not found to be associated with self-compassion, supporting arguments that it is an independent construct from burnout (Paris & Hoge, 2009), though statistical power may have been an issue within this study. Other criticisms lie on the varying cut-off points used to define an individual as 'burned out', observed in some of the included studies. This has implications as such cut-off scores were used to compile an adjusted odds risk ratio in Kemper et al.'s (2020) study, with no justification for the criteria. Finally, studies exploring self-compassion's relationship with other aspects of wellbeing (e.g., compassion satisfaction, quality of life) were only represented by a small number of studies, and therefore caution is advised in interpreting these results in the context of the wider profession.

Despite the drawbacks of the methodology of the included studies, this review has many strengths, including it being the first to explore the relationship in medical professionals, exclusively. The rigorous search strategy employed has led to a comprehensive overview of the evidence from a variety of studies in medical professionals worldwide at different levels of training. By focusing on mental wellbeing, studies exploring both positive and negative aspects of psychological health and functioning have been included, steering away from the reliance on the dominant concept of burnout. In addition, a validated appraisal tool was used to assess the quality of included studies, reviewing for bias or inappropriate reporting of results.

Nevertheless, several limitations have also arisen in the process. Despite the diligent search strategy, three out of thirteen papers were discovered through other means, which

raises concern that other studies may have been missed. In addition, despite the use of a quality assessment strategy, Kmet's tool still relies on subjective appraisals, highlighted by the minor discrepancies found between reviewers. Though this tool was chosen for its ability and instructions on how to appraise various study designs, this also had some drawbacks relating to the scoring. A bias towards cross-sectional studies was noted, as items relating to more robust designs (e.g. confounding, randomising) are deemed ineligible and therefore removed from the percentage score. This is exemplified whereby an experimental study reported a lower percentage quality than three cross-sectional studies. Nevertheless, this did not impact upon the systematic review's findings as the quality appraisal scores were used to identify weaknesses in the studies, rather than to omit or rank them.

There was considerable heterogeneity of many important factors in this review, which may impact upon how generalisable the findings are to the wider profession. Analytic methods varied, making it challenging to compare the strength of various relationships between papers. The inclusion of intervention studies may have introduced non-representative study samples, as participants may have a specific need or interest in mental health initiatives. The use of a broad definition of 'mental wellbeing' resulted in eight different variables and 12 unique measures. Though burnout was explored in ten studies, the varying scales used, and subsequent definitions, questions whether they were measuring the same concept. This raises the question of whether a scoping review may have been more appropriate due to the literature's diversity. However, the adoption of a systematic approach allowed for a wide variety of research to be included, critiqued and synthesised, and finding that self-compassion is not just related to less distress but also positive psychological health.

Finally, the exclusion of qualitative studies related to the need for a focussed approach to an already heterogeneous quantitative literature base. Quantitative studies used specific definitions and measures to explore the variables of concern. It is unlikely that qualitative

papers could have added to this particular aspect of the knowledge base. However, the inclusion of qualitative papers could have added to the richness and understanding of self-compassion in medical professionals, considering how it is perceived, experienced and utilised.

Future Research

The findings of this review are consistent with that of other populations, though more robust studies are needed to fully understand the relationship between self-compassion and wellbeing. Employing structural equation modelling could assist in understanding how personal characteristics are associated with medics' wellbeing, in the context of other important factors, such as job demands, resources and non-work-related aspects of life. In addition, more prospective studies akin to the PRB-RSC programme are needed to determine how self-compassion predicts mental wellbeing across time in large representative samples, taking into consideration age, gender, seniority, and speciality. As per Muris and Petrocchi's recommendations, studies should report all analysis of the sub-dimensions of self-compassion. Not only would this add to the understanding of self-compassion as a construct, but how it is related to each sub-dimension. Similarly, qualitative research could add to the nuances of self-compassion in medicine. The preference to explore the negative aspects of psychological health was also highlighted in this review, which limits the importance of these findings to doctors who are experiencing or at risk of mental health difficulties. A salutogenic focus on self-compassion's association with positive aspects of wellbeing could inform workplace initiatives beneficial to all medical professionals. All these suggestions are important for effectively developing much-needed preventative measures and targeting interventions in this workforce.

When assessing intervention efficacy, a collaborative and coordinated research strategy should be in place, utilising randomised controlled trials where possible. This can

help identify the most efficacious wellbeing initiatives and help understand if observed

improvements are attributable to the cultivation of self-compassionate skills. Such research

could inform educational programme changes, wellbeing initiatives and targeted

interventions underpinned by a solid and unified evidence base.

Conclusion

This systematic review found a consistent relationship between self-compassion and

mental wellbeing in doctors and medical students, finding it to be positively associated with

good psychological health. More research is needed to fully understand its protective role.

Medical educators and organisations could invest time and resources into equipping doctors

with adaptive coping strategies, such as self-compassion, to meet the difficult demands

placed on the profession.

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Figures and Tables

Figure 1

Overview of the systematic search process
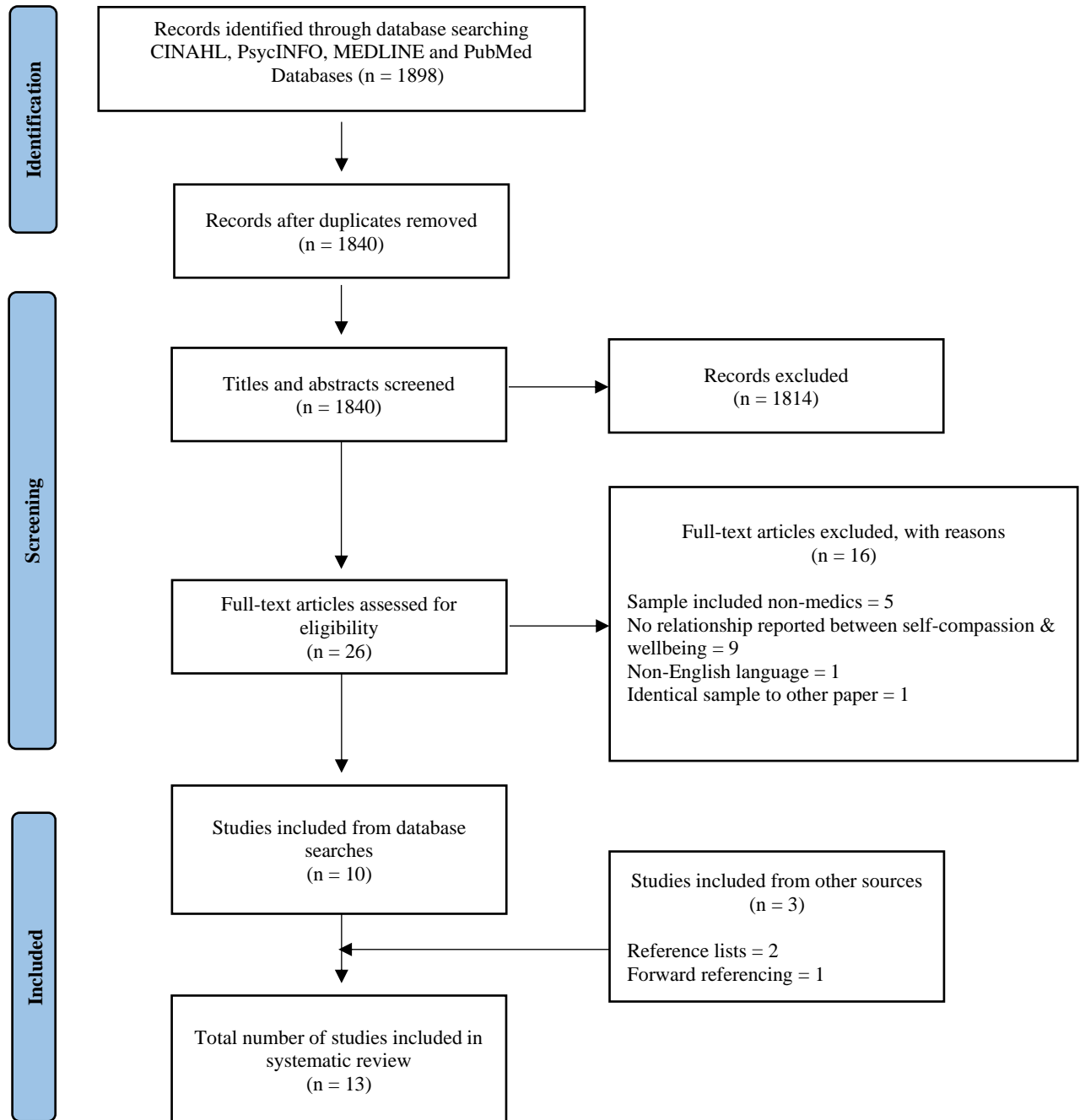
Table 1

Search terms used

String	Search Terms
String 1	"Self-Compassion" OR "Self-Care" OR "Self-Criticism" OR "Self compassion" OR"self care" OR "Self criticism"
String 2	"Physicians" OR "doctors" OR "medics" OR "medical students" OR "residents" OR "registrars" OR "practitioners" OR "General Practitioners" OR" Internists" OR "Surgeons"
String 3	"well-being" OR "well being" OR "quality of life" OR "mental" OR "anxiety" OR "depression" OR "stress" OR "burnout" OR "burn out" OR "distress" OR "psychological" OR "engagement" OR "satisfaction" OR "quality of life"

Table 2:

Study characteristics

Author(s) (date) Country	Relevant study population (*n*, occupation, % female, Mean age)	Study Design, Data Analyses	Self-compassion measure (Cronbach's α)	Psychological wellbeing measure (Cronbach's α)
Babenko et al. (2018) Canada	200 undergraduate medical students, 60.4% f, Not specified	Cross-sectional, Hierarchical regression	SCS-SF (α = 0.86)	▪ *OLBI* - 2 subscales – work engagement (α = 0.81) & work exhaustion (α = 0.70)
Babenko et al. (2019) Canada	57 physicians 65% f, Not specified	Cross-sectional, Sequential regression analyses	SCS-SF (α = 0.85)	▪ *OLBI* - 2 subscales: work engagement (α = 0.82) & work exhaustion (α = 0.78) ▪ *SWLS* – professional life satisfaction (α = 0.93)
Dev et al. (2020) New Zealand	899 physicians & medical students, Physicians (*n* = 516, 52.7% f, 43.6 years) Medical students (*n* = 383, 62.1% f, 24.1 years)	Cross-sectional, 2 step-multiple regression	SCS-SF (α_P = 0.86, α_{MS} = 0.86)	▪ *CBI* – burnout (α_P = 0.90, α_{MS} = 0.89) ▪ *SWLS* – quality of life (α_P = 0.90, α_{MS} = 0.87) ▪ Work stress (3 self-developed items) (α_P = 0.73, α_{MS} = 0.63)
Erogul et al. (2014) United States	58 1st year medical students (30 in control group) 45.6% f, 23.5 years	Prospective unblinded randomised controlled study of MBSR Repeated measures at T1, T2 and T3, correlation	SCS (n/a)	▪ *PSS* – stress (n/a)

Kemper et al. (2018) United States	1758 paediatric residents in 2016, 2148 in 2017) 72% f, Not specified	Prospective cohort study, Correlations (Spearman's)	SCS-SF (n/a)	▪ *MBI-HSS* - 3 subscales, emotional exhaustion, depersonalisation & personal accomplishment (n/a)
Kemper et al. (2019) United States	872 paediatric residents 72% female, 28.8 years	Prospective cohort study, Correlations (Spearman's) Mixed linear regression	SCS-SF (n/a)	▪ *MBI-HSS* - 3 subscales, emotional exhaustion, depersonalisation & personal accomplishment (n/a)
Kemper et al. (2020) United States	**2016** (n = 1664 paediatric residents, 71.9% f, 29.3 years) **2017** (n = 2153 paediatric residents, 71.9% f, 29 years) **2018** (n = 2241 paediatric residents, 72.6% f, 29 years)	Prospective cohort study, ANOVA Mixed effects linear & logistic regression	SCS-SF (n/a)	▪ *MBI-HSS* - 3 subscales, emotional exhaustion, depersonalisation & personal accomplishment (n/a)
Olson and Kemper (2014) United States	12 medical students, residents & 1 faculty member, 59% f, 27.6 years	Cross-sectional, Correlations	SCS (n/a)	▪ *PSS* – stress (n/a) ▪ *PROMIS* - mental health (n/a)
Olson et al. (2015) United States	45 1st year paediatric & medical paediatric residents 64% f, 28.4 years	Cross-sectional, Correlations	SCS-SF (n/a)	▪ *MBI-HSS* - 3 subscales, emotional exhaustion, depersonalisation & personal accomplishment (n/a)
Richardson et al. (2016) United States	88 medical students & residents, 48.9% f, 28.5 years	Cross-sectional, Multiple linear regression	SCS-SF (n/a)	▪ *ProQOL* - 3 subscales: burnout, compassion satisfaction & secondary traumatic stress (n/a)
Sabir et al (2018)	100 doctors,	Cross-sectional,	SCS (α = 0.76)	▪ *SPANE* – emotional wellbeing (α = 0.76)

β

Pakistan	45% f, 28.27 years	Multiple regression		
Solms et al. (2019) Netherlands	193 physicians, 78.2% f, 36.5 years	Cross-sectional, Regression	SCS (6-items) ($\alpha = 0.72$)	▪ **_MBI-GS_** - exhaustion ($\alpha = 0.84$) & cynicism subscales ($\alpha = 0.77$) ▪ **_UWES_** – work engagement ($\alpha = 0.90$)
Solms et al. (2021) Netherlands	114 paediatric residents & specialists (57 control group), 78.1% f, 34 years	Quasi-experimental pre- and post-test control design of coaching intervention, Correlations	SCS (6-items) (n/a)	▪ **_MBI-GS_**- exhaustion (n/a) & cynicism subscales (n/a) ▪ **_UWES_** – work engagement (n/a)

Note: CBI = Copenhagen Burnout Inventory (Kristensen et al., 2005); MBI-GS = Maslach Burnout Inventory – General Survey; MBI-HSS = Maslach Burnout Inventory – Human Services Survey; OLBI = Oldenburg Burnout Inventory (Demerouti & Bakker, 2008); PROMIS global health scale (Hays et al., 2009); PROQOL= Professional Quality of Life Scale (Stamm, 2010); PSS = Perceived Stress Scale (Cohen et al., 1983); SCS = Self-Compassion Scale (Neff, 2003b); SCS-SF = Self-Compassion Scale – Short Form (Raes et al., 2011); SPANE = Survey of Positive and Negative Emotion (Diener et al., 2010); SWLS = Satisfaction with Life Scale (Diener et al., 1985); UWES = Utrecht's Work Engagement Scale (Schaufeli et al., 2002)

Table 3

Results for studies exploring burnout

Study	Sample	*n*	Measure & criteria	Prevalence	Mean Scores (SD)	Correlations / Analysis	Regression analysis / Pre-post intervention analysis	Effect size
Kemper et al. (2018)	2016	1785	MBI: >27 EE, >10 DP, Screening >3 in either question	56%	Not reported	SC correlated with BO measured with MBI (r = -.46, p < .01) and screening (r = -.42, p<.01)		Moderate
	2017	2148		54%	Not reported	SC correlated with BO measured with MBI (r = -.47, p < .01) and screening (r = -.43, p<.01)		Moderate
Kemper et al. (2019)	2016	872	MBI: >27 EE, >10 DP	58.20%	SC = 3.1 (0.58)[a]	SC and BO correlated (r = -.47, p<.001)	2016 SC score predicted 2017 burnout, when controlling for 2016 burnout β = -.17 (0.08), *p = .03*	Moderate
	2017			58.30%	SC =3.13 (0.58)[a]	SC and BO correlated (r = -.52, p<.001)		Moderate
Kemper et al. (2020)	2016	1664	MBI: >27 EE, >13 DP	56%	Not reported for whole sample	SC scores for "burnt-out" v non "burnt-out" 2.9 (0.5) v 3.4 (0.6), *p* < .001 Adjusted odds ratio (0.8)	2018 SC score had an adjusted odds ratio score of 0.9 for 2018 burnout, *p = .4* (not sig)	*d* = 0.91 (strong)
	2017	2153		54%	Not reported for whole sample	SC scores for "burnt-out" v non "burnt-out" 2.9 (0.5) v 3.4 (0.6), *p* < .001 Adjusted odds ratio (0.8)		*d* = 0.91 (strong)
	2018	2241		54%	Not reported for whole sample	SC scores for "burnt-out" v non "burnt-out" 2.9 (0.6) v 3.4 (0.6), *p* < .001 Adjusted odds ratio (0.8)		*d* = 0.83 (strong)

Olson 2015	Residents	45	MBI: >27 EE, >10 DP, <33 PA	40%	EE = 21.1 (9.4) DP = 8.9 (4.8) PA = 39 (5.8) SC = 3.2 (0.6)	EE and SC (r = - .35, p < .05), DP and PA not sig correlated with SC	SC remained sig associated with EE, when controlling for gender (F = 10.07, p < .001)	Moderate
Solms et al. (2019)	Residents	124	MBI		Ex = 2.55 (1.02) C = 2.24 (0.99) SC = 3.19 (0.63)	EX and SC (r = - .45, p <.01), C and SC (r = - .26, p <.01)	Path analysis, SC was negatively predictive of BO (β = -.22, p < .05)	Moderate, small
	Specialists	69			Ex = 2.40 (1.18) C = 2.01 (1.07) SC = 3.36 (0.65)	Ex and SC (r = - .33, p < .01), C and SC (r = - .50, p < .01)	Not statistically significant in path analysis	Moderate
Solms et al. (2021)	Coaching	57	MBI		Ex = 2.75 (1.08) C = 2.11 (1.08) SC = 3.07 (0.6)	At baseline, Ex and SC (r = -.55, p < .01), C and SC (r = -.40, p < .01)	Coaching intervention sig. increased SC (3.07 (0.6) v 3.27 (0.52), p < .001) and reduced Ex (2.75 (1.08) v 2.25 (0.79), p < .001)	Moderate
	Control	57			Ex = 2.13 (0.92) C = 2.06 (0.93) SC = 3.39 (0.66)	At baseline, Ex and SC (r = -.44, p < .01), C and SC (r = -.29, p < .05)	No sig. change in C scores (2.11 (1.08) v 1.90 (0.75), p = .15)	Moderate, small
Dev et al. (2020)	Doctors	516	CBI		Burnout = 2.57 (0.56) SC = 3.24 (0.68)	SC and BO correlated (r = -.45, p < .01)	Lower SC precited BO (β = - 0.33, p < .01). Model includes low experience, greater stress, low SC	Moderate
	Medical students	383			Burnout = 2.59 (0.53) SC = 2.92 (0.67)	SC and BO correlated (r = -.40, p < .01)	Lower SC precited BO (β = - 0.32, p < .01). Model includes greater stress, low SC	Moderate
Babenko et al. (2019)	Doctors	57	OLBI		WEng = 2.86 (0.36) WExh = 2.50 (0.43) SC = 3.39 (0.60)	WEng and SC (r = .33, p < .05), WExh and SC (r = - .41, p < .01)	SC predicted work engagement (β = .33, p < .05), and work exhaustion (β = - 0.41, p < .01)	Moderate

Study	Population	N	Measure			Correlations	Regression	Effect size
Babenko et al. (2018)	Medical students	200	OLBI		WEng = 2.98 (0.46) WExh = 2.58 (0.46) SC = 3.15 (0.64)	WEng and SC ($r = .32$, $p < .01$, WExh and SC ($r = - .25$, $p < .01$)	In regression analysis, SC explained a sig amount of the model on engagement ($\beta = .13$, $p < .05$) and exhaustion ($\beta = - .32$, $p < .01$)	Moderate. small
Richardson 2016	Mix	88	PROQOL BO score >27	23.9% high BO 30% low SC	Not reported for whole sample	BO and SC ($r = - .41$, $p < .001$), BO correlates with SC subscales; self-kindness ($r = - .34$, $p < .001$), self-judgement ($r = .37$, $p < .001$), common humanity ($r = - .03$, $p > .1$), isolation ($r = .41$, $p < .001$), mindfulness ($r = - .27$, $p < .001$), over-identification ($r = .33$, $p < .05$)	SC predicted burnout ($\beta = .375$, $p < .01$)	Moderate

Note: CBI = Copenhagen Burnout Inventory (Kristensen et al., 2005); MBI-GS = Maslach Burnout Inventory – General Survey; MBI-HSS = Maslach Burnout Inventory – Human Services Survey; OLBI = Oldenburg Burnout Inventory (Demerouti & Bakker, 2008); PROQOL= Professional Quality of Life Scale (Stamm, 2010)

[a] self-compassion score calculated as per Neff (2003b) recommendations

Subscale abbreviations:

BO = burnout; C = cynicism; DP = depersonalisation; EE -= emotional exhaustion; Ex = exhaustion; PA = personal accomplishment; SC = self-compassion; WEng = work engagement; WExh = work exhaustion

Table 4

Results for studies exploring stress

Study	Sample	*n*	Measure & Criteria	Mean Scores	Correlations	Other analysis	Effect size
Erogul et al. (2014)	Control students	29	PSS-10	PSS = 18.3 (7.1) SC = 2.9 (0.6)	At baseline and for whole sample, PSS and SC were correlated (*r* = -.47, *p* < .001)	The correlation coefficients of the changes in PSS score and SC (pre-and post) were *r* = -.58, *p* < .01 (MBSR) and *r* = -.35, *p* = .06 (control)	Moderate
	MBSR students	28		PSS = 17.6 (5.5) SC =3.1 (0.5)			
Kemper et al. (2019)	2016	872	PSS	PSS = 16.4 (6.0) SC = 3.1 (0.58)[a]	SC and PSS correlated (*r* = -.59, *p* < .001)	After controlling for 2016 stress, 2016 SC predicted 2017 stress (β = -.16 (0.04), *p* < .001)	Moderately strong
	2017			PSS = 16.2 (6.3) SC =3.13 (0.58)[a]	SC and PSS correlated (*r* = -.64, *p* < .001)		
Olson & Kemper (2014)	Mix	12	PSS	PSS = 13.5 (3.5) SC = 3.1 (0.5)	SC and PSS correlated (*r* = -.79, *p* < .01)		Strong
Dev et al. (2020)	Doctors	516	*z*-scores of 3-items	Stress = - 0.01 (0.76) SC = 3.24 (0.68)	SC and stress correlated (*r* = -.20, *p* < .01)	No correlation observed in nurses between stress and SC	Small
	Medical students	383		Stress = - 0.36 (0.68) SC = 2.92 (0.67)	SC and stress correlated (*r* = -.21, *p* < .01)		

Note: PSS = Perceived Stress Scale (Cohen et al., 1983)

[a] self-compassion score calculated as per Neff (2003b) recommendations

Subscale abbreviations: PSS = stress; SC = self-compassion

Table 5

Results for studies exploring other measures of wellbeing

	Study	Sample	*n*	Measure & Criteria	Prevalence	Mean Scores	Correlations	Other analysis	Effect size
Work engagement	Solms et al. (2019)	Residents	124	UWES-9		WEng = 4.93 (0.77) SC = 3.19 (0.63)	SC and WEng correlated (*r* = .29, *p* < .01)	Path analysis, SC did not predict WEng in residents (*p* > .05)	Small
		Specialists	69			WEng = 5.21 (0.88) SC = 3.36 (0.65)	SC and WEng correlated (*r* = .32, *p* < .01)	SC negatively predicted WEng in specialists (β = -0.33, *p* < .01)	Moderate
	Solms et al. (2021)	Intervention	57	UWES-9		WEng = 5.08 (0.78) SC = 3.07 (0.60)	SC and WEng correlated (*r* = .39, *p* < .01)	Coaching intervention sig. increased SC (3.07 (0.6) v 3.27 (0.52), *p* < .001) and increased WEng (5.08 (0.59) v 5.28 (0.59), *p* < .05)	Moderate
		Control	57			WEng = 5.04 (0.75) SC = 3.39 (0.66)	SC and WEng correlated (*r* = .30, *p* < .05)		Moderate
Quality of life	Dev et al. (2020)	Doctors	516	SWLS		QOL = 5.30 (1.25) SC = 3.24 (0.68)	SC and QOL correlated (*r* = .32, *p* < .01)	SC predicted QOL (β = 0.29, *p* < .01)	Moderate
		Medical students	383	SWLS		QOL = 5.25 (1.18) SC = 2.92 (0.67)	SC and QOL correlated (*r* = .39, *p* < .01)	SC predicted QOL (β = 0.35, *p* < .01)	Moderate
	Babenko et al. (2019)	Doctors	57	SWLS		QOL = 5.24 (1.24) SC = 3.39 (0.6)	SC and QOL correlated (*r* = .32, *p* < .01)	SC predicted QOL (β = 0.32, *p* < .05), however was found to be mediated by work exhaustion and engagement	Moderate

Compassion satisfaction	Richardson et al. (2016)	Mix	88	PROQOL		Not reported for whole sample	SC and CS correlated ($r =$ .29, $p < .05$) CS correlates with SC subscales; self-kindness ($r =$ .22, $p < .05$), self-judgement ($r = -$ .24, $p < .05$), common humanity ($r = .09, p > .1$), isolation ($r = -$ .31, $p < .05$), mindfulness ($r = .19, p < .1$), over-identification ($r = -$ .19, $p > .1$)	SC predicted CS ($\beta = 0.245$, $p < .05$)	Small
Secondary traumatic stress	Richardson et al. (2016)	Mix	88	PROQOL	27.3% high STS	Not reported for whole sample	SC and STS correlated ($r =$ .29, $p < .05$) STS correlates with SC subscales; self-kindness ($r = -$ .20, $p < .1$), self-judgement ($r = .24, p < .05$), common humanity ($r = .01, p > .1$), isolation ($r = .22, p < .05$), mindfulness ($r = -$ .24, $p < .05$), over-identification ($r = .24, p < .05$)	SC predicted STS ($\beta = -0.181, p < .1$)	Small
Mental health	Olson & Kemper (2014)	Mix	12	PROMIS		MH = 49.7 (6.9) SC = 3.1 (0.5)	SC and MH correlated ($r =$ .83, $p < .01$)		Strong
Emotional wellbeing	Sabir et al. (2018)	Doctors	100	SPANE		EW = 52.61 (7.61) SC = 3.10 (0.39)[a]	SC and emotional wellbeing correlated in critical care doctors ($r = .29. \ p < .05$) & non-critical care doctors ($r = .47. p < .01$)	SC predicted emotional wellbeing ($\beta = .35, p < .01$)	Small

Note: PROMIS global health scale (Hays et al., 2009); PROQOL= Professional Quality of Life Scale (Stamm, 2010); SPANE = Survey of Positive and Negative Emotion (Diener et al., 2010); SWLS = Satisfaction with Life Scale (Diener et al., 1985); UWES = Utrecht's Work Engagement Scale (Schaufeli et al., 2002)

[a] self-compassion score calculated as per Neff (2003b) recommendations

Subscale abbreviations:

CS = compassion satisfaction; EW = emotional wellbeing; MH = mental health; QOL = quality of life; SC = self-compassion; STS = secondary traumatic stress; WEng = work engageme

Appendix A

The quality appraisal checklist and scores of included papers

Figure A1

Standard quality assessment criteria for evaluating primary research papers from a variety of fields (Kmet et al., 2004).

	Criteria	YES (2)	PARTIAL (1)	NO (0)	N/A
1	Question / objective sufficiently described?				
2	Study design evident and appropriate?				
3	Method of subject/comparison group selection or source of information/input variables described and appropriate?				
4	Subject (and comparison group, if applicable) characteristics sufficiently described?				
5	If interventional and random allocation was possible, was it described?				
6	If interventional and blinding of investigators was possible, was it reported?				
7	If interventional and blinding of subjects was possible, was it reported?				
8	Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?				
9	Sample size appropriate?				
10	Analytic methods described/justified and appropriate?				
11	Some estimate of variance is reported for the main results?				
12	Controlled for confounding?				
13	Results reported in sufficient detail?				
14	Conclusions supported by the results?				

Table A1

Quality appraisal scores

Study	1. Question/objective sufficiently described?	2. Study design evident and appropriate?	3. Method of subject / comparison group selection or source of information / input variable described and appropriate?	4. Subject (and comparison group, if applicable) characteristics sufficiently described?	5. If interventional and random allocation was possible, was it described?	6. If interventional and blinding of investigators was possible, was it reported?	7. If interventional and blinding of subjects was possible, was it reported?	8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	9. Sample size appropriate?	10. Analytic methods described / justified and appropriate?	11. Some estimate of variance is reported for the main results?	12. Controlled for confounding?	13. Results reported in sufficient detail?	14. Conclusions supported by the results?	Score
Babenko et al. (2018)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	N/A	2	2	19/20 95%
Babenko et al. (2019)	2	2	1	1	N/A	N/A	N/A	2	2	2	0	N/A	2	2	16/20 80%
Dev et al. (2020)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	N/A	2	2	19/20 95%
Erogul et al. (2014)	2	2	2	2	2	N/A	1	2	2	2	2	2	1	2	24/26 92%
Kemper et al. (2018)	2	2	2	1	N/A	N/A	N/A	1	2	2	2	N/A	2	2	18/20 90%
Kemper et al. (2019)	2	2	2	2	N/A	N/A	N/A	2	2	2	2	N/A	2	2	20/20 100%

Study	1. Question/objective sufficiently described?	2. Study design evident and appropriate?	3. Method of subject / comparison group selection or source of information / input variable described and appropriate?	4. Subject (and comparison group, if applicable) characteristics sufficiently described?	5. If interventional and random allocation was possible, was it described?	6. If interventional and blinding of investigators was possible, was it reported?	7. If interventional and blinding of subjects was possible, was it reported?	8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?	9. Sample size appropriate?	10. Analytic methods described / justified and appropriate?	11. Some estimate of variance is reported for the main results?	12. Controlled for confounding?	13. Results reported in sufficient detail?	14. Conclusions supported by the results?	Score
Kemper et al. (2020)	2	2	2	2	N/A	N/A	N/A	1	2	2	2	2	2	2	21/22 95%
Olson & Kemper (2014)	2	2	1	2	N/A	N/A	N/A	1	0	1	1	N/A	2	2	14/20 70%
Olson et al. (2015)	2	2	2	1	N/A	N/A	N/A	2	1	2	2	N/A	2	2	18/20 90%
Richardson et al. (2016)	2	2	1	2	N/A	N/A	N/A	2	2	2	2	N/A	2	2	19/20 95%
Sabir et al (2018)	1	2	1	2	N/A	N/A	N/A	2	1	2	2	N/A	2	2	17/20 85%
Solms et al. (2019)	2	2	2	2	N/A	N/A	N/A	2	2	2	1	N/A	2	2	19/20 95%
Solms et al. (2021)	1	2	2	2	N/A	N/A	N/A	2	2	2	2	2	2	2	21/22 95%

Appendix B

Table B1

Descriptions of various outcome measures used in included papers

Measure	Aspect of wellbeing	Measure type	Example items	Definition / Aim of Survey	Scoring
Copenhagen Burnout Inventory (CBI)	Burnout: • personal (6 items) • work-related (7 items) • client-related (6 items)	Self-report 5-point Likert scale (0 – 4) 19 items	Personal: *How often are you emotionally exhausted?* Work-related: *Does your work frustrate you?* Client -related: *Does it drain your energy to work with clients?*	Personal burnout: "*the degree of physical and psychological fatigue and exhaustion experienced by the person*" Work-related burnout: "t*he degree of physical and psychological fatigue and exhaustion that is perceived by the person as related to his/her work*" Client-related burnout: *"The degree of physical and psychological fatigue and exhaustion that is perceived by the person as related to his/her work with clients"*	One item is reverse scored. Total scores added up per scale and transformed into percentages of time: 0 = 0%, 1 = 25%, 2 = 50%, 3 = 75%, and 4 = 100% The score on each scale was calculated as the average percentage of the score of the questions of that scale, and the total score was calculated as the average score of the three scales together.
MBI-General Survey (MBI-GS	Burnout: • exhaustion • cynicism • professional efficacy	Self-report	Exhaustion: *Working all day is really a strain for me* Cynicism: *I don't really care if my work is done well or poorly*	*Burnout is a state of exhaustion in which one is cynical about the value of one's occupation and*	Scores are added up per sub-scale.

			Professional efficacy: *At my work, I am confident that I am effective at getting things done*	*doubtful of one's capacity to perform.*	
MBI-Human Services Survey (MBI-HSS)	Burnout: • emotional exhaustion (9 items) • depersonalisation (5 items) • personal accomplishment (8 items)	Self-report 7-point Likert scale (0-6) 22 items	Emotion exhaustion: *I feel emotionally drained by my work* Depersonalisation: *I have become more insensitive to people in the workplace* Personal accomplishment: *I accomplish many worthwhile things in this job*	*Burnout is a psychological syndrome of emotional exhaustion, depersonalisation and reduced personal accomplishment that can occur among individuals who work with other people in some capacity.*	Scores are added up per sub-scale.
OLBI	Burnout • work disengagement (8-items) • work exhaustion (8 items)	Self-report 4-point Likert scale (1-4) 16 items	Work disengagement: *I feel more and more engaged in my work* (reversed) Work exhaustion: *After my work, I regularly feel worn out and weary*	*Exhaustion refers to general feelings of emptiness, overtaxing from work, a strong need for rest, and a state of physical exhaustion. Disengagement refers to distancing oneself from the object and the content of one's work and to negative, cynical attitudes and behaviours toward ones' work in general.*	Positive and negative items (reversed). Scores are added up per subscale. Total OLBI score is the two subscale scores summed.
PROQOL	Professional quality of life: • burnout (10 items)	Self-report 5-point Likert scale (1-5)	Compassion satisfaction: *I get satisfaction from being able to help people* Burnout: *I feel worn out because of my work*	*Compassion satisfaction is the pleasure you derive being able to do your work well. Burnout is one of the elements of compassion*	Raw scores are presented for each subscale.

	• compassion satisfaction (10 items) • secondary traumatic stress (10 items)	30 items	Secondary traumatic stress: *I think that I might have been affected by the traumatic stress of those I help*	*fatigue and is associated with feelings of hopelessness and difficulties in dealing with work or in doing your job effectively.* *Secondary traumatic stress is the second component of compassion fatigue and is associated with work-related, secondary exposure to stressful or traumatic events.*	Percentile ranks are also calculated, used to compare to typical patterns of scores for that profession.
PSS	Stress	Self-report 5-point Likert scale (0-4) 10 items	*In the last month, how often have you felt nervous and stressed?*	*Stress can be defined as a process in which environmental demands strain an organism's adaptive capacity, resulting in both psychological as well as biological changes that could place a person at risk for illness*	Four items are reverse scored. Total score is calculated by the sum of all scores.
SCS	Self-compassion: • self-kindness (5 items) • self-judgement (5 items) • common humanity (4 items) • isolation (4 items) • mindfulness (4 items)	Self-report 5-point Likert scale (1-5) 26 items	Self-kindness: *I try to be loving towards myself when I'm feeling emotional pain* Self-judgement: *I'm disapproving and judgemental about my own flaws and inadequacies* Common humanity: *When things are going badly for me, I see the difficulties as part of life that everyone goes through* Isolation: *When I think about my inadequacies, it tends to make*	*Self-compassion involves being kind to oneself when confronting personal inadequacies or situational difficulties, framing the imperfection of life in terms of common humanity, and being mindful of negative emotions so that one neither suppresses nor ruminates on them.*	Self-judgement, isolation and over-identification subscale scores are reversed. Mean scores of each subscale are calculated. Total SCS score is mean of all mean subscale scores.

	• over-identification (4 items)		*me feel more separate and cut off from the rest of the world* Mindfulness: *When something upsets me, I try to keep my emotions in balance* Over-identification: *When I'm feeling down, I tend to obsess and fixate on everything that's wrong*		
SCS-SF	Self-compassion: • self-kindness (2 items) • self-judgement (2 items) • common humanity (2 items) • isolation (2 items) • mindfulness (2 items) • over-identification (2 items)	Self-report 5-point Likert scale (1-5) 12 items	Self-kindness: *I try to be understanding and patient towards those aspects of my personality I don't like* Self-judgment: *I'm disapproving and udgmental about my own flaws and inadequacies* Common humanity: *I try to see my failings as part of the human condition* Isolation: *When I faill at something that's important to me, I tend to feel alone in my failure* Mindfulness: *When something painful happens I try to take a balanced view of the situation* Over-identification: *When I fail at something important to me I become consumed by feelings of inadequacy*	*Self-compassion involves being kind to oneself when confronting personal inadequacies or situational difficulties, framing the imperfection of life in terms of common humanity, and being mindful of negative emotions so that one neither suppresses nor ruminates on them.*	Self-judgement, isolation and over-identification subscale scores are reversed. Mean scores of each subscale are calculated. Total SCS score is mean of all mean subscale scores.

SPANE	Emotional wellbeing: • Positive feelings (SPANE-P) (6 items) • Negative feelings (SPANE-N) (6 items)	Self-report 5-point Likert scale (1-5) 12 items	How often in the last 4 week have you felt? *Positive, good, pleasant, happy, joyful, concentrated* (Positive items) *Negative, bad, unpleasant, sad, afraid, angry)* Negative items	*To assess subjective feelings of well-being and ill-being.*	Total scores of SPANE-P and SPANE-N. Overall affect score = SPANE-P – SPANE-N
SWLS	Quality of life / satisfaction with life	Self-report 5 items	*In most ways my life is close to ideal*	*To measure global cognitive judgments of one's life satisfaction*	Total score calculated by adding up individual scores.
UWES-9	Work engagement: • vigour (3 items) • dedication (3 items) • absorption (3 items)	Self-report 7-point Likert scale (0-6) 9 items	Vigour: *At my work, I feel bursting with energy* Dedication: *I find the work I do full of meaning and purpose* Absorption: *Time flies when I'm working*	*Engagement is a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication and absorption.*	Total score summed by adding up subscale scores.

Note: CBI = Copenhagen Burnout Inventory (Kristensen et al., 2005); MBI-GS = Maslach Burnout Inventory – General Survey; MBI-HSS =

Maslach Burnout Inventory – Human Services Survey; OLBI = Oldenburg Burnout Inventory (Demerouti & Bakker, 2008); PROQOL=

Professional Quality of Life Scale (Stamm, 2010); PSS = Perceived Stress Scale (Cohen et al., 1983); SCS = Self-Compassion Scale (Neff,

2003b); SCS-SF = Self-Compassion Scale – Short Form (Raes et al., 2011); SPANE = Survey of Positive and Negative Emotion (Diener et al.,

2010); SWLS = Satisfaction with Life Scale (Diener et al., 1985); UWES = Utrecht's Work Engagement Scale (Schaufeli et al., 2002)

Appendix C

Journal of Occupational Health Psychology Author Guidelines

Journal scope statement

The *Journal of Occupational Health Psychology*® publishes theory, research, and public policy articles in occupational health psychology, an interdisciplinary field representing a broad range of backgrounds, interests, and specializations. Occupational health psychology concerns of the application of psychology to improving the quality of work life and to protecting and promoting the safety, health, and well-being of workers.

The journal has a threefold focus, including organization of work, individual psychological attributes, and work–nonwork interface in relation to employee health, safety, or well-being.

The journal seeks scholarly articles, from both researchers and practitioners, concerning psychological factors in relationship to all aspects of occupational safety, health, and well-being.

Included in this broad domain of interest are

- articles in which work-related and nonwork-related psychological factors play a role in the etiology of occupational safety, health, and well-being

- articles examining the dynamics of occupational safety, health, and well-being

- articles concerned with the use of psychological approaches to improve occupational safety, health, and well-being

Special attention is given to articles with a prevention and a promotion emphasis.

Authors should consider the financial costs and economic benefits of prevention and promotion programmes they evaluate.

Manuscripts dealing with issues of contemporary relevance to the workplace, especially regarding the unique challenges of occupational safety, health, and well-being experienced by

minority, cultural, or occupationally underrepresented groups, or topics at the interface of work and nonwork, are encouraged.

Each article should represent an addition to knowledge and understanding of occupational health psychology.

Submission

Prepare manuscripts according to the *Publication Manual of the American Psychological Association* using the 7th edition. Manuscripts may be copyedited for bias-free language (see Chapter 5 of the *Publication Manual*). APA Style and Grammar Guidelines for the 7th edition are available.

Section Two: Empirical Paper

Relationships between perfectionistic concerns, psychological safety, and mental wellbeing
in doctors

Word count (excluding references, tables and appendices): 7987

Abstract: 215

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March 2022

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Abstract

Poor psychological health is prevalent in doctors and understanding factors that are associated is important in developing ways to improve it. This study aims to investigate the relationships between perfectionistic concerns, psychological safety, and mental wellbeing, using the Job Demands-Resource model as a theoretical guide. High psychological safety and low perfectionistic concerns were hypothesised to predict greater mental wellbeing.

The online survey comprised of validated scales measuring the above variables and demographic/ occupational factors. The survey was completed by 121 doctors (38 male, 81 female). All participants had a license to practice medicine, were currently working and had patient contact.

Multiple regression analysis revealed that high psychological safety and low perfectionistic concerns were predictive of positive mental wellbeing, accounting for 44.5% of the variance. Psychological safety was not found to moderate the relationship between perfectionistic concerns and mental wellbeing, though this could be due to a type-II error.

This study found that these previously under-researched variables contributed significantly to wellbeing in doctors. Recommendations for clinical, organisation and education initiatives based on these findings are discussed. Future research should investigate these variables using more advanced modelling, longitudinal or experimental designs.

Keywords: doctors, perfectionism, psychological safety, wellbeing, mental health

Relationships between perfectionistic concerns, psychological safety, and mental

wellbeing in doctors

Studies have consistently found that doctors are at an increased risk of experiencing

poor mental health, including burnout, stress and anxiety (Imo, 2017), accompanied with a

five times increased risk of suicide (Gerada, 2018). Forty percent of doctors surveyed by the

BMA self-reported experiencing mental health challenges that were impacting upon their

work (BMA, 2018), highlighting wider implications. Staffing issues are exacerbated due to

sickness and doctors leaving the profession or retiring early (GMC, 2021). Patient care and

safety can also be influenced by physician mental health (Aiken et al., 2012; Hall et al., 2016;

Wilkinson et al., 2017).

For clinical psychologists, and other professionals supporting doctors, understanding

mental health-associated factors is important. Research has tended to focus upon individual

(socio-demographic, personality), occupational (speciality, demands) and organisational level

(culture) factors (Kinman & Teoh, 2018). Barriers to disclosing or accessing support have

also been recognised (Hassan et al., 2009), such as perceived stigma, fear of implications on

career progression (Thompson et al., 2009; Wijeratne at al., 2021) and practical obstacles

(lack of time, moving trusts frequently) (Practitioner Health, (n.d.)). This study aims to

explore the relationships between a personality trait (perfectionism), an aspect of team culture

(psychological safety) and the psychological health in a sample of doctors. The Job-Demands

Resource (JD-R) model will be used as a framework (Demerouti et al., 2001), chosen due to

its familiarity within the occupational wellbeing field and to highlight two factors

(personality and team culture) that have received little attention within it.

Personality and Mental Wellbeing in Doctors

Research into individual factors associated with doctors' mental health has long-been

studied, with some dominating the research field (e.g. resilience). Interestingly, age and

gender have shown inconsistent associations with the mental wellbeing of doctors (Imo, 2017), though some studies suggest female doctors are at an increased risk (Burbeck et al., 2002; Lydall et al., 2009; Newbury-Birch & Kamali, 2001). Doctors high in resilience, extroversion, conscientiousness, and emotional intelligence are less likely to report stress and burnout (Imo, 2017; McCain et al., 2018; McManus et al., 2004; Weng et al., 2011). Similarly, self-compassion has consistently been linked to better mental health in doctors (Babenko et al., 2019, Dev et al., 2020; Kemper et al., 2020), highlighting the potential of compassion-focused interventions for this professional group. Interestingly, studies have shown that doctors are not short of personal resources (self-compassion, resilience, grit) (Halliday et al., 2017; Kemper et al., 2020; McCain et al., 2018), yet still experience high rates of psychological distress. Rather than lacking personal resources, doctors may possess certain qualities that place them at an increased risk, such as workaholism and neuroticism (Imo, 2017; McManus et al., 2004; Schaufeli et al., 2009). One factor that is relatively underexplored in doctors is perfectionism.

Perfectionism in Doctors

Doctors are frequently cited as being likely to possess perfectionistic traits (Peters & King, 2013; Practitioner Health, (n.d.), yet there is little empirical evidence to support this. The rigorous and competitive nature of medical training, along with the need for meticulousness in clinical scenarios would suggest that doctors would benefit from possessing perfectionistic traits. Ninety-five percent of doctors reported feeling fearful of making mistakes (a key component of perfectionism) in a BMA (2018) study, yet medical students have been found to be less perfectionistic than other professional students (Enns et al., 2001; Seeliger & Harendza, 2017). This may suuggest that perfectionism is cultivated in doctors through their careers. However, the lack of research in doctors makes it difficult to draw conclusions. To our knowledge, only one study has explored the association between

perfectionism and wellbeing in doctors, finding it to be associated with an increased risk of experiencing stress and burnout (Craiovan, 2014). Similar findings have been shown in medical students (Bynum et al., 2019; Enns et al., 2001; Seeliger & Harendza, 2017; Yu et al., 2016). In the general population, perfectionism has been linked with eating disorders, anxiety, burnout, depression, stress and suicidal ideation (Brennan-Wydra et al., 2021; Eberhart et al., 2011; Limburg et al., 2017). Whether perfectionistic characteristics vary based on age and gender is debated. Female medical students were found to be more perfectionistic than their counterparts (Pereria et al., 2022), yet other studies report no gender differences (Stoeber & Stoeber, 2009). Age has shown similarly conflicting results (Landa & Bybee, 2007; Stoeber & Stoeber, 2009), as has level of experience (Kinman & Grant, 2022).

There are several conceptualisations of perfectionism, most agreeing that it is a multi-dimensional trait containing both positive and negative facets (Egan et al, 2011). Hewitt and Flett (1991) conceptualised perfectionism based on whom the desire or expectation of perfection is attributed to or felt to be from. They classified perfectionism as either self-orientated, other-orientated or socially prescribed. Though important, this model does not distinguish between the positive and negative attributes of the trait. As some aspects of perfectionism may be desirable and potentially necessary for doctors to work effectively, this study sought to use a model that distinguishes potentially harmful nuances of the trait, that could be targeted with interventions, without detracting from the positive.

Frost et al.'s (1990) multidimensional model conceptualises perfectionism based on six dimensions and defined it as a 'setting of extremely high standards for performance accompanied by overly critical self-evaluation'. Since its development, the Frost Multidimensional Perfectionism Scale (FMPS), has been used to understand perfectionism and its relationship with wellbeing. Perfectionistic strivings, or adaptive perfectionism, is linked to high levels of organisation, personal standards, and conscientiousness, promoting a

desire to succeed and achieve goals (Hamachek, 1978), and is associated with the 'personal standards' facet within the FMPS (Frost et al., 1990). Perfectionistic concerns, or maladaptive perfectionism, is proposed to be driven by a fear of failure, setting unrealistic standards, and displaying negative reactions to errors, such as concealment, self-criticism, and impaired decision-making (Frost et al., 1990; Hamachek, 1978). Perfectionistic concerns is represented by the concerns over mistakes (CM) and doubts about actions (D) dimensions of the FMPS. Stöber (1998) recognised these two subdimensions as a singular construct (CMD) using confirmatory factor analysis, which has been supported by others (Khawaja & Armstrong; 2005; Purdon et al., 1999).

Given the need for high quality patient care, high standards and error reduction, doctors who are concerned about making errors and cautious could be deemed to be safe and diligent practitioners. Doctors can work in an 'imperfect' environment, often with scarce resources and treating patients with complex conditions, where there is no 'perfect' clinical decision to be made. Taking this into consideration, excessive concerns over mistakes and doubts could be harmful for doctors and their professional practices. From a cognitive perspective, doctors high in perfectionistic concerns may perceive any unmet personal standard as a failure, resulting in self-criticism and maintaining the fear of failure and striving for perfection cycle (Shafran et al., 2002). The dimension has been linked to chronic guilt and doubt, all-or-nothing thinking, low self-esteem, obsessions (Myers & Gabbard, 2008) and workaholism (Tziner & Tanami, 2013). This could impact a doctor's ability to carry out duties (e.g., reluctance to delegate, micromanaging), harm peer relationships (Peters & King, 2012), promote defensive medicine or influence their team's environment (Shimazu & Schaufeli, 2009; Yanes, 2017). This study aims to explore if perfectionistic concerns are directly associated with the mental wellbeing in a sample of doctors.

Psychological Safety

Psychological safety is fast becoming a popular concept in relation to healthcare (NHS England, 2020; NHS Providers, 2020). This is perhaps due to an increasing recognition that blame culture may adversely affect patient safety or staff wellbeing (WHO, 2021). Psychological safety refers to how safe an individual perceives themselves to take interpersonal risks without fear of blame or retribution in a team context (Edmonson, 1999). These risks include speaking up, asking for support and reporting errors, which could be considered necessary for safe patient care. However, healthcare workers have reported being fearful of not being listened to or to be seen as 'causing trouble' (Edmondson, 2003). A BMA (2018) survey found that fifty percent of doctors were fearful of being wrongly blamed, perhaps not surprising due to the recent high-profile medico-legal cases of Dr Bawa-Garba and Dr Chris Day (BMA, 2021; GMC, 2018).

Doctors are required to make clinical decisions on a day-to-day basis, often with high-stakes and limited resources. Psychological safe working environments may share this accountability amongst teams, allowing for open communication, trust and a learning culture that not just reduces errors, but learns from those that have taken place. Medical errors are a known source of psychological harm for doctors (Seys et al., 2013), yet few researchers have explored how a team's culture in relation to errors, is related to their wellbeing. The lack of psychological safety was implicated in surgeon burnout in one qualitative study, though quantitative studies exploring this are needed. Interestingly, a study in medical students found no relationship between psychological safety and burnout (Zhou et al., 2021), contradicting studies in nurses (Ma et al., 2021; Vévoda et al., 2016), professional drivers (Silla & Gamero, 2018) and athletes (Fransen et al., 2020). Appelbaum et al's (2016) study found no difference in psychological safety based on gender or experience-level. Some studies have reported that older staff are more likely to report a reduced sense of psychological safety (Giordano et al.,

2018; Buljac-Samardžić et al., 2021), perhaps due to the level of responsibility that comes with greater age or changes in medical culture.

This study aims to explore if psychological safety is associated with the mental wellbeing of doctors. The construct will be viewed at an individual-level (an individual perception of team psychological safety), though it is likely that team-level factors will contribute to these appraisals (e.g. communication, trust, leadership) (Ito et al., 2022).

Job-Demands Resource Model

The JD-R model is a flexible descriptive model of occupational wellbeing and performance that is continually being revised (Demerouti et al., 2001). This balance model posits that job characteristics are either a resource or a demand that can interact and influence wellbeing and other outcomes (Kaiser at al., 2020). Job demands are aspects of the job that require sustained effort associated with certain physical and psychological costs (Schaufeli & Taris, 2014). Job resources are aspects of the job that concern achieving goals, reducing job demands and costs, and stimulating personal growth and development (Demerouti et al., 2001).

Personal Characteristics

Until recently, personality had been relatively overlooked in the JD-R, though recent studies have hypothesised their role (Bakker & Demerouti, 2017). Personal resources are resilience-associated aspects of the self that add to an individual's perception of their ability to control and influence their environment (Hobfoll et al., 2003) (e.g. self-compassion) (Bakker & Demerouti, 2017). Personal demands are defined as *"the requirements that individuals set for their own performance and behaviour that force them to invest effort in their work and are therefore associated with physical and psychological costs"* (Barbier et al., 2013, p.715), with traits such as perfectionism and emotional instability being implicated (Prieto et al., 2018). How personal resources and demands interact within the model is

debated, which various mechanisms being proposed (Bakker & Demerouti, 2017; Bakker & de Vries, 2021; Schaufeli & Taris, 2014). This study will consider perfectionistic concerns as a personal demand.

Team Climate / Culture

Another overlooked aspect of the JD-R model is the role of organisational and team culture. How the values, rules and beliefs shared within a team influence employee wellbeing has been underexplored compared to other factors. Team atmosphere, social support climate and psychosocial safety climate have all been implicated as important factors (Albrecht et al., 2012; Loh et al., 2018; Xanthopoulou et al., 2009), though how they are conceptualised within the JD-R taxonomy is debated. Some have argued that aspects of team culture are job resources at the team-level (Meneghel et al., 2016), whereas others have hypothesised that team climate is an antecedent to job resources (Bakker & de Vries, 2021; Nielsen et al, 2011). Team culture could also moderate job resources, by helping supply, channel and funnel resources to individuals and acting as a safety signal that using such resources is permitted (Loh et al., 2018). In this study, psychological safety will be viewed as a job resource, and a facet of team culture (Bakker at al., 2011).

Perfectionistic Concerns and Psychological Safety

How personality and team climate/culture interact in relation to wellbeing is unclear, specifically in relation to the JD-R model. Bolger & Zuckerman (1995) hypothesised various interactions between an employee's personality and their work environment. For example, work characteristics could influence the personality of team members. Alternatively, employee's personality may alter the perception and nature of the work. Psychological safety has been found to mediate the relationships between organisational factors (e.g. team structure) and team learning (Edmondson, 1999). Edmondson & Lei (2014) highlighted

psychological safety's moderating properties on learning and performance outcomes. However, research exploring its role interacting with wellbeing is lacking.

A psychologically unsafe workplace could precede perfectionistic traits in its employees, in that employees could learn to be perfectionistic based on social learning processes (Bandura, 1986). In this way, psychosocial climate and social support have previously been found to mediate the relationship between perfectionism and psychological distress (Gazica et al., 2021; Sherry et al., 2008). However, doctors frequently move between teams and hospitals as often as every four months. Therefore, it may be unlikely that their perceived team psychological safety could directly influence what is considered a relatively stable personality trait in a short period (Ståhlberg et al., 2021). It could be argued that perfectionism exacerbates reduced wellbeing when the team environment is perceived to be psychologically unsafe. Given the likely long-standing trait aspect of perfectionism however, it may be more likely that psychological safety intensifies the relationship between perfectionistic concerns and mental wellbeing. A highly perfectionistic doctor may experience less psychological harm if their team is perceived to be safe to voice concerns, ask for support and where errors are treated with openness and as a learning experience. Comparatively, the internal fear of making a mistake may be more likely to be related to psychological distress and associated experiences (self-criticism, low self-esteem, rumination) if their environment is one perpetuates the threat. As a secondary aim, this study will explore if psychological safety moderates the relationship between perfectionistic concerns and mental wellbeing.

Rationale

For clinical psychologists to work to improve the wellbeing of doctors at an individual and team-based level, understanding factors associated with psychological health is warranted. This study aims to explore two factors that are relevant, yet under-researched in

doctors. Though not explicitly testing the JD-R model, this study hopes to add to the understanding of personal characteristics and aspects of team culture that may interact with mental wellbeing. Thus the JD-R model is the contextual framework for the present study.

Aims and Hypotheses

This study primarily aims to explore the relationship between a personal demand (perfectionistic concerns), an aspect of team culture (psychological safety) and mental wellbeing of doctors A secondary aim is to explore if psychological safety plays a moderating role in the relationship between perfectionism and wellbeing. Occupational and demographic factors will be explored for group differences, which could identify at-risk groups in need of extra support.

The following hypotheses will be tested:

1. High perfectionistic concerns will be associated with reduced psychological wellbeing.

2. High psychological safety will be associated with increased psychological wellbeing.

3. High perfectionistic concerns and low psychological safety will predict reduced psychological wellbeing.

4. Psychological safety will moderate the relationship between perfectionistic concerns and mental wellbeing in doctors, in that high psychological safety will weaken the relationship.

Method

Design

This was a cross-sectional, observational study. Quantitative data were collected by means of an online survey consisting of self-report questionnaires. The main statistical method used to analyse these data was multiple linear regression, used to assess if the

independent variables significantly predicted the outcome variable. To assess difference between groups, based on demographics and occupational factors, parametric and non-parametric analysis of variance tests were used. Finally, the secondary aim was investigated using moderation analysis.

Participants

Doctors with a license to practise (including a pre-registration license) who were currently practising medicine and had patient contact were eligible.

A priori power calculations were conducted to determine the sample size required to detect a small effect size of 0.15 for eight predictor variables for a multiple linear regression. Using G*power, an estimated 109 participants were required to achieve statistical power at 80% ($p = 0.05$) with six predictor variables entered into the regression analysis. Therefore, the sample of 121 participants was adequate to detect a small effect size, as per Vevoda's (2016) study in nurses. To investigate the secondary aim using moderation analysis, a sample size of 395 participants would be needed to detect a small effect size at 80% statistical power.

Participants were recruited from varying specialties, with vaying levels of experience. Participants were initially recruited via advertisement on two forums: Doctors.net and Junior Doctors UK forum on Reddit. Following this, five doctor contacts from varying specialties, who had agreed to assist in the recruitment process, distributed the advertisement to potential participants via non-NHS email accounts. Participants were asked to confirm that they met the inclusion criteria for the study, namely that they: were a currently practising, licensed doctor, who had patient contact. All participants completed the survey online.

Procedure

In the development of the study, consultation and feedback was sought from practising doctor acquaintances on the layout, content, and wording of the survey, excluding the standardised measures. Once the survey had been developed and ethical approval had

been granted, the study was advertised on online forums. Following four weeks, this recruitment strategy had yielded approximately three-quarters of the necessary participants. The study was then advertised via practising doctors, using non-NHS emails, as per the recruitment strategy. Data collection was active between June 2021 and September 2021. Potential participants were presented with information regarding the study and a hyperlink to the online survey (via the web-based survey tool Qualtrics). The first webpage of the survey provided further information on the study, including contact information of the Principal Researcher.

Materials

The online survey comprised: a participant information sheet; a question to confirm participation and informed consent; three questions to confirm eligibility to participate; six questions relating to demographic and occupational information; a series of validated questionnaire measures; and a de-brief sheet. The demographic and occupational information questionnaire asked about age, gender, job role, years in job role, training specialty and current placement specialty. Age, gender, job role and years in current job role were all included as potential predictor variables in the regression model, depending on statistical significance.

Demographic and Occupational questions

Respondents were asked to answer some sociodemographic questions including their age and gender. To explore the seniority of the respondents, they were asked what their current job role was (e.g. Foundation year 1 doctor, Consultant) and how many years they had been in that role. Job role was then ranked based on seniority, to be included in the regression analyses based on the BMA's (2017) outline of hierarchy of seniority. Specialty was recorded for both current work placement and for track for those in-training.

Validated measures

Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS). The WEMWBS (Tennant et al., 2007) followed the demographic and occupation questions. The scale aims to assess subjective well-being and psychological functioning in which all items are worded positively and address aspects of positive mental health. The scale is comprised of 14-items, answered on a 1 to 5 Likert scale (None of the time to All of the time), relating to the state of their mental wellbeing in the last two weeks. The minimum score of 14 represents poor mental wellbeing and the maximum score of 70 represents positive mental wellbeing. The WEMWBS has been widely validated in adult populations internationally (Warwick Medical School, 2020). Tennant et al (2007) report the internal consistency to be high (Cronbach's alpha = 0.91).

Psychological Safety Scale. This 7-item scale was developed by Edmondson (Edmondson, 1999). The scale aims to assess the shared belief that a team is safe for interpersonal risk taking. Each question is scored from 1 to 7 (Strongly Agree to Strongly Disagree), with questions 1, 3 and 5 reverse-scored. The maximum score of 49 indicates low psychological safety and the minimum score of 7 represents a psychological safe team/workplace. The scale shows good internal consistency (Cronbach's alpha = 0.82). and has been validated across different populations (Ramalho & Porto, 2021).

Concern over Mistakes and Doubts (CMD). This 14-item sub-scale is from the updated Frost Multidimensional Perfectionism Scale (FMPS) (Frost et al., 1990; Stöber, 1998). Initially CMD represented two dimensions of perfectionism, out of six (Frost et al., 1990), however, Stöber's (1998) analysis found that they represented a unified factor in a four-dimensional model. Due to conflicting evidence on whether CMD represents one or two dimensions, all analyses were repeated with CM and D separately. The internal consistency of CMD is good, with a Cronbach's alpha score of 0.88 (Stöber, 1998). The FMPS has been validated in a wide range of studies (Bastiani et al., 1995; Frost & Marten, 1990; Rhéaume et

al., 1995), the questions are all scored on a Likert scale of 1 to 5 (Strongly Disagree to Strongly Agree), with a total score range of 13 to 65. Higher scores reflect more perfectionistic traits.

Ethical Considerations

Ethical approval was granted by the Lancaster University Faculty of Health and Medicine Research Ethics Committee (reference: FHMREC 20034). A letter confirming ethical approval is attached in Section Four: Ethics and Appendices.

Efforts were made to ensure that informed consent was given by every participant. Following the participant information sheet, participants were asked to confirm that they consented for their data to be used in the research. Participants were not able to complete the survey without consenting. The potential for individuals to experience distress due to participation was considered and details of relevant organisations and resources were included on the participation information sheet and de-brief. All data were submitted anonymously and stored securely on password protected software.

Data Analysis

The data were analysed using the software IBM SPSS Statistics (Version 28.0). There were no participants with missing data. Total and mean scores were calculated for the questionnaire measures as necessary. For all analyses, a p-value of less than .05 was considered statistically significant. Cronbach's alphas for each of the questionnaire measures were calculated to assess their internal consistency for the sample. The data were visually and statistically inspected for outliers using a series of box plots and z-score calculations, with data points more than 3.29 standard deviations from the mean considered outliers (Field, 2017) (Appendix A). Two outliers were identified regarding mental wellbeing scores.

A Mann-Whitney U test was used to determine if there was a difference between the core variables based on gender, due to outliers being present. The heterogeneity of the sample

based on specialty made it difficult to assess for any differences of mental wellbeing,

psychological safety or CMD between groups, due to the small numbers within each sub-

group. Kruskall-Wallis tests were undertaken and analysis is reported in Appendix C.

The data were assessed as to whether it met the required assumptions for a multiple

regression. To assess the strength and direction of relationships between demographic,

predictor, and outcome variables, Pearson's correlation coefficients were calculated.

Variables that showed no statistically significant relationship to mental wellbeing ($p > .05$)

were subsequently not included in the regression analysis.

To assess independence of observations, the Durbin-Watson score was calculated and

compared to critical values, with a statistic between 1.651 and 2.349 being valid (Ewans,

2014). Scatterplots and partial regression plots were produced to observe for linear

relationships and homoscedasticity. Any predictor variables with correlation coefficients less

than 0.80 and tolerance value under 0.10 were considered to meet the multicollinearity

assumption required for the analysis. Unusual points and outliers were assessed for, with data

points more than 3.29 standard deviations from the mean considered outliers (Field, 2017). A

decision was made to keep the outliers (from mental wellbeing scores) within the analysis, as

they had minimal effect on the resulting regression analysis (Appendix B) and due to the

robustness of the statistical method. Cook's distance and leverage points were considered

acceptable if over 1.0 (Cook & Weisberg, 1982) and under 0.74 (Stevens, 2009),

respectively. The Q:Q plot was assessed for normality.

A multiple linear regression analysis was conducted on the statistically significant

independent variables to observe if they predicted mental wellbeing, along with any other

predictor variables. Finally, a moderator analysis was conducted using Hayes PROCESS

Tool Version 4.0 (Hayes, 2018) to investigate whether psychological safety moderated the

relationship between CMD and mental wellbeing. Predictor variables were centred to

improve the interpretability of the results by providing meaningful zero points (Toothaker et al., 1994).

Results

Demographic and Occupational Characteristics

A total of 121 doctors met the inclusion criteria and completed the survey with 81 (66.9%) participants identifying as female, 38 (31.4%) as male, and two choosing not to declare their gender. Their ages ranged from 24 to 71 years, with a mean age of 35.63 years ($SD = 9.70$).

There was a wide range in seniority among the sample, with 34% representing GPs or consultants, 15% representing foundation doctors and 17% each representing senior house officers and registrars. The mean number of years that participants were in their current role was 6.7 years ($SD = 7.7$).

Forty-five participants were in speciality training, within varying fields. There was a large variation in the speciality of the participants' current work placement.

The demographic and clinical characteristics of the sample which were measured on a continuous scale are summarised in Table 1, and the categorical variables are presented in Table 2.

[INSERT TABLE 1 ABOUT HERE]

[INSERT TABLE 2 ABOUT HERE]

Descriptive Statistics and Internal Consistency for Standardised Measures

Table 1 shows the descriptive statistics and Cronbach's alpha for the sample on each of the standardised measures: mental wellbeing, psychological safety and CMD. Of note, the mean mental wellbeing of the sample ($M = 43.98$, $SD = 9.66$) is below the norms of those in England ($M = 51.60$, $SD = 8.70$) (University of Warwick, 2011). In addition, CMD scores in

the sample ($M = 38.07$, $SD = 9.49$) were higher than those in a validated sample of university students ($M = 30.58$, $SD = 9.31$ (Stöber, 1998).

Mental wellbeing demonstrated excellent internal consistency (Cronbach's alpha = 0.93). Both psychological safety and CMD showed good internal consistency with Cronbach's alpha scores of 0.86 and 0.89, respectively.

Group Differences based on Demographic and Occupational Factors

Mann-Whitney U tests were undertaken to explore if the variables of interest varied based on gender. Mental wellbeing scores did not vary between males ($Mdn = 42.5$) and females ($Mdn = 44.0$), $U = 1558.50$, $z = 0.111$, $p = .911$. Analysis revealed no difference in CMD scores between males ($Mdn = 22$) and females ($Mdn = 23$), $U = 1606$, $z = 0.382$, $p = .702$, or psychological safety: males ($Mdn = 35$), females ($Mdn = 39$), $U = 1739.50$, $z = 1.144$, $p = .253$. Kruskal-Wallis tests revealed no statistically significant difference of the variables of interest based on training or placement specialty, though the heterogeneity of subgroups made this analysis difficult. Full analysis results can be found in Appendix C.

Correlation Analyses

A correlation matrix (using Pearson's r correlation coefficient) is displayed in Table 3.

[INSERT TABLE 3 ABOUT HERE]

Demographic and Occupational Variables

Age was strongly positively correlated with job role ($r = - .71$, $p < .001$), and years in job role ($r = .84$, $p < .001$). Job role was also moderately positively correlated with years in job role ($r = .62$, $p < .001$).

Demographic and Occupational Variables and Mental Wellbeing, Psychological Safety and CMD

There was no significant correlation between any of the demographic or occupational

variables and mental wellbeing or psychological safety. There was a very weak, negative

relationship between CMD and age ($r = -.16$, $p < 0.05$), and CMD and years in job role ($r = -$

$.23$, $p < .01$).

Mental Wellbeing, Psychological Safety and CMD

Moderate negative relationships were observed between mental wellbeing and

psychological safety ($r = -.53$, $p < .001$), and CMD ($r = -.56$, $p < .001$). A weak, positive

relationship existed between psychological safety and CMD ($r = .32$, $p < .001$).

Regression Analyses

A multiple regression was used to determine the extent to which psychological safety

and CMD were predictive of mental wellbeing. The other predictor variables were omitted

due to the lack of a significant relationship ($p > .05$) with the questionnaire measures.

Analyses and observations of plots revealed that the data met the assumptions for a multiple

regression, bar the outliers in mental wellbeing scores. For full statistics see Appendix A.

The multiple regression model statistically significantly predicted mental wellbeing

$F(2, 118) = 47.381$, $p < .0005$, adjusted $R^2 = .445$. According to Cohen (1988) this shows a

moderate effect size. Both variables added statistically significantly to the prediction, $p <$

$.001$. Regression coefficients and standard errors can be found in Table 4.

<div align="center">[INSERT TABLE 4 ABOUT HERE]</div>

Moderation Analyses

Psychological safety did not significantly moderate the relationship between CMD

and mental wellbeing ($F(1, 117] = 33.132$, $p = .085$, R^2 Change $= .014$, $\beta = -.558$, $t = -1.736$)

(Appendix D).

<div align="center">**Discussion**</div>

This study aimed to explore if perfectionistic concerns, measured as CMD, and psychological safety were each associated with the mental wellbeing of doctors, using the JD-R taxonomy as a guiding framework. A secondary aim was to explore if psychological safety played a moderating role in the relationship between perfectionism and psychological health. By doing so, we hoped to add to the understanding of doctors' mental health and the impact of personality and team culture. High perfectionistic concerns and low psychological safety predicted poorer mental wellbeing, as hypothesised, accounting for 45.5% of the variance. Psychological safety was not found to moderate the relationship between perfectionism and wellbeing, though the lack of statistical power to detect such an effect should be noted.

Similar to other studies researching doctors, this study had twice as many female respondents as males. Although female doctors are increasing, our sample is not representative of recent demographics of the medical profession, reported as 48% (female) to 52% (male) in 2019 (GMC, 2019). Sixty nine percent of this sample were under the age of 40, higher than the estimated 42.6% reported by the GMC in 2019, reflecting the younger age of our sample. Recruiting initially via online blogs may have, at least in part, accounted for this phenomenon as they be viewed more by younger professionals. This may also have impacted upon the gender bias, as older doctors are more likely to be male. However, it is worth noting, despite these limitations, no gender or age differences were observed in the variables of concern.. Doctors from a broad range of specialties (both in-training and current placement) were recruited, varying in clinical experience (FY1s to consultants) and time in their current role (0 - 38 years).

The mean wellbeing score for the sample (43.98, $SD = 9.66$) was somewhat lower than other populations (University of Warwick, 2011), including studies in Swiss (52.40, $SD = 7.20$) and Pakistani doctors (52.08, $SD = 8.26$) (Lindemann et al., 2019; Siddiqui et al., 2021). Although not the purpose of this study, this discrepancy in prevalence is notable and

may be reflective of the physical and psychological toll of working through a pandemic. However, the limitations of the recruitment methodology and gender bias make it difficult to draw firm conclusions from the findings.

Of more interest, is the higher perfectionistic concern scores found in this population compared to those in medical students. Three studies reported mean CM scores between 18.85 and 20.63, compared to 27.14 in our sample (Eley et al., 2017; Eley et al., 2020; Leung et al., 2019), however they did not report mean CMD scores. This suggests that perfectionistic concerns develop during medical training or as a result of clinical experience, as previously reported (Cope et al., 2017). Concerns have been raised surrounding how aspects of medical education (pre-and post-qualification) may cultivate perfectionism, such as fostering a competitive learning environment via consistent evaluation and ranking against peers. 'Pimping' is a frequently used technique that involves learners being asked a series of questions, often in public, to determine their knowledge (McCarthy & McEvoy, 2015), criticised for triggering shame and perpetuating perfectionistic characteristics (Thomas & Bigatti, 2020). Alternatively, the jump from student to clinician may play a part due the increase in responsibility which is known to be a source of stress in newly qualified doctors (Burridge et al., 2020). Psychological safety scores averaged at 23.21, indicating that the sample perceived their workplace to be psychologically safe, if the midpoint score of 27.5 is to be taken as neither psychologically safe or unsafe, and lower scores reflect safety. No differences were observed based on specialty, though the small numbers of participants in each group questions the generalisability of these findings.

As predicted, both perfectionistic concerns and psychological safety were found to be significantly associated with mental wellbeing in the expected direction and supporting previous studies implicating them as risk factors. Due to the observational nature of this study, causality cannot be presumed, and we would expect it to be a two-way relationship.

Doctors with high perfectionistic concerns may self-critically ruminate over their performance and subsequently prioritise work and neglect other aspects of their life (e.g., relationships, exercise) that keep them well. Alternatively, individuals struggling with their mental wellbeing may be more pre-occupied on the negative aspects of their job, becoming more fearful of making mistakes and catastrophising the outcomes. Similarly, such individuals may perceive their team support to be lacking and fear retribution. In times of stress, doctors have been found to use avoidant and emotion-focused coping skills, which may contribute to a feeling of distance and isolation from their team (Deary et al., 1996; Tattersall et al., 1999). Together, perfectionistic concerns and psychological safety predicted 45.5% of the variance in mental wellbeing, though their correlation to one another was lower than expected, although still reaching statistical significance. This was surprising due to commonality around mistakes and blame. Though these findings support the notion that perfectionistic concerns and psychological safety could be targeted for intervention to improve wellbeing, it should be noted that extreme levels could be detrimental. Doctors who are unconcerned about making errors or who work in an excessively psychologically safe environment may experience their professional practice and learning environment to suffer. This suggests that a balance is needed, and optimal levels that maintain wellbeing but do not detract from professional practice and development should be sought.

The final hypothesis in this study predicted that psychological safety would act as a buffer on the relationship between perfectionistic concerns and wellbeing. This hypothesis was unsupported, yet this could be due to a type-II error due to the small sample size. Nevertheless, this study has identified two variables that have previously been under-researched and offer a potential avenue for clinical psychologists to explore further and potentially target. Although not specifically testing the JD-R, the findings of this study,

highlight that both personality and aspects of team culture are important factors that need to be established in the occupational wellbeing model.

Clinical and Organisational Implications

As a response to the pandemic, the NHS has established many services to support staff wellbeing, often with clinical psychologists at the helm. The findings from this study highlight several areas that could be targeted in the quest to improve doctors' psychological wellbeing, including psychological interventions, medical education, and team/organisational change. It is worth noting that perfectionistic characteristics offer a host of benefits to the medical profession, and the following suggestions are targeted at reducing the negative consequences of perfectionistic concerns, while maintaining the high standards required for the job. Similarly, a balance is required regarding psychological safety in that autonomy and accountability are important factors in the development of competency in medical education.

Hu et al (2019) proposed screening medics for perfectionistic cognitions and offering tailored support to those at-risk. Targeting perfectionistic concerns in psychological therapy may be more beneficial than disorder-specific interventions (Limburg et al., 2017). A small case-series found cognitive behavioural therapy (CBT) to be effective in reducing unhealthy perfectionism and reducing psychological distress in medical students (Chand et al., 2017) via psychoeducation, cognitive restructuring, and stress management techniques. Similarly, Lloyd et al.'s (2015) meta-analysis found CBT to be effective in reducing concern over mistakes and significantly improving symptoms of depression and anxiety, with medium to large pooled-effect sizes. Five of the eight included studies were randomised controlled trials and they found no variation in efficacy depending on therapy intensity (e.g., higher number of sessions, individual therapy). This, along with its utility in group settings (Steele et al., 2013) and as a web-based therapy (Radhu et al., 2012) makes it a potential cost-effective solution for healthcare systems to support time-constrained doctors. Alternatively, acceptance

and commitment therapy and mindfulness-based cognitive therapy have been found effective in treating perfectionism to a similar degree as CBT in randomised controlled trials (James & Rimes, 2017; Ong et al., 2019).

Self-compassion has emerged as a protective factor in the relationship between wellbeing and perfectionism (Abdollahi et al., 2020; Hiçdurmaz, 2017; Linnett & Kibowski, 2020; Richardson et al., 2020; Tobin & Dunkley, 2021). By replacing harsh self-criticism with tolerance and kindness, self-compassion could be a key skill to cultivate in the medical profession (Abdollahi et al., 2020). Randomised controlled trials have shown self-compassion interventions to be effective in reducing self-criticism (Wakelin et al., 2022) and maladaptive perfectionism (Woodfin et al., 2021). Although these offer potential inerventions to support doctors, they may be futile if the target population will not be able to access them. Wellbeing initiatives need to consider and adapt for occupational barriers that prevent engagement (e.g., staff cover, stigma) and work to challenge organisational cultures that may reinforce unhealthy perfectionistic attitudes.

Medical schools could also play a part in educating students about harmful perfectionistic cognitions and teaching appropriate coping skills. This was one of several curriculum changes adopted by a US medical school, with positive outcomes (Slavin, 2019). Currently, the GMC requires medical schools to teach 'resilience', however this has been met with some criticism for being stigmatising and disregarding wider organisational issues (Oliver, 2017). Including psychoeducation on personality qualities that may predispose doctors to distress, or that may be protective, could improve their ability to recognise early warning signs, normalise the experience and make them feel valued by the system.

Although not the sole purpose, this study found a higher level of perfectionistic concerns (measured by CM), than in medical student populations. This suggests that the characteristic may develop or be learnt as a response to clinical or educational experiences.

Some authors call for medical education to change its approach, by creating a culture that transforms failure into a teaching tool and reduces unhealthy competition (Seritan & Mehta, 2015; Slavin, 2019), as opposed to using teaching methods such as 'pimping' that provokes fear and shame (McCarthy & McEvoy, 2015). Creating openness and transparency about mistakes could also be a way of reducing harmful perfectionistic cognitions (Schmitt et al., 2021). 'Near misses' sessions, where junior doctors meet regularly to discuss and reflect on errors, have been found effective in creating a 'non-blaming' culture (Millwood, 2014).

These proposals go hand in hand with cultivating a psychological safe environment, which was found in this study to be associated with positive wellbeing. Although the importance of psychological safety is established, how to implement it is less so. Most recommendations are aimed at how leaders can create a psychological safe environment, such as being accessible, thankful for input from colleagues, whilst modelling fallibility and providing fair accountability (Edmondson, n.d.). Others have highlighted the importance of collective and compassionate leadership in fostering empathic and open relationships between team members (West, 2021). In practice, trusts or educational systems could provide training for clinical leaders on how do this, and on how to support their staff's wellbeing or tendencies that may predispose them (e.g., perfectionistic concerns, workaholism).

Promoting peer support is also likely to cultivate psychological safety and positive team outcomes (Anjara et al., 2021; Newman et al., 2017; O'Donovan & McAuliffe, 2020a). Building relationships with colleagues in medicine can be difficult to due to constant rotation between workplaces. Some doctors suggested allocating time in meetings to discuss personal experiences and building interpersonal relationships may improve the psychological safety within their team (O'Donovan & McAuliffe, 2020b). Promoting peer supervision and reflective practice groups could also build a sense of trust and openness between colleagues. At an organisation level, Schwartz rounds have been developed as a space to spark

conversations about the emotional impact of the work and have been linked with positive

outcomes, such as increasing openness, resilience, teamwork and compassion (to self and

others) (Maben et al., 2018).

Limitations

The observational nature of this study prevents any causal relationships from being

inferred. In addition, participants were self-selected and therefore may have a particular

interest in the mental wellbeing of doctors. This means that the sample may not be

representative of the mental health of the profession in general. Moreover, the 'healthy

worker' effect may have played a part. To be included in this study, doctors had to be

currently practising and therefore would exclude doctors that were off work due to sickness.

However, doctors who may be struggling may be less likely to take part in a voluntary study

due to other demands (Gander et al., 2007; Taris & Schreurs, 2007). In addition, doctors are

known to be reluctant to identify as struggling and therefore may overreport wellbeing

(Hayes et al., 2017).

Another limitation of the study was the reliance on online blogs to recruit. Although

helpful in recruiting from a variety of specialties, this method may have led to an over-

representation of younger doctors, who may be more likely to use such platforms. Similarly,

the doctor contacts who assisted in the advertisement of the study in phase two of

recruitment, were all between the age of 25-35. Although unknown, they may have been

more likely to share the study with peers of a similar age or training level.

Given this study was carried out in the midst of the COVID-19 pandemic, it is unclear

what role this would have had on data collected. Survey responses were collected between

August and September 2021, at a time when restrictions were lifted, and hospitals had

relatively low levels of COVID-19 patients. How this may have affected the results is

uncertain and is undoubtedly complex. For example, at a time when the impact of COVID-19

on life was comparatively lower, it could be predicted that wellbeing would be better.

However, when relating this to a post-traumatic event, this may be the period where the

reality of what has occurred sets in, and symptoms may start to present.

This study also had demographic limitations. As mentioned, our sample had a strong

female bias, that is not representative of doctors in the UK. This may be due to the relatively

younger age of our sample, as older doctors tend to be male. As female doctors have been

found to be more at risk of mental health issues (Imo, 2017) this may limit the

generalisability of findings, although age and gender were not found to be associated with the

variables of concern. Also of note, doctors were not asked what country they worked in,

although results have been compared to demographics of the UK medical profession.

Recruiting via UK doctor blogs and through UK-based doctors would predict UK-based

participants, however this cannot be confirmed. Ethnicity was not explored in the study,

which is a weakness due to its previous links with both perfectionism and psychological

safety (Derickson et al., 2015; Stoeber, 2018).

The survey design and chosen measurement scales could also be criticised.

Firstly, a general mental wellbeing measure was used intentionally to deviate from the

predominant focus on burnout and work-related stress and to gain a more encompassing view

of psychological health. However, this didn't account for the broad range of factors (in-work

and out of-work) that could impact upon it. Another concern was merging the CM and D

subscales of the FMPS, in line with Stober's (1998) recommendations, as some studies have

found them to be separate factors (Abiri et al., 2019; Stallman & Hurst, 2010). Our analysis

revealed no difference in results, when entering them as a singular or separate factors. In

addition, by collecting data from individuals, rather than teams, psychological safety in this

study was measured at an individual level, reflecting perceptions that may not accurately

represent the team culture. However, these appraisals are likely to be influenced by various team characteristics, such as leadership, communication, and policies.

Finally, though not the primary aim of this study, we attempted to explore how personality and aspects of team culture interacted with doctors' wellbeing. Though not explicitly testing the JD-R model, we used its nomenclature in order to highlight their importance and to explore if team culture acted as a buffer to personal demands. However, the lack of statistical power made the latter aim unobtainable. In addition, it is unclear whether psychological safety would be considered a job resource by other researchers in the field, as this remains a point of debate (Bakker & de Vries, 2021; Meneghel et al., 2016; Nielsen et al, 2011). Our measurement of psychological safety at an individual-level may also not accurately reflect the team climate participants are working within, though this criticism could be targeted at other job resources frequently studied (e.g. social support in Xanthopoulou et al, 2007). Lastly, the JD-R model itself is purely a descriptive model that offers no unique psychological explanations, relying on other theories such as conservation of resources theory (Hobfoll, 1989), social cognitive theory (Bandura, 1986) and self-determination theory (Deci & Ryan, 2014). Although, cognitive theories of perfectionism were drawn upon in this paper, perhaps this would have been a more appropriate model to base the study upon, rather than an incomplete JD-R model.

Future Research

Firstly, future research could extend upon some of the flaws of this study, by exploring the role of ethnicity on the variables of interest. This is an important topic as racism, bullying and microaggressions are being reported by doctors (BBC, 2022). To fully test and understand the role of team culture and personality within the JD-R, future studies should do so with larger sample sizes, exploring their relationship with job demands, job resources, personality resources (e.g. self-compassion) and other occupation-specific

psychological outcomes (e.g. burnout). This could also help determine whether psychological safety should be viewed as a job resource, or another resource-related factor. Though we hypothesised that psychological safety would act in a moderating capacity, alternative relationships are also possible and therefore structural equation modelling would be preferable. Longitudinal study designs could help determine if perfectionism and psychological safety vary through career progression, potentially highlighting vulnerable times in their careers.

Lastly, this paper outlined clinical, organisational, and educational recommendations based on the findings. Testing the efficacy of such interventions and initiatives in medical populations is necessary to support their inclusion in organisational structures. Randomised controlled trials of such interventions could also support any hypotheses relating to whether psychological safety or perfectionism are causative factors in psychological wellbeing, adding further understanding to occupational wellbeing and the JD-R model.

Conclusion

This study found that high psychological safety and low perfectionistic concerns predicted better psychological health in a sample of doctors, accounting for 44.5% of the variance. Further research is needed to explore how these factors interact with other important variables to influence the wellbeing of a professional group known to be at risk of psychological distress. The novel findings of this paper offer several potential avenues for targeted initiatives to combat this and improve the mental health of doctors.

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Tables

Table 1

Descriptive statistics of age, years working in current role, mental wellbeing, psychological

safety and concerns over mistakes and doubts about actions

	Mean (*SD*)	Range	Cronbach's alpha
Age (in years)	35.63 (9.70)	24 - 71	
Time in current role (in years)	6.72 (7.68)	0 - 28	
Mental wellbeing	43.98 (9.66)	14 – 68	0.93
Psychological safety	23.21 (8.68)	7 – 47	0.86
CMD	38.07 (9.49)	17 – 56	0.89

Note. All values rounded to two decimal places. *SD* = Standard deviation, CMD = concerns

over mistakes and doubts about actions

Table 2

Frequencies and percentages of demographic and occupational factors

Variable	Frequency	Percentage
Gender:		
Female	81	66.9
Male	38	31.4
Prefer not to disclose	2	1.7
Job role:		
FY1	10	8.3
FY2	8	6.6
Clinical Fellow	7	5.8
Trainee SHO	16	13.2
Locum SHO	5	4.1
GP Trainee	10	8.3
Trainee Registrar	19	15.7
Locum Registrar	1	0.8
Specialty and Associates Specialists	4	3.3
GP	12	9.9
Consultant	29	24.0
Specialty of current placement:		
Anaesthetics	7	5.79
Emergency Medicine	20	16.53
General Practice	14	11.57
Intensive Care Medicine	4	3.31
Medicine		
Acute Internal Medicine	5	4.13
Cardiology	2	1.65
Dermatology	1	0.83
Endocrinology & Diabetes	1	0.83
Gastroenterology	2	1.65
General (Internal) Medicine	2	1.65
Geriatric Medicine	3	2.48
Oncology	1	0.83

Palliative Care	2	1.65
Renal Medicine	2	1.65
Respiratory Medicine	3	2.48
Obstetrics & Gynaecology	5	4.13
Occupational Medicine	2	1.65
Other	4	3.31
Paediatrics	7	5.79
Psychiatry	16	13.22
Public Health	1	0.83
Radiology	1	0.83
Sexual Health	1	0.83
Surgery	15	12.40
Speciality of training track: [a]		
Acute Internal Medicine	1	2.2
Anaesthetics	3	6.7
Emergency Medicine	8	17.8
General Practice	13	28.9
Obstetrics & Gynaecology	2	4.4
Paediatrics	4	8.9
Psychiatry	8	17.8
Public Health	1	2.2
Surgery	5	11.1

Note. Percentages rounded to 2 decimal places.

[a] Reflects the number and percentage of participants who are in-training (GP Trainees,

Trainee SHOs and Trainee Registrars), $n = 45$

Table 3

Correlations between age, job role, years in job role, mental wellbeing, psychological safety

and concern over mistakes and doubts about actions

	1	2	3	4	5	6
1. Age	-					
2. Job role [a]	.71**	-				
3. Years in job role	.84**	.62**	-			
4. Mental wellbeing	.05	.11	.15	-		
5. PS	.04	- .14	- .00	- .53**	-	
6. CMD	- .16*	- .15	- .23*	- .56**	.32**	-

Note. Percentages rounded to 2 decimal places, CMD = concerns over mistakes and doubts

about actions, PS = psychological safety

[a] *Each job role was given a value of 0 – 10 based on seniority (FY1 – consultant)*

* p < .05, ** p < .001

Table 4

Multiple regression results for mental wellbeing

Mental wellbeing	*B*	95% CI for *B*		*SE B*	β	R^2	ΔR^2
		LL	*UL*				
Model						.45	.44
Constant	70.82**	65.06	76.59	2.909			
PS	- .434**	- .593	- .274	.080	- .390**		
CMD	- .441**	- .586	- .295	.074	- .433**		

Note: Dependent variable = mental wellbeing, predictor variables = psychological safety (PS)

& CMD (concern over mistakes and doubts about actions)

Appendix A

Descriptive and figures testing of assumptions to be appropriate for multiple regression

analyses

Table A1

Table of distribution statistics of mental wellbeing, psychological safety and CMD

	Mental wellbeing	Psychological safety	CMD
Mean	43.98	23.21	38.07
Median	44.00	23.00	38.00
Standard deviation	9.67	8.69	9.49
Skewness	- 0.29	0.52	- 0.05
Std. Error of Skewness	0.22	0.22	0.22
Kurtosis	0.73	- 0.31	- 0.80
Std. Error of Kurtosis	0.44	0.44	0.44
Range	54	40	39

Note: CMD = concern over mistakes and concern about actions
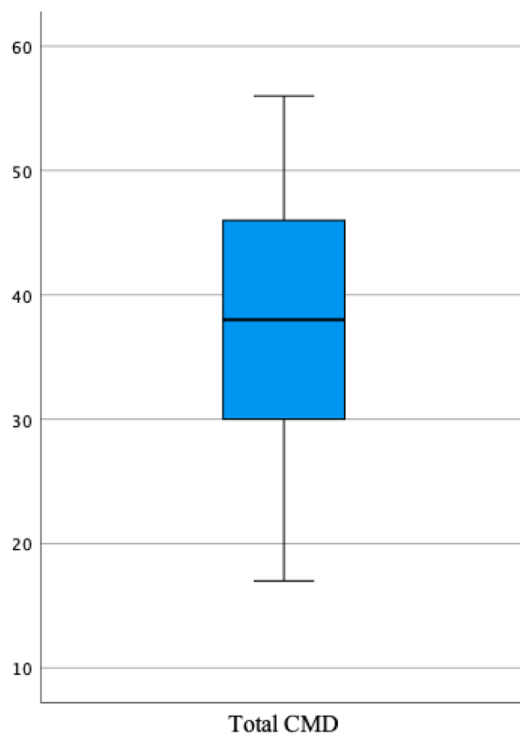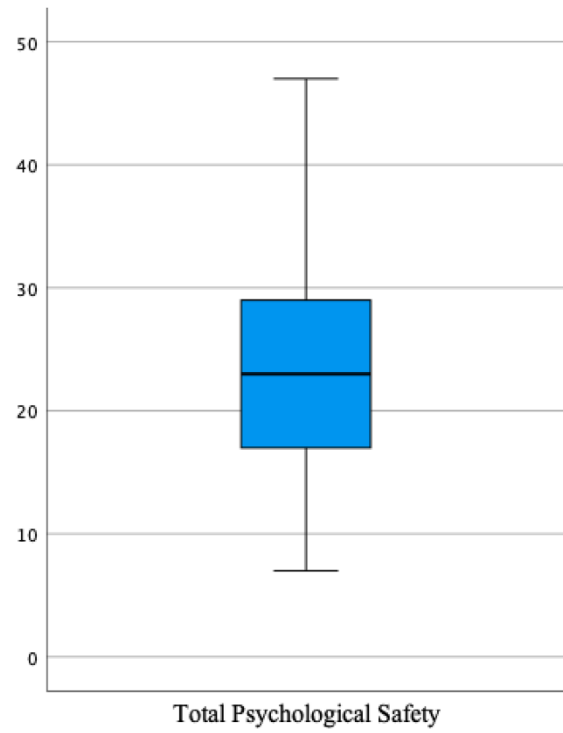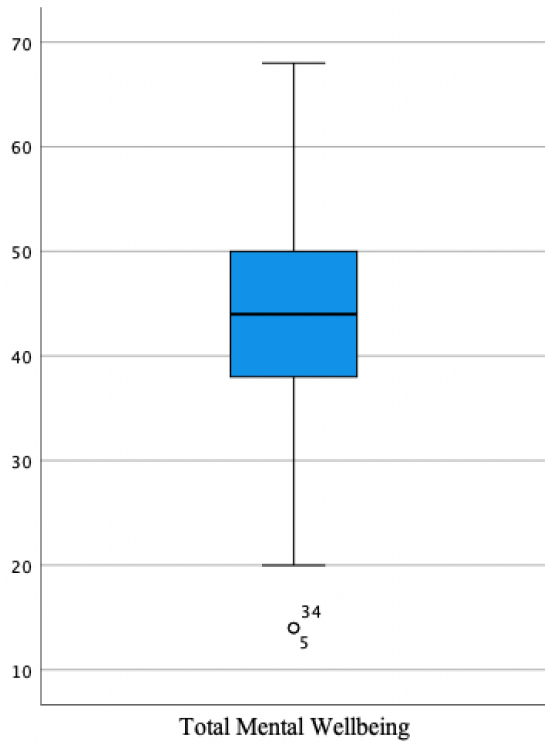
Figures A1-A3

Histograms of frequency distributions for mental wellbeing, psychological safety and concern over mistakes and doubts about actions
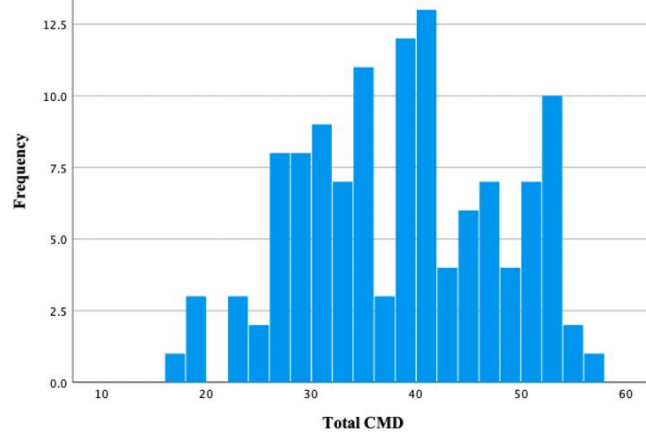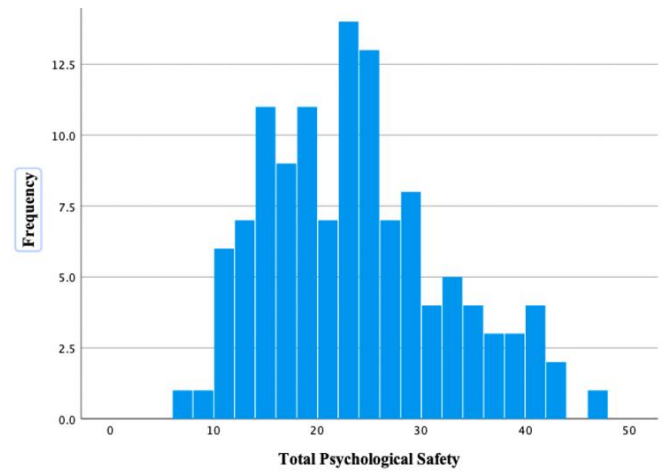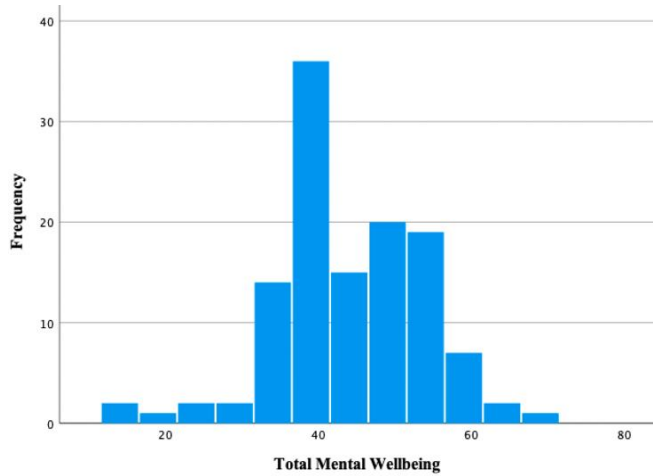
Figures A4-A6

Stem and leaf diagrams for the distribution of mental wellbeing, psychological safety and concerns over mistakes and doubts about actions

Figures A7-A8

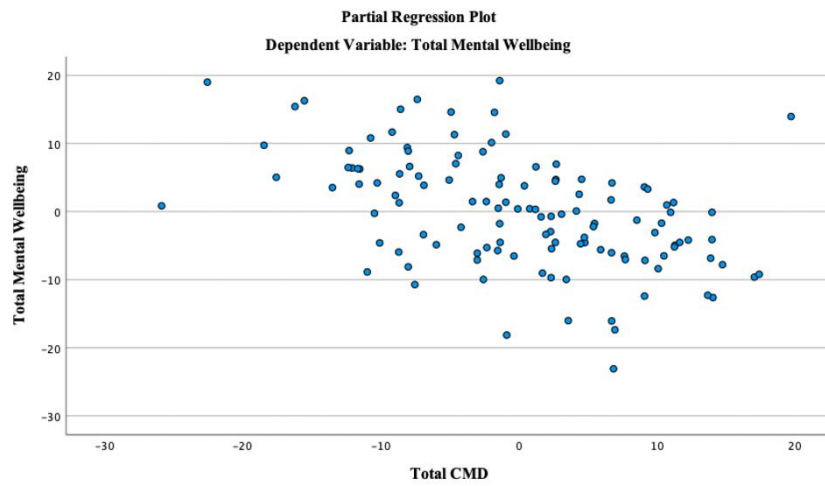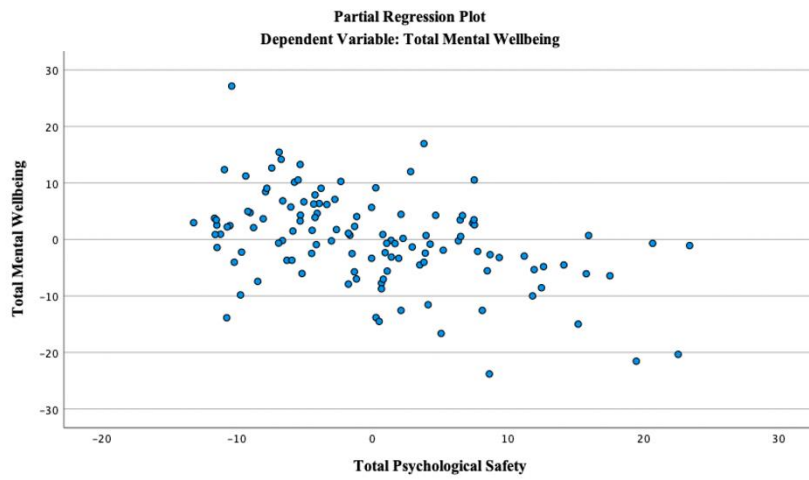*Regression plots of mental wellbeing's relationship with psychological safety and CMD*

Figure A9

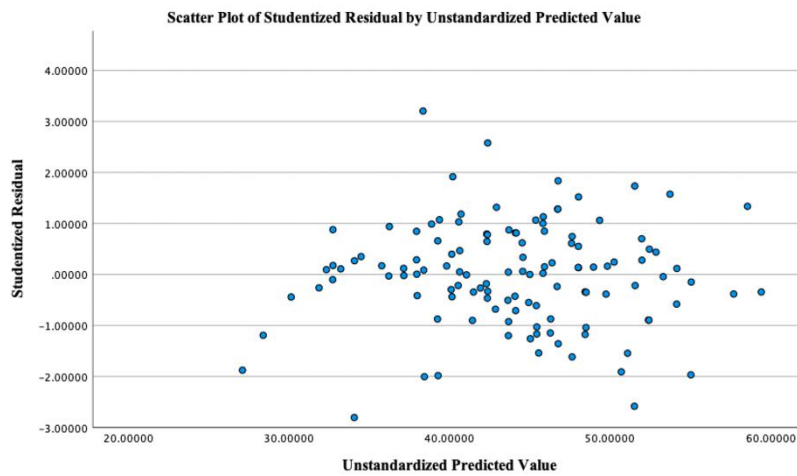*Scatterplot of standardised residual by unstandardised predicted value*

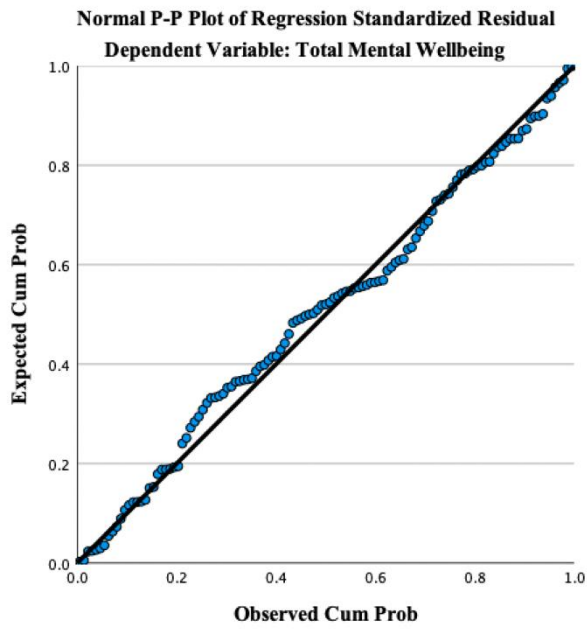**Figure A10**

P-P plot of regression standardised residual
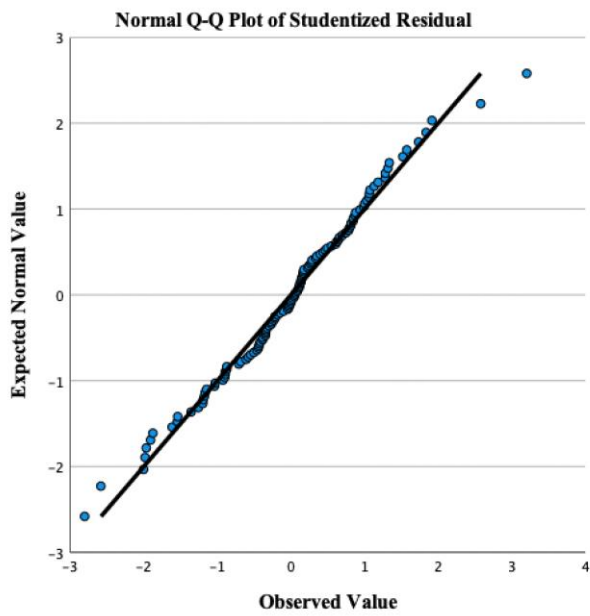

Figure A11

Q-Q plot of studentized residuals

Table A2

Residual statistics of multiple regression model

	Minimum	Maximum	Mean	Std. Deviation	*N*
Predicted value	27.10	59.42	43.98	6.45	121
Std. predicted value	- 2.62	2.39	0.00	1.00	121
Standard error of predicted value	0.663	2.39	1.09	0.34	121
Adjusted predicted value	28.16	59.56	43.99	6.44	121
Residual	- 20. 06	22.65	0.00	7.20	121
Std. residual	- 2.764	3.12[a]	0.00	.992	121
Deleted residual	- 20.65	23.88	- 0.005	7.41	121
Stud. Deleted residual	- 2.89	3.34[a]	- 0.001	1.02	121
Mahal distance	0.10	11.97	1.98	2.04	121
Cook's distance	.00	0.19	0.01	0.02	121
Centred leverage value	.00	0.10	0.02	0.02	121

Note: [a] Case 98

Dependent variable = mental wellbeing, predictor variables = psychological safety, concern

over mistakes and doubts about actions

Appendix B

Results from multiple regression analyses with and without outliers

Table B1

Results from regression models, with and without outliers

	N	R^2	ΔR^2	F change	Sig.
All cases	121	.45	.44		$< .001$
Case 98 removed	120	.48	.47	54.02	$< .001$
Cases 5 & 34 removed	119	.44	.43	44.69	$< .001$
Cases 5, 34 & 98 removed	118	.47	.46	51.30	$< .001$

Note: Dependent variable = mental wellbeing, predictor variables = psychological safety,

concern over mistakes and doubts about actions

Appendix C

Non-parametric analysis of group differences based on gender and specialty

Table C1

Results from a Mann-Whitney U test exploring if mental wellbeing, psychological safety and concern over mistakes and doubts about actions vary based on gender.

	Mental Wellbeing	Psychological safety	CMD
Total N	119	119	119
Mann-Whitney U	1558.50	1606.00	1739.50
Wilcoxon W	4879.50	4927.00	5060.50
Test statistic	1558.50	1606.00	1739.50
Standard Error	175.29	175.27	175.29
Standardised test statistic	0.111	0.382	1.144
Asymptomatic Sig. (2-sided test)	.911	.702	.253

Note: CMD = concern over mistakes and doubt about actions

Table C2

Results from Kruskal-Wallis test exploring is mental wellbeing, psychological safety and concern over mistakes and doubts about actions varied based on placement specialty.

	Mental Wellbeing	Psychological safety	CMD
Total N	89[a]	89	89
Test statistic	5.55	5.31	4.75
Degree of Freedom	4	4	4
Asymptomatic Sig. (2-sided test)	.236	.257	.314

Note: [a] Only placement specialty's with >10% prevalence were included in the analysis

(Emergency medicine, General practice, Medicine, Psychiatry and Surgery)

CMD = concern over mistakes and doubt about actions

Table C3

Results from Kruskal-Wallis test exploring is mental wellbeing, psychological safety and

CMD varied based on training specialty.

	Mental Wellbeing	Psychological safety	CMD
Total *N*	88[a]	88	88
Test statistic	2.711	3.31	4.79
Degree of Freedom	3	3	3
Asymptomatic Sig. (2-sided test)	.438	.346	.188

Note: [a] Only placement specialty's with >10% prevalence were included in the analysis

(Emergency medicine, General practice, Psychiatry and Surgery)

CMD = concern over mistakes and doubt about actions

Table C4

Results from a Mann-Whitney U test exploring if mental wellbeing, psychological safety and

concern over mistakes and doubts about actions vary based on if training specialty was

different than the placement specialty

	Mental Wellbeing	Psychological safety	CMD
Total *N*	45	45	45
Mann-Whitney U	164.50	263.00	134.50
Wilcoxon W	230.50	329.00	200.50
Test statistic	164.50	263.00	134.50
Standard Error	37.81	37.81	37.82
Standardised test statistic	- .595	2.010	- 1.388
Asymptomatic Sig. (2-sided test)	.552	.044*	.165
Exact Sig. (2-sided test)	.558	.045*	.168

Note: $*p < .05$, CMD = concern over mistakes and doubt about actions

Appendix D

Results from a moderation analysis

Table D1

Moderation analyses for psychological safety on mental wellbeing and concern over mistakes

and doubts about actions

	N	R^2	ΔR^2	F change	Sig.
Model 1[a]	121	.45	.44	47.38	$< .001$
Model 2[b]	121	.46	.45	3.01	.085

[a] Predictors (Constant), CMD, PS

[b] Predictors (Constant), CMD, PS, PSxCMD

CMD = concern over mistakes and doubt about actions, PS = psychological safety

Appendix E

Journal of Occupational Health Psychology Author Guidelines

Journal scope statement

The *Journal of Occupational Health Psychology*® publishes theory, research, and public policy articles in occupational health psychology, an interdisciplinary field representing a broad range of backgrounds, interests, and specializations. Occupational health psychology concerns of the application of psychology to improving the quality of work life and to protecting and promoting the safety, health, and well-being of workers.

The journal has a threefold focus, including organization of work, individual psychological attributes, and work–nonwork interface in relation to employee health, safety, or well-being.

The journal seeks scholarly articles, from both researchers and practitioners, concerning psychological factors in relationship to all aspects of occupational safety, health, and well-being.

Included in this broad domain of interest are

- articles in which work-related and nonwork-related psychological factors play a role in the etiology of occupational safety, health, and well-being

- articles examining the dynamics of occupational safety, health, and well-being

- articles concerned with the use of psychological approaches to improve occupational safety, health, and well-being

Special attention is given to articles with a prevention and a promotion emphasis.

Authors should consider the financial costs and economic benefits of prevention and promotion programmes they evaluate.

Manuscripts dealing with issues of contemporary relevance to the workplace, especially regarding the unique challenges of occupational safety, health, and well-being experienced by

minority, cultural, or occupationally underrepresented groups, or topics at the interface of work and nonwork, are encouraged.

Each article should represent an addition to knowledge and understanding of occupational health psychology.

Submission

Prepare manuscripts according to the *Publication Manual of the American Psychological Association* using the 7th edition. Manuscripts may be copyedited for bias-free language (see Chapter 5 of the *Publication Manual*). APA Style and Grammar Guidelines for the 7th edition are available.

Section Three: Critical Appraisal

Factors associated with the mental wellbeing of medical professionals: a reflection on the the thesis process

Word count (excluding references, tables and appendices): 4000

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Factors associated with the mental wellbeing of medical professionals: reflections on the

thesis process

This critical appraisal aims to expand upon the literature review and empirical paper, by discussing the challenges and consequential limitations. I will discuss how my ties to the research topic have influenced the project and consider what I would do differently.

Main Findings

Systematic Literature Review

The systematic literature review investigated the relationship between self-compassion and different aspects of mental wellbeing in doctors and medical students. Relevant literature was gathered and synthesised into a comprehensive review of the consistency and extent of relationships reported. Thirteen quantitative papers were included, with findings suggesting that high self-compassion was associated with positive psychological health and a reduced risk of burnout and stress. Most papers included relied on cross-sectional study designs and reported correlation coefficients and/or regression analyses. One paper using a longitudinal study design found that low self-compassion predicted burnout and stress a year later (Kemper et al., 2019). Two experimental studies revealed coaching and mindfulness-bases stress reduction programmes to be effective in improving mental health and increasing self-compassion (Erogul et al., 2014; Solms et al., 2021). Overall, the effect sizes reported were akin to those observed in other healthcare professions, and no observable difference was seen between doctors and medical students. Future researchers could add to the findings of this review by using longitudinal or experimental study designs with larger sample sizes, to establish if a causal relationship exists and further test the efficacy of interventions in this professional group.

Empirical Paper

This paper explored the relationship between perfectionistic concerns, psychological safety, and mental wellbeing in a sample of 121 doctors. The Job-Demands Resource (JD-R) model was used a guiding framework (Demerouti et al., 2001). Perfectionistic concerns was viewed as a personal demand and psychological safety as a job resource. It was hypothesised that low perfectionistic concerns and high psychological safety would predict greater mental wellbeing. A secondary aim was to explore the variable interactions, hypothesising that psychological safety would moderate the relationship between the other two variables.

Correlation analyses and non-parametric analysis of variance tests found that the variables of interest did not differ based on age, gender, or seniority. Multiple regression analyses revealed that psychological safety and perfectionistic concerns did predict better psychological wellbeing in the expected directions, accounting for 44.5% of the variance. Psychological safety was not found to moderate the relationship between wellbeing and perfectionistic concerns. The lack of statistical power required for this analysis makes it unclear if this is a true finding, or a result of a type-II error.

This study identified two previously overlooked factors that moderately predicted wellbeing in doctors and could be targeted with clinical psychology-led initiatives at an individual, team, organisational and educational level (e.g. therapeutic interventions, Schwartz rounds, psychological safety training). Future research should focus on testing the efficacy of such initiatives along with exploring further how personality and team culture influence wellbeing through the lens of the JD-R.

Positionality, epistemological position, and personal relevance

Prior to discussing the decisions made, the challenges that arose and subsequent limitations, I will discuss my professional background and positionality, as they have undoubtedly influenced, and at times hindered the research process.

My pathway into clinical psychology training stemmed from my previous experience working as a junior doctors, which I left due to experiencing a significant decline in my mental health. I attribute this to working in a clinical setting with excessive work demands, minimal senior support and unhelpful personal coping strategies. I opted to pursue a career in clinical psychology, wanting to help individuals experiencing psychological difficulties. When the opportunity arose to do this thesis project, I felt researching doctors' wellbeing would keep me motivated and capitalise on my specialist interest.

As a researcher, understanding your positionality is an important aspect of the process. Positionality refers to the stance that the researcher has chosen to adopt within a given research study (Savin-Baden & Major, 2013). It can influence the study's subject matter, how it is conducted and ultimately the outcomes (Grix, 2018; Rowe, 2014). Being an 'insider' (that is having a position associated with the research subjects) does reap some advantages, such as easier access to specific populations, an understanding of the culture, the language used, and insight into potentially important factors that may not be apparent to 'outsiders'. With this comes a risk of bias, over-familiarity, an overly sympathetic stance to that group and a lack of an external and objective perspective. Some argue that being an 'insider' or having personal ties to research is discredited (Anteby, 2013), whereas others advise for increased reflexivity (Holmes, 2020), and taking precautions to promote objectivity (Jones & Bartunek, 2021).

Interestingly, at the beginning of this research process, I would have classed myself as an 'insider', having spent more time in the medical profession than clinical psychology. I was, and still am, sympathetic to the experience of doctors, along with other healthcare professionals and workers. Yet, my position as an 'insider' allowed me to understand factors associated with doctors' work that an 'outsider' may not (e.g. recruitment issues, medical school culture) (Jones & Bartuneky, 2021). Throughout this research process, I have been

aware of the need for objectivity at every decision-point, though there will undoubtedly be times when I have been unsuccessful. At the end of this process, I no longer consider myself an 'insider', or an 'outsider', but somewhere in the middle. The personal relevance of the research focus acted as a double-edged sword. Although it motivated me, it also led to more time-spent pursuing fruitless avenues due to my interest. Most of the time, the project felt rewarding, though at times it felt demoralising, arduous, and emotionally taxing.

Another important aspect to consider when critiquing this research project, is the relative lack of psychological education and research experience I had at the outset. Prior to clinical training, I had spent one year studying psychology and my research experience was limited to one dissertation. Conducting research is not common practice within medicine, and on reflection I feel I was naive when designing my study, leading to several methodological flaws. I was also ignorant of the influence my epistemological position would have on a quantitative study. At the beginning of this project, I considered myself a positivist, mirroring that seen in medicine. Positivism assumes that the social world is external and should be measured objectively based on facts (Kolakowski ,1972). Following three years of clinical psychology training, this position has shifted to one of a social constructionism which posits that knowledge or meaning is constructed by people, not discovered (Berger & Luckmann, 1967). This shift in position has made it difficult to realign with some conceptualisations and subsequent hypotheses laid out in my initial proposal. These challenges have highlighted how important it is to reflect on one's positionality and beliefs when designing a study, rather than realising it when challenges arise.

Decisions, challenges and limitations

Here I will reflect on some of the challenges that arose during the thesis project along with the decisions made, presented in the order they were carried out.

Empirical Paper

Deciding a research focus and variables to study

The first decision in this process was the type of research to conduct. I opted for quantitative research, as I was wary of how my position as an 'insider' could introduce bias into qualitative research (e.g. interpretating data). I was keen to explore overlooked factors that if found to be important, could guide professionals (e.g. clinical psychologists) and organisations in supporting doctors through target initiatives. Ultimately such factors can be categorised as individual, occupational, and organisational (Kinman & Teoh, 2018).

My initial interest in perfectionism stemmed from the results of a recent BMA study that reported 95% of doctors were fearful of making a mistake (BMA, 2018). This was in-keeping with what I had witnessed in medicine and was a particular concern amongst peers in the lead up to qualification. Whilst researching this topic, I found an abundance of literature referring to doctors as 'second victims', (those who experience psychological distress following a medical error), yet little on the preceding fear. This led me to the concept of perfectionism, which includes an element of being overly concerned with making mistakes. I was surprised to find limited research into doctors and perfectionism, though it is frequently cited as a predominant characteristic. Most studies focused on medical students, perhaps due to accessibility for recruitment, yet medical students had less opportunity to make errors, due to their negligible clinical responsibility. Interestingly, when deciding upon this variable, it didn't seem 'too close' to my own experiences, and yet at the end of this project, I recognise that I do possess perfectionistic traits.

Next, I was tasked with choosing a conceptualisation of perfectionism to explore in relation to wellbeing. I opted for Frost's multidimensional model of perfectionism, for several reasons. Firstly, the dimension I explored (concerns over mistakes (CM) and doubts about actions(D)), directly linked with my initial interest in the topic; fear of making mistakes. Secondly, how Frost conceptualised perfectionism clearly identified aspects of perfectionism

(perfectionistic concerns) linked with unwanted outcomes, such as psychological distress (Limburg et al., 2017). In a profession where aspects of perfectionism are likely to be helpful, I felt it was important to make this distinction, so that any potential interventions could target the unhelpful facets, without detracting from the positive. This differed from another leading conceptualisation of perfectionism, which conceptualises perfectionism based on whom the characteristic is directed to, or felt to be from (e.g. self-orientated, socially prescribed and other orientated) (Hewitt & Flett, 1991). Another conceptualisation I could have considered was Dunkley et al.'s (2006) two-factor model of perfectionism, which divides the trait as either relating to personal standards or self-criticism. This could have been a useful to explore in linking together self-compassion, perfectionism and psychological health.

Once settling upon exploring perfectionistic concerns using the FMPS, I had to decide how many dimensions I would research this as. In Frost's original development of the model and survey, CM and D represented two factors, whereas other studies have shown them to be a unified factor (Abiri et al., 2019; Stallman & Hurst, 2010, Stober, 1998). However, others disagree, and I therefore ran the regression analyses for both scenarios. The debate over how many factors exist within the FMPS, highlights the factorial instability of the measure, and in hindsight perhaps another measure should have been used (e.g. Dunkley et al. (2006)).

In the design of my study, I was wary of solely focusing on a personal characteristic and wanted to consider systemic factors that may also be involved. The focus on resilience is an example of how focusing on individual factors/ skills can be seen as blaming and detracting from organisational failures (Oliver, 2017). I was particularly interested in how team / organisational culture was associated with wellbeing, as I had witnessed the influence team communication, leadership and peer support had in fostering team morale. I opted to focus on psychological safety for three main reasons; it was becoming increasingly

recognised as an important factor in healthcare, it was understudied in relation to wellbeing

and initiatives promoting psychological safety were being piloted within the NHS.

Interestingly, I believe my epistemological stance and psychological naivety

influenced how I first conceptualised psychological safety. My positivist stance may have

influenced how true I believed Edmondson's psychological safety measure to capture how

safe it was to take interpersonal risks. I now reflect how the perception of psychological

safety will be influenced by many other things than their working environment, such as their

experiences, personality, and views of the world. Psychological safety is undoubtedly worth

studying; however, this study could have benefited from a true measure of

team/organisational culture for comparison and completeness.

Finally, a choice was to be made on the dependent variable measure. I chose to focus

on mental wellbeing, as opposed to a measure of 'mental illness', due to its more inclusive

and salutogenic view. Occupational health research has tended to focus on preventing or

treating ill health, by focusing on 'burnout' and 'work-related stress'. Although helpful this is

ignoring a large part of the workforce that may not meet the criteria yet are still not happy or

thriving. Research finds that happier workers are more efficient and perform better (Wright &

Cropanzano, 2000). Another reason I steered away from focusing on burnout, was the

criticisms associated with it, such as its lack of universal definition (Kaschka et al., 2011), the

considerable overlap with other psychological classifications (e.g., depression) (Bianchi et

al., 2015) and the over-reliance on using the Maslach Burnout Inventory (Doulougeri et al.,

2016). One of the biggest limitations of using a general measure of wellbeing is accounting

for all the factors in their home life, social life and relationships that will likely influence it,

making it difficult to ascertain the influence of occupational factors.

Hypothesising the relationships

Following the selection of the variables to study, I had to predict what relationships I expected to find. Based on previous research, I predicted that high psychological safety and low perfectionistic concerns would be associated with increased wellbeing, which was supported. However, I was unsure if and how they would interact with one another, in relation to wellbeing. The options available to me were whether to test a mediation or moderation interaction and predict which direction. My initial conceptualisation of psychological safety as a true representation of the team environment, and therefore an external factor, may have influenced my hypothesis (that psychological safety would moderate perfectionistic concerns relationship with psychological wellbeing). Akin to the diathesis-stress model, I predicted that a lack of psychological safety would exacerbate the negative relationship between perfectionistic concerns and wellbeing. Alternatively, psychological safety could be predicted to mediate the relationship instead. Perfectionists may be more likely to perceive their workplace as unsafe to take interpersonal risks, thereby influencing wellbeing. The results of the study added no clarity to this interaction, due to the inadequate sample size for moderation analyses. On reflection, it may be that the relationship is complex and could be a result of multiple and bi-directional interactions.

Choosing a model

As part of the thesis project we were required to use a psychological model to test or contextualise the findings. Ideally, the study would have been designed with a model in mind, however in this case, it was done retrospectively, resulting in several limitations. I used the Job-Demands Resource (JD-R) model which theorizes that job characteristics can be categorised as either resources or demands, which interact to influence wellbeing and other job-related outcomes (e.g. engagement, performance). Since its development, researchers have attempted to include other variables (e.g. personality, coping strategies), yet their place in the model is not fully established. Similarly, team culture has been relatively under-

researched within the model, and researchers have classed it in different ways (e.g. job resource, a precursor to job resources).

    As the model was chosen retrospectively, it didn't necessarily 'fit' with the study design. Job demands were not explored, and it remains unclear how psychological safety should be classed. However, after consideration of other models, the JD-R felt the most appropriate to use for nomenclature purposes and to highlight the gaps in the model. Many occupational health models, (e.g. Warr's (1987) vitamin model) did not include the impact of personality within their conceptualisation and were therefore excluded. I mainly considered Firth-Cozen's (2001) systemic model of doctors' wellbeing which appreciated the impact of both personality and psychological safety on wellbeing, among many other factors (e.g. job demands, organisational factors). However, the author does not explicitly theorise the interactions between these factors, and therefore the JD-R felt more appropriate.

    At this step, my knowledge of therapeutic models was limited and therefore I opted for an occupational model. With more clinical experience, I have considered whether the study could have been theorised through the lens of Compassion Focused Therapy (Gilbert, 2010). This model theorises that shame and self-criticism are linked to a sense of threat and psychological distress, and that self-compassion can have a soothing buffering effect on this. For doctors overly concerned with making mistakes, being in an environment that they perceive to be blaming of mistakes, could increase that sense of threat, and subsequent psychological distress. Having considered this, exploring self-compassion as well as perfectionistic concerns could have linked with this model and the findings from the systematic literature review.

Recruitment and power limitations

    Deciding how best to recruit was also challenging, as doctors are thought to be difficult to recruit, perhaps due to lack of time and resources to participate (Kaner et al.,

1998; Maheux et al., 1989). Pre-empting this barrier, I used my connections to the profession to side-step some of these issues. I also contacted the BMA, medical defence organisations and several charities to be involved, however received no response. I opted for a phasic approach to recruit: firstly, advertising on two popular medical forums and secondly using doctor acquaintances who had offered to share with other potential participants. Approximately three-quarters of the participants were recruited via the forums, and only when this had ceased, was phase two initiated. The use of personal contacts in recruiting physicians for research is common and found to be effective in boosting participation rates (Asch et al., 2000). Although successful in recruiting enough participants for the multiple regression analyses, it failed to do so to test the interactions.

Unfortunately, the study was not adequately powered to determine whether the lack of significance in the moderation analysis was a true finding, or due to a type-II error. The sample size achieved was drastically under what was required, and therefore future studies may need to consider how best to recruit. The use of other blogs, medical organisations (e.g Practitioner Health) and the Royal Colleges could perhaps have wielded more participants. Furthermore, recruiting via the NHS was not possible due to NHS ethics committees only considering COVID-19 related studies at the time.

Literature Review

Deciding the focus

Deciding the focus of the literature review was a difficult task. Whilst data collection was underway for the empirical paper, I came up with several research questions for the review, many of which were unsuitable due to pre-existing reviews or an inappropriate number of relevant papers. I opted to focus on the relationship between self-compassion and wellbeing, due to its previously found inverse relationship with perfectionistic concerns (Hiçdurmaz, 2017; Tobin & Dunkley, 2021) and its ability to be targeted via psychological

interventions (Sinclair et al., 2017). I considered reviewing qualitative papers, to add a richer

understanding of the perception, utilisation and development of the skill in doctors, however I

chose not to for several reasons. From initial scoping searches, only a few qualitative papers

were found that referenced self-compassion. These were either generated as themes from a

broader research question (Phillips & Dalgardno, 2017) or following a self-compassion

intervention (Kratzke et al., 2022). Although the experiences of self-compassion in doctors is

important, the paucity of qualitative studies in this area and the fact that self-compassion in

this context is defined in a specific way, made it challenging to construct a review based on

exclusively qualitative papers. Additionally, I felt synthesising quantitative papers was more

objective, considering my insider position. Finally, a quantitative review could complement

any findings from my own empirical paper. I chose not to do a mixed-methods review purely

for course-related time-restrictions.

Inclusion criteria

Once decided upon a quantitative review, I had to construct my search criteria.

Ideally, I would have focused on a specific aspect of mental wellbeing (e.g. quality of life),

however this was not possible due to a dearth of papers. Instead, I focused upon both positive

and negative aspects of psychological health, for similar reasons cited for the empirical paper.

Initially I was intent on exploring the relationship exclusively in qualified doctors, however

the search yielded too few papers. Consequently, I extended the inclusion criteria to medical

students as well. This felt appropriate as medical students are exposed to similar demands

(excluding responsibility), and the variable of interest was a personal coping skill, as opposed

to a reflection of working conditions dependent on training level. However, it could be that

self-compassion may develop or wane during post-qualification experience, and therefore

observed differences between experience and seniority were noted.

Type of review

Another aspect to consider was what type of review and analysis should be included in this thesis project. I opted to conduct a systematic literature review, aiming to identify all studies exploring the relationship between self-compassion and wellbeing/distress in medical professionals, synthesise the results and appraise the approaches undertaken. However, the heterogeneity of sampling, study design and measurement scales limited the ability to synthesise the results and draw firm conclusions applicable to the wider profession. This raises the question of whether a scoping review may have been more appropriate.

Learning and developmental points

Overall, this thesis project found evidence that self-compassion, perfectionistic concerns, and psychological safety are factors associated with the mental wellbeing of doctors. As this appraisal has detailed, there have been significant challenges in this process highlight several learning and developmental points. I now understand the importance of recognising and acknowledging positionality and epistemological position at the outset of conducting research. This ultimately led to several conceptual issues in the empirical study design. Identifying a suitable psychological model prior to confirming factors to study and hypothesising relationship is also imperative. In this case, failing to do so led to wasted time retrospectively trying to 'fit' a model to the study design. Finally, strategizing recruitment methods to yield samples sizes large enough for the intended analyses is key in determining whether results are true findings. These issues have prompted me to consider how I would design and conduct this thesis project again if I had the chance.

Literature Review

As mentioned, I would have conducted a scoping review of the relationship between self-compassion and mental wellbeing in medical professionals. This would have been done to allow for the considerable heterogeneity in measures used and study designs. If time allowed, I would include qualitative papers to add to the richness and understanding of the

skill in doctors. I would have searched more databases, to address the few papers found from other methods.

Empirical Paper

To fully test the JD-R model, I would opt to study the interaction between established aspects of the model. These could include; job demands (e.g. workload), job resources (e.g. social support), personality (perfectionistic concerns, perfectionistic strivings, self-compassion), team culture (psychological safety), organisational factors with psychological wellbeing. Alternatively, an occupation-specific wellbeing measure (e.g. work-related stress) could be used. By exploring both perfectionism and self-compassion, any relationships detected could promote compassion-focused interventions as a potential intervention for this group. Ideally, exploratory analysis techniques, such as structural equation modelling, involving very large sample sizes, would be used to explore any interactions. This could add to the understanding to how personality and team culture fit into the JD-R. However, this analysis, along with the extra independent variables, would require a much larger sample size, and therefore greater efforts would be taken to engage more doctors in the research process (e.g. medical organisations, NHS ethics).

Conclusion

Overall, I have found this thesis project challenging, highlighting many important considerations in research and personal development points. My positionality and the personal relevance of the subject matter has at times acted as a barrier, sending me down fruitless avenues and at times being emotionally taxing. Despite my best efforts to remain objective, there will have been times this will have introduced bias, with my own beliefs swaying interpretations. I have also learnt the importance of designing a study around an established psychological model and conceptualisations of variables. Not doing so led to some significant challenges later.

Nevertheless, I feel this research adds to the understanding of doctors' mental wellbeing, highlighting factors that can be targeted with clinical psychology-led initiatives. As well, the moderate associations found between personality and an aspect of team culture, warrants further research into how they should be conceptualised within the JD-R.

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Tables and Figures

Appendix A

Analysis with concerns over mistakes (C) and doubts about actions (D) as separate variables

Table A1

Correlation coefficient matrix, with CM and D as separate variables

	1	2	3	4
1. Mental wellbeing	-			
2. Psychological safety	- .53**	-		
3. CM	- .50**	.28*	-	
4. D	- .50**	.30**	.59**	-

*Note: * p < .01, ** p < .001*

CM = concern over mistakes, D = doubts about actions

Table A2

Multiple regression results, with CM and D as separate variables

	N	R^2	ΔR^2	F change	Sig.
Model 1	121	.48	.43	31.56	< .001

Note: Dependent variable = mental wellbeing, predictor variables = psychological safety,

concern over mistakes, and doubts about actions

Section Four: Ethics Proposal

Ethics proposal for the empirical study '*Relationships between concerns over mistakes,*

psychological safety and mental wellbeing in doctors'

Word count (excluding references, tables and appendices): 2692

Corinna Milroy
Doctorate in Clinical Psychology

Division of Health Research

Lancaster University

March 2022

All correspondence should be sent to:

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Faculty of Health and Medicine Research Ethics Committee (FHMREC)
Lancaster University

Application for Ethical Approval for Research

for additional advice on completing this form, hover cursor over 'guidance'.

Guidance on completing this form is also available as a word document

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Title of Project: Relationships between concerns over mistakes, psychological safety and mental wellbeing in doctors

Name of applicant/researcher: Corinna Milroy

ACP ID number (if applicable)*: N/A   **Funding source (if applicable):** N/A

Grant code (if applicable): N/A

*If your project has *not* been costed on ACP, you will also need to complete the Governance Checklist [link].

Type of study

☐ Involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants. **Complete sections one, *two* and four of this form**

☒ Includes *direct* involvement by human subjects. **Complete sections one, *three* and four of this form**

SECTION ONE

1. Appointment/position held by applicant and Division within FHM   Trainee Clinical Psychologist

2. Contact information for applicant:
E-mail: c.milroy1@lancaster.ac.uk   **Telephone**: 07500554975 (please give a number on which you can be contacted at short notice)

Address: 25 North Barcombe Road, Childwall, Liverpool, L167PT

3. **Names and appointments of all members of the research team (including degree where applicable)**

Corinna Milroy MBChB MSc

3. If this is a student project, please indicate what type of project by marking the relevant box/deleting as appropriate: (please note that UG and taught masters projects should complete **FHMREC form UG-tPG**, following the procedures set out on the <u>FHMREC website</u>

PG Diploma ☐   Masters by research ☐   PhD Thesis ☐   PhD Pall. Care ☐

PhD Pub. Health ☐   PhD Org. Health & Well Being ☐   PhD Mental Health ☐   MD ☐

DClinPsy SRP ☐ [if SRP Service Evaluation, please also indicate here: ☐]   DClinPsy Thesis ☒

4. Project supervisor(s), if different from applicant: Professor Bill Sellwood

5. Appointment held by supervisor(s) and institution(s) where based (if applicable): Professor of Clinical Psychology at Lancaster University

SECTION TWO
Complete this section if your project involves existing documents/data only, or the evaluation of an existing project with no direct contact with human participants

1. Anticipated project dates (month and year)
Start date: End date:

2. Please state the aims and objectives of the project (no more than 150 words, in lay-person's language):

Data Management
For additional guidance on data management, please go to <u>Research Data Management</u> *webpage, or email the RDM support email:* <u>rdm@lancaster.ac.uk</u>
3. Please describe briefly the data or records to be studied, or the evaluation to be undertaken.

4a. How will any data or records be obtained?

4b. Will you be gathering data from websites, discussion forums and on-line 'chat-rooms'
4c. If yes, where relevant has permission / agreement been secured from the website moderator?
4d. If you are only using those sites that are open access and do not require registration, have you made your intentions clear to other site users?

4e. If no, please give your reasons

5. What plans are in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with General Data Protection Regulation (GDPR) and the (UK) Data Protection Act 2018.

6a. Is the secondary data you will be using in the public domain?

6b. If NO, please indicate the original purpose for which the data was collected, and comment on whether consent was gathered for additional later use of the data.

Please answer the following question *only* if you have not completed a Data Management Plan for an external funder
7a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?

7b. Are there any restrictions on sharing your data?

8. Confidentiality and Anonymity
a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications?
b. How will the confidentiality and anonymity of participants who provided the original data be maintained?

9. What are the plans for dissemination of findings from the research?

10. What other ethical considerations (if any), not previously noted on this application, do you think there are in the proposed study? How will these issues be addressed?

SECTION THREE
Complete this section if your project includes *direct* involvement by human subjects

1. Summary of research protocol in lay terms (indicative maximum length 150 words):

This study aims to investigate the relationship between two factors and the mental wellbeing of doctors, whom are currently practicing medicine and who work with patients. The first factor is a doctor's concern over making mistakes and doubts about actions, which is thought to be a major dimension of the perfectionism trait. The second factor is the psychological safety of the workplace. This measures how safe employees feel to take interpersonal risks within their workplace, without fear of repercussions, among other things. The study will explore if there is an association between either of the factors and mental wellbeing of doctors, as well as investigating the combined effect of both factors. Data will primarily be collected by means of an online anonymous survey accessed via advertised links on two doctor's forums. If this fails to yield enough participants, then several other methods may be used to recruit for the study.

2. **Anticipated project dates (month and year only)**

Start date: December 2020   End date: August 2022

Data Collection and Management
For additional guidance on data management, please go to Research Data Management *webpage, or email the RDM support email:* rdm@lancaster.ac.uk

3. Please describe the sample of participants to be studied (including maximum & minimum number, age, gender):
Inclusion criteria:
     - Doctors currently working (part-time, full-time or locum)
     - full or provisional license to practice medicine (e.g. GMC)
     - any speciality

       - public or private healthcare setting
       - clinical contact with patients

Exclusion criteria
       - retired doctors
       - doctors not currently working (e.g. maternity leave)

The survey will be produced in English, therefore placing a language restriction on who can participate. This is due to limited funding for research and limited time to collect data in other languages (e.g. translating surveys).

4. How will participants be recruited and from where? Be as specific as possible. Ensure that you provide the *full versions* of all recruitment materials you intend to use with this application (eg adverts, flyers, posters).

Participants will be recruited via the following methods in the following order (e.g. if 1) does not recruit enough participants, then 2) will be used as well etc.
1) The survey link will be posted on the following forums for doctors along with a brief description of the study (See advertising material):-
- Junior Doctors UK on Reddit
- Doctors.net Forum
2) The survey link, along with a brief description of the study, will be distributed via doctor contacts who have agreed to assist in the recruitment process. See advertising materials to observe how these contacts will be consenting to this process.
3) The Louise Tebboth Foundation, a doctor's mental wellbeing charity, has agreed to distribute the link with a brief description of the study on their social media page (See advertising material)

Participants will be directed to a link to the survey, where they would read the participant information sheet and have to consent to take part before answering any questions.

All volunteering participants who meet the inclusion criteria and do not meet the exclusion criteria will be accepted.

5. Briefly describe your data collection and analysis methods, and the rationale for their use.

Data Collection: Data will be collected via an online Qualtrics questionnaire, including the following subsections/measures:-
- Demographic information (age, gender, seniority/years of experience, speciality)
- Mental wellbeing – The Warwick-Edinburgh Mental Well-being scale (14-items)
- Psychological safety (PS) measure (7-items)
- Concern over mistakes and doubt about actions (COMDAA) (13-items). This is a subsection of the Frost Multidimensional Perfectionism Scale
- potentially an open-ended question regarding additional work-related coronavirus pressures (if appropriate at the time)

Data Analysis:
Firstly, the correlations between the explanatory and outcome variable will be assessed for correlational significance.
Then a multiple regression will be performed on the independent variables (age, gender, COMDAA, PS) and any explanatory variables that showed statistical correlation with mental wellbeing (e.g. seniority or speciality). This will assess their relationship with the dependent variable (mental wellbeing).
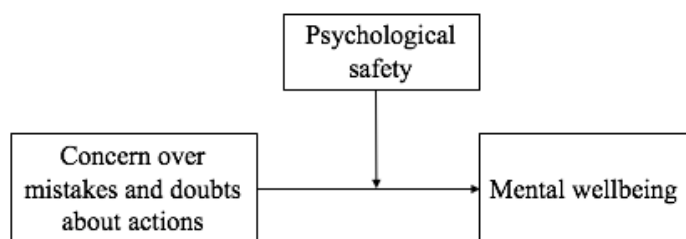Finally, evidence of possible mediation or moderation of PS on COMDAA will be assessed.

Figure 1. *Proposed model of moderating/mediating relationship of PS on COMDAA and mental wellbeing*

6. What plan is in place for the storage, back-up, security and documentation of data (electronic, digital, paper, etc.)? Note who will be responsible for deleting the data at the end of the storage period. Please ensure that your plans comply with General Data Protection Regulation (GDPR) and the (UK) Data Protection Act 2018.

Data will be stored anonymously and securely on Qualtrics (a password protected platform). Only the principal investigator and the supervisor named will have access to the data during the study. Once submitted, the research coordinator and/or Research/Programme director in the DClinPsy team will have access. Following the completion of the project, the data will be sent to the research coordinator of the DClinPsy team for storage for 10 years on the Lancaster University secure Network. Professor Bill Sellwood will be the data custodian and will be responsible for overseeing the data being destroyed after 10 years.

7. Will audio or video recording take place? ☒ no ☐ audio ☐ video
a. Please confirm that portable devices (laptop, USB drive etc) will be encrypted where they are used for identifiable data. If it is not possible to encrypt your portable devices, please comment on the steps you will take to protect the data.
N/A

b What arrangements have been made for audio/video data storage? At what point in the research will tapes/digital recordings/files be destroyed?
N/A

Please answer the following questions *only* if you have not completed a Data Management Plan for an external funder
8a. How will you share and preserve the data underpinning your publications for at least 10 years e.g. PURE?
N/A
8b. Are there any restrictions on sharing your data?
N/A

9. Consent
a. Will you take all necessary steps to obtain the voluntary and informed consent of the prospective participant(s) or, in the case of individual(s) not capable of giving informed consent, the permission of a legally authorised representative in accordance with applicable law? yes

b. Detail the procedure you will use for obtaining consent?

Following the Patient Information Sheet on the survey, is a question detailing that the participant understands what is needed from them in the study, that the study is voluntary and anonymous, and

how their data will be used and stored. Participants then have to select the option 'I consent to take part in this study' before being allowed to move onto the next section of the survey.

10. What discomfort (including psychological, distressing or sensitive topics), inconvenience or danger could be caused by participation in the project? Please indicate plans to address these potential risks. State the timescales within which participants may withdraw from the study, noting your reasons.

There is a small chance that participants may feel distressed as a result of completing the question and answering questions regarding wellbeing, mistakes and workplace environment. In the debrief section of the questionnaire, details of relevant organisations that the participants can contact for support will be included.

Participants are informed that they are able to withdraw from the study at any point during the survey (e.g. exiting survey). Any incompletely answered survey data will be deleted.

11. What potential risks may exist for the researcher(s)? Please indicate plans to address such risks (for example, noting the support available to you; counselling considerations arising from the sensitive or distressing nature of the research/topic; details of the lone worker plan you will follow, and the steps you will take).

No risks to the researchers have been identified. Non-personal contact information has been provided to protect the researcher's privacy.

12. Whilst we do not generally expect direct benefits to participants as a result of this research, please state here any that result from completion of the study.

There are no direct benefits for the participants to take part, however participants may find taking part a positive experience, knowing it may help in the future with doctor's wellbeing.

13. Details of any incentives/payments (including out-of-pocket expenses) made to participants:

No incentives/payments will be made offered or made to participants.
14. Confidentiality and Anonymity
a. Will you take the necessary steps to assure the anonymity of subjects, including in subsequent publications?

Yes

b. Please include details of how the confidentiality and anonymity of participants will be ensured, and the limits to confidentiality.

No identifiable data are included in the survey, therefore the anonymity and confidentiality of the participants will be protected.

15. If relevant, describe the involvement of your target participant group in the *design and conduct* of your research.

The Louise Tebboth Foundation (http://www.louisetebboth.org.uk/) have agreed to assist in the reviewing the design and conduct of the study. Similarly, contacts of the researcher who meet the inclusion criteria have contributed to the design and content of the survey.

16. What are the plans for dissemination of findings from the research? If you are a student, include here your thesis.

It is anticipated that the findings of this study will be disseminated as follows:

- Submitted as part of the principal investigator's thesis for the Doctorate in Clinical Psychology (DClinPsy)
- Submitted for publication in a peer-reviewed journal
- Presented to trainee clinical psychologists and course staff at the DClinPsy thesis presentation day at Lancaster University.

17. What particular ethical considerations, not previously noted on this application, do you think there are in the proposed study? Are there any matters about which you wish to seek guidance from the FHMREC?

No ethical concerns identified.

SECTION FOUR: signature

Applicant electronic signature: C.Milroy   Date 14/10/20

Student applicants: please tick to confirm that your supervisor has reviewed your application, and that they are happy for the application to proceed to ethical review ☐

Project Supervisor name (if applicable): Bill Sellwood   Date application discussed 20/10/20

Submission Guidance

1. **Submit your FHMREC application <u>by email</u> to Becky Case** (fhmresearchsupport@lancaster.ac.uk) as two separate documents:

    i. **FHMREC application form.**
    Before submitting, ensure all guidance comments are hidden by going into 'Review' in the menu above then choosing *show mark-up>balloons>show all revisions in line.*

    ii. **Supporting materials.**
    Collate the **following materials for your study, if relevant, into a single word document:**

        a. **Your full research proposal (background, literature review, methodology/methods, ethical considerations).**
        b. Advertising materials (posters, e-mails)
        c. Letters/emails of invitation to participate
        d. Participant information sheets
        e. Consent forms
        f. Questionnaires, surveys, demographic sheets
        g. Interview schedules, interview question guides, focus group scripts
        h. Debriefing sheets, resource lists

    Please note that you DO NOT need to submit pre-existing measures or handbooks which support your work, but which cannot be amended following ethical review. These should simply be referred to in your application form.

2. Submission deadlines:

    i. Projects including direct involvement of human subjects **[section 3 of the form was completed]**. The *electronic* version of your application should be submitted to <u>Becky Case</u> **by the committee deadline date.** Committee meeting dates and application submission dates are listed on the <u>FHMREC website</u>. Prior to the FHMREC meeting you may be contacted by the lead reviewer for further clarification of your application. Please ensure you are available to attend the committee meeting (either in person or via telephone) on the day that your application is considered, if required to do so.

    ii. The following projects will normally be dealt with via chair's action, and may be submitted at any time. **[Section 3 of the form has *not* been completed, and is not required].** Those involving:

        a. existing documents/data only;
        b. the evaluation of an existing project with no direct contact with human participants;
        c. service evaluations.

3. **<u>You must submit this application from your Lancaster University email address, and copy your supervisor in to the email in which you submit this application</u>**

Ethical Approval Form

Applicant: Corinna Milroy
Supervisor: Bill Sellwood
Department: DHR
FHMREC Reference: FHMREC20034

29 March 2021

Re: FHMREC20034
Relationships between concerns over mistakes, psychological safety and mental wellbeing in doctors

Dear Corinna,

Thank you for submitting your research ethics application for the above project for review by the **Faculty of Health and Medicine Research Ethics Committee (FHMREC)**. The application was recommended for approval by FHMREC, and on behalf of the Chair of the Committee, I can confirm that approval has been granted for this research project.

As principal investigator your responsibilities include:

- ensuring that (where applicable) all the necessary legal and regulatory requirements in order to conduct the research are met, and the necessary licenses and approvals have been obtained;

- reporting any ethics-related issues that occur during the course of the research or arising from the research to the Research Ethics Officer at the email address below (e.g. unforeseen ethical issues, complaints about the conduct of the research, adverse reactions such as extreme distress);

- submitting details of proposed substantive amendments to the protocol to the Research Ethics Officer for approval.

Please contact me if you have any queries or require further information.

Email: fhmresearchsupport@lancaster.ac.uk

Yours sincerely,

Dr. Elisabeth Suri-Payer
Research Ethics Officer, Secretary to FHMREC

Relationships between concern over mistakes and doubts about actions, psychological

safety and mental wellbeing in doctors

Research Protocol

Applicants

Principal Researcher

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Introduction

Poor psychological wellbeing is an important issue within the NHS workforce, as many doctors are reporting work-related mental health issues. A 2018 BMA survey found that 40% of the doctors surveyed self-reported struggling from a mental health condition that impacted on their work (BMA, 2019). Similarly, a systematic review found the prevalence of common psychiatric conditions in doctors to be between 17-52% (Imo, 2017). This has implications for staff sickness levels, staff retention, patient safety and quality of care (Aiken et al., 2012; Hall et al., 2016; NHS, 2019a, 2019b; The Health Foundation, 2019; Wilkinson et al., 2017). Previously studies found that female doctors were at an increased risk of poorer mental health (Kinman & Teoh, 2018) and suicide(Schernhammer & Colditz, 2004), however more recent studies suggest that there is no gender difference (Imo, 2017; McCain et al., 2018; O'Kelly et al., 2016), suggesting that working conditions may have changed for women over time (Kinman & Teoh, 2018). A 2017 systematic review found 17 of 19 studies found no association between gender and psychiatry morbidity(Imo, 2017), however some studies have found an increased risk of anxiety and depression in females (Burbeck et al., 2002; Lydall et al., 2009). The association of seniority of doctors and mental wellbeing has also been explored, however many studies find little difference (Imo, 2017; McCain et al., 2018; Vijendren et al., 2018). However, junior doctors have been found to report increasing levels of stress and burnout (NHS, 2019b; Orton et al., 2012) compared to more experienced staff. However, it's important to note that doctors at varying grades experience different types of stressors based on their working conditions as their roles and responsibilities change (Kinman & Teoh, 2018). Clinical specialty has also been investigated, with a 2004 meta-analysis finding that GPs, anaesthetists, community doctors and psychiatrists being at an increased risk of suicide compared to their hospital counterparts between the years of 1979-1995 (Schernhammer & Colditz, 2004). However, a more recent systematic review suggest there is

no difference in mental health risk across specialties (Imo, 2017; Vijendren et al., 2018), although several studies have found GPs to be at an increased risk (Halliday et al., 2017; McCain et al., 2018).

Psychological safety (PS) is a crucial element of organisational structures including healthcare services (Edmondson et al., 2016). It is defined as the 'shared belief amongst individuals as to whether it is safe to engage in interpersonal risk-taking in the workplace' (Edmondson, 1999). These interpersonal risks include speaking up, asking for help, having trust in colleagues and utilising whistleblowing policies. High levels of PS are associated with many positive learning and behavioural outcomes (Frazier et al., 2017), including patient safety issues surrounding errors (Edmondson, 1996; Leroy et al., 2012) and positive work attitudes (e.g. job commitment, work engagement and teamwork) (Frazier et al., 2017). However, to-date no studies have investigated the relationships between PS and the mental wellbeing of doctors. A study in nurses found that reduced PS was significantly associated with burnout, highlighting its potential as a mental health determinant in healthcare professionals, including doctors (Vévoda et al., 2016). Several studies have identified PS to be a moderating variable on relationships in non-healthcare related settings (Erkutlu & Chafra, 2016; Hans & Gupta, 2018; Miao et al., 2020).

The issue of feeling safe to voice concerns without fear of retribution is becoming increasingly relevant for the NHS. Earlier this year, an urgent investigation into the whistleblowing policies at West Suffolk Hospital was ordered, following an employee 'witch-hunt' after information was disclosed to a patient's relative (NHS England, 2020). The Francis Inquiry and the medico-negligent case of Dr Bawa-Garba have both highlighted the current perception of a 'blame culture' within the NHS (Department of Health and Social Care, 2013; Nicholl, 2018). This culture was further explored by the BMA, whom found that 95% of surveyed doctors reported 'often' or 'occasionally' feeling fearful of making an error

and 55% reporting they are fearful of being wrongly blamed (BMA, 2018). This exemplifies the low levels of trust NHS doctors have in their colleagues, clinical teams and the NHS. To our knowledge no studies have explored how this fear is associated with the mental wellbeing of doctors, however a Turkish study found it was the greatest source of anxiety for medical students (Sarikaya et al., 2006). Concern over making mistakes is considered to be a major dimension of perfectionism (Frost et al., 1990) along with 'doubt about actions' (Stöber, 1998). Perfectionism is a trait that has been found to be associated with psychopathology in medical students (Henning et al., 1998) and other populations (DiBartolo et al., 2008; Frost et al., 1990; Hewitt et al., 1996). It also thought to be a common trait in doctors (Peters & King, 2012).

Considering the lack of research in this area, any understanding of any associations could impact how clinical psychologists address improving staff wellbeing within healthcare settings in several ways. First, clinical psychologists play a role in NHS Occupational Health services through direct clinical work, as well as delivering counselling throughout a number of UK medical schools. Knowledge of associated factors could influence intervention choice and/or outcomes. Secondly, clinical psychologists are often involved in service development, which could benefit from information on improving staff mental wellbeing at a group or service-level. Finally, exploring the association may enable identifying doctors-at-risk, thereby facilitating health prevention strategies, at an individual, group or service-level.

Due to the high prevalence of psychiatric morbidity amongst doctors, it is important to explore the relationships between potential associated factors. This study aims to answer the following research question:

To what extent are psychological safety, concern over mistakes and doubts about actions associated with mental wellbeing in doctors?

The null hypotheses are as follows:

- There is no relationship between participant's mental wellbeing scores and psychological safety scores.

- There is no relationship between participant's mental wellbeing scores and concern over mistakes and doubts about actions.

- Psychological safety and concern over mistakes and doubts about actions do not predict participant's mental wellbeing.

- Psychological safety does not moderate any relationship found between concerns over mistakes and doubts about actions and mental wellbeing.

Method

Participants

Participants will be recruited via several different methods in a specified order. First, the survey will be advertised on two forums; Doctors.net.uk's forum and the Junior Doctors UK forum on Reddit (see advertising material 1). The title and a brief description of the study, along with a hyperlink to the survey link will be displayed. If this fails to recruit enough participants, doctor contacts who have agreed to assist in the recruitment process will distribute the survey to potential participants (see advertising material 2), by forwarding on my email (advertising material 2). Within the email are reminders that there is no obligation to complete the survey or share with others, to reduce any perceived pressure. There is also a reminder that the link should not be shared via NHS email accounts. Failing the above, the Louise Tebboth Foundation, a doctor's mental wellbeing charity, has agreed to distribute the survey on their social media page and to their contacts (see advertising material 2).

Participants will be doctors with a full or provisional license to practice medicine who are currently working (part-time, full-time or locum). They can work in public or private healthcare settings, within any specialty as long as they have clinical contact with patients.

A-priori power calculations indicate that a sample of at least 75 participants will be required in order to detect a small effect size of 0.20 (as observed in Vevoda's (2016) study in nurses) between the explanatory variables (PS, COMDAA, age, gender, seniority of doctor, specialty). This was calculated using G*power analysis, with an □ value of .05 and the number of predictors being 6. Whether the latter two are entered into the regression will be dependent on any correlations observed.

To increase the stability of the regression model, the rule of thumb equation of N = 50 plus 10 per independent variable will be used, meaning a minimum of 110 participants will be required

Design

The study will employ a cross-sectional, correlational design: it will aim to measure the strength and direction of relationships between several variables, using only one group of participants, at one time-point.

Materials

The participants' materials for this study will be available online via Qualtrics. In total, the survey contains 44 questions, with an estimated completion time of ten minutes for participants. The participants' materials will consist of:

1. Participation information sheet – this outlines the purpose of the research and includes information on how data will be stored and used, contact information for the research team and details on how to make a complaint.

2. Eligibility and consent questions – these four questions assess if the participant meets the inclusion criteria for the study and if they consent to take part.

3. Demographics questionnaire – Six questions to gather demographic and occupational information about participants.

4. The Warwick-Edinburgh Mental Well-being Scale (Tennant et al., 2007). This validated 14-item scale measures mental wellbeing and has been widely validated in adult populations, across different countries and cultures (Warwick Medical School, 2020). Tennant et al (2007) report the internal consistency to be high (Cronbach's alpha = 0.91). Each question is positively scored on a Likert scale of 1-5, resulting in a total score of 14 to 70 points, with a higher score reflecting greater mental wellbeing.

5. Psychological safety measure (Edmondson, 1999). This is a 7-item questionnaire with a reported Cronbach's alpha score of 0.82 and established discriminatory validity (Edmondson, 1999). Each question is scored on a Likert scale of 1-5. The range of total scores is 7 to 35, with a lower score reflecting a 'psychologically safer' environment.

6. Concern over mistake and doubts about actions (COMDAA). This is measured using 13-items taken from the updated Frost Multidimensional Perfectionism Scale (FMPS) (Frost et al., 1990; Stöber, 1998), The internal consistency of Concern over mistakes and Doubts about actions were acceptable and good, with Cronbach's alpha scores of 0.80 and 0.70, respectively (Franco et al., 2014). The FMPS has been validated in a wide range of studies (Bastiani et al., 1995; Frost & Marten, 1990; Rhéaume et al., 1995), The questions are all scored on a Likert score of 1 to 5, with a total score range of 13 to 65. Higher scores reflect more perfectionistic traits.

Procedure

Potential participants will see the title of the research, a brief description of the study, and a hyperlink which leads them to the landing page of the Qualtrics survey. The first page of the survey is the Patient Information sheet.

Data will be collated on the principal investigator's password protected Qualtrics account and will only be accessible to the principal investigator and supervisor.

Data Analysis

The relevant data for each analysis will be transferred from Qualtrics to SPSS data files. Firstly, the correlations between the explanatory and outcome variable will be assessed for statistical significance.

Then a multiple regression will be performed on the independent variables (age, gender, COMDAA and psychological safety) and any explanatory variables that showed statistical correlation with mental wellbeing (seniority and specialty). This will assess their relationship with the dependent variable (mental wellbeing).

Finally, evidence of possible moderation effects of PS on COMDAA will be assessed. Numerous studies have shown the moderating effects of PS on various relationships. The hypothesis is that PS may moderate the relationship between an individual's COMDAA and their mental wellbeing.

Dissemination

It is anticipated that the findings of this study will be disseminated as follows:

1. Submitted as part of the principal investigator's thesis for the Doctorate in Clinical Psychology (DClinPsy)

2. Submitted for publication in a peer-reviewed journal

3. Presented to trainee clinical psychologists and course staff at the DClinPsy thesis presentation day at Lancaster University.

4. Distributed to online forums and organisations relevant to the medical profession (e.g. the Health Service Journal, BMA etc.)

Practical Issues

Data will be submitted anonymously and stored securely on password protected software (Qualtrics). Data will be accessible only to the principal investigator and the supervisor (and the research coordinator and Research and/or Programme Director in the DClinPsy team once the assignment is submitted). Once the project is complete, the data will be sent to the research coordinator of DClinPsy team for storage for 10 years on the Lancaster University secure Network or Box. Professor Sellwood (supervisor) will be the data custodian and will be responsible for overseeing the data being destroyed after 10 years.

The license for the necessary statistical analysis software (SPSS) is available through Lancaster University.

Ethical Concerns

Since participant recruitment is to be carried out through the Louise Tebboth Foundation, other organisations and through contacts, NHS ethical approval is not required and ethics approval is being sought via the FHMREC only.

There is a small chance that the participants may feel distressed as a result of completing the questionnaire. In the debrief section of the questionnaire, details of relevant organisations that participants can contact for support will be included. No risks to the researchers have been identified and non-personal contact information has been provided to protect the researcher's privacy.

Collected data will be submitted anonymously and stored securely on Qualtrics (a password protected platform). Only the principal investigator and the supervisor named above will have access to the data during the study. Once submitted, the research coordinator and/or Research/Programme Director in the DClinPsy team will have access. Following the completion of the project, the data will be sent to the research coordinator of the DClinPsy team for storage for 10 years on the Lancaster University secure Network. Professor Bill

Sellwood will be the data custodian and will be responsible for overseeing the data being destroyed after 10 years.

Timescale

October - November 2020: Submission of ethics application

December – March 2021: Data Collection

April – September 2021: Data Analysis

October – 2021 – April 2022: Write up

May 2022: Submission of report as part of thesis

June - September 2022: Viva voce, submission for publication, dissemination of findings

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Qualtrics Survey

Relationship between concerns over mistakes, psychological safety, and mental wellbeing in doctors.

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research.data-protection. My name is Corinna Milroy and I am conducting this research as a student in the Clinical Psychology doctorate (DClinPsy) programme at Lancaster University, Lancaster, United Kingdom.

Participant Information

What is the study about?

We are aiming to study the relevance of two psychological stressors which may affect the wellbeing of doctors. We are not specifying what these are until you complete the survey. This is so that the results have a reduced risk of bias.

Why have I been approached?

This study has been shared with you as the study requires information from qualified doctors.

Do I have to take part?

No. It's completely up to you to decide whether or not you take part.

What will I be asked to do if I take part?

If you decide you would like to take part, you would be asked to complete the following questions on the survey. The survey should take between 10-15 minutes.

Will my data be Identifiable?

No – the data collected from this study is from an anonymous survey. The data collected for this study will be stored securely and only the researchers conducting this study will have

access to this data. The files on the computer will be encrypted (that is no-one other than the researcher will be able to access them) and the computer itself password protected.

What will happen to the results?

The results will be summarised and reported in the researcher's doctoral thesis and may be submitted for publication in an academic or professional journal.

Are there any risks?

There are no risks anticipated with participating in this study. However, if you experience any distress following participation you are encouraged to read the resources provided at the end of this sheet.

Are there any benefits to taking part?

Although you may find participating interesting, there are no direct benefits in taking part.

Who has reviewed the project?

This study has been reviewed and approved by the Faculty of Health and Medicine Research Ethics Committee at Lancaster University.

Where can I obtain further information about the study if I need it?

If you have any questions about the study, please contact the main researcher:

Corinna Milroy

c.milroy1@lancaster.ac.uk

B31, Health Innovation One

Sir John Fisher Drive

Lancaster University

Lancaster

LA1 4AT

Tel: [Insert research phone number here]

Or the main research supervisor:

Professor Bill Sellwood

b.sellwood@lancaster.ac.uk

Professor of Clinical Psychology

Health Innovation One

Sir John Fisher Drive

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Lancaster

LA1 4AT

Tel: 01524 593998

Complaints

If you wish to make a complaint or raise concerns about any aspect of this study and do not

want to speak to the researcher, you can contact:

Dr Ian Smith

Tel: (01524) 592 282

Research Director

i.smith@lancaster.ac.uk

Health Innovation One

Sir John Fisher Drive

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If you wish to speak to someone outside of the DClinPsy Doctorate Programme, you may

also contact:

Dr Laura Machin

Tel: (01524) 594973

Chair of FHM REC

l.machin@lancaster.ac.uk

Faculty of Health and Medicine

(Lancaster Medical School)

Lancaster University

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LA1 4YG

Thank you for taking the time to read this information sheet.

Resources in the event of distress

Should you feel distressed either as a result of taking part, or in the future, the following

resources may be of assistance.

BMA Support Directory for medical students and doctors:

https://www.bma.org.uk/media/3074/bma-uk-wellbeing-support-services-for-medics-august-

2020.pdf

Doctors Support Network:

https://www.dsn.org.uk/support-for-doctors

Samaritans 116 123

https://www.samaritans.org/how-we-can-help/contact-samaritan/

NHS UK:

https://www.nhs.uk/conditions/stress-anxiety-depression/mental-health-helplines/

<u>Consent</u>

By clicking 'I consent to take part in this study' you are agreeing to the following statements:-

1) You have read the information sheet and understand what is expected of you within this study

2) You confirm that you understand that any responses/information you give will remain anonymous

3) Your participation is voluntary

4) You consent for the information you provide to be discussed with my supervisor at Lancaster University

5) You consent to Lancaster University keeping the anonymised data for a period of 10 years after the study has finished

6) You consent to take part in the following survey

    ◯ I consent to take part in this study

    ◯ I don't consent to take part in this study

    ◯ I would like to read the participation information again

Do you have a provisional license or full license to practice medicine?

    ◯ Yes

    ◯ No

Are you currently working as a doctor?

◯ Yes

◯ No

Do you have clinical contact with patients?

◯ Yes

◯ No

What is your age?

_____

What is your gender?

◯ Male

◯ Female

◯ Nonbinary

◯ Prefer not to disclose

◯ Prefer to self-describe (see next question)

How would you describe your gender?

_____

What is the best description of your current role?

○ Foundation Doctor 1 (FY1)

○ Foundation Doctor 2 (FY2)

○ Locum Foundation Doctor

○ Locum SHO

○ Locum Registrar

○ Locum Consultant

○ Specialty and Associate Specialists

○ Trainee (SHO)

○ Trainee (Registrar)

○ GP Trainee

○ Consultant

○ GP

○ Clinical Fellow

How many years of experience do you have for your current role?

Please note if you have re-specialised, please describe the number of years of experience you

have for your current specialty.

_____

What specialty are you training in?

Please choose the option that best fits

◯ Surgery

◯ General Medicine

◯ Obstetrics & Gynaecology

◯ Radiology

◯ Emergency Medicine

◯ Acute Internal Medicine

◯ Anaesthetics

◯ Psychiatry

◯ Paediatrics

◯ Sexual Health

◯ Public Health

◯ Academic Medicine

What is the specialty of your current place of work/placement?

Please choose the option that best fits.

◯ Acute internal medicine

◯ Anaesthetics

◯ Cardio-thoracic surgery

◯ Cardiology

◯ Clinical genetics

◯ Radiology

○ Sexual and reproductive health

○ Dermatology

○ Emergency medicine

○ Endocrinology and diabetes mellitus

○ Gastroenterology

○ General (internal) medicine

○ General practice

○ Psychiatry

○ General surgery

○ Genitourinary medicine

○ Geriatric medicine

○ Haematology

○ Histopathology

○ Immunology

○ Infectious diseases

○ Intensive care medicine

○ Microbiology/Virology

○ Oncology

○ Neurology

○ Neurosurgery

○ Obstetrics and gynaecology

○ Occupational medicine

○ Ophthalmology

○ Oral and maxillofacial surgery

○ Otolaryngology

○ Paediatric cardiology

○ Paediatric surgery

○ Paediatrics

○ Palliative medicine

○ Plastic surgery

○ Public health medicine

○ Renal medicine

○ Respiratory medicine

○ Rheumatology

○ Sport and exercise medicine

○ Trauma and orthopaedic surgery

○ Tropical medicine

○ Urology

○ Vascular surgery

○ Other

Below are some statements about feelings and thoughts.

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

	None of the time	Rarely	Some of the time	Often	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	○	○	○	○	○

How strongly do you agree with these statements in relation to your current workplace?

	Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
If I make a mistake in this team, it is held against me	○	○	○	○	○	○	○
Members of this team are able to bring up problems and tough issues	○	○	○	○	○	○	○
People on this team sometimes reject others for being different	○	○	○	○	○	○	○
It is safe to take a risk in this team	○	○	○	○	○	○	○
It is difficult to ask other members of this team for help	○	○	○	○	○	○	○
No one on this team would deliberately act in a way that undermines my efforts	○	○	○	○	○	○	○
Working with members of this team, my unique skills and talents are valued and utilised	○	○	○	○	○	○	○

Please answer the following questions in relation to how much they apply to you. Do not

spend too much time on any one question.

	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
If I fail at work, I am a failure as a person	○	○	○	○	○
I should be upset if I make a mistake	○	○	○	○	○
If someone does a task at work better than I do, then I feel as if I failed the whole task	○	○	○	○	○
If I fail partly, it is as bad as being a complete failure	○	○	○	○	○
Even when I do something very carefully, I often feel that it is not quite right	○	○	○	○	○
I hate being less that the best at things	○	○	○	○	○
People will probably think less of me if I make a mistake	○	○	○	○	○
If I do not do as well as other people, it means I am an inferior being	○	○	○	○	○
If I do not do well all the time, people will not respect me	○	○	○	○	○
I usually have doubt about the simple everyday things that I do	○	○	○	○	○
I tend to get behind in my work because I repeat things over and over	○	○	○	○	○
It takes me a long time to do something 'right'	○	○	○	○	○
The fewer mistakes I make, the more people will like me	○	○	○	○	○

Thank you for completing the survey!

Your responses will help us gain a better insight into the mental wellbeing of doctors and two associated factors; doctor's concern over making mistakes and doubts about actions, and the psychological safety of their workplace. This study aims to provide useful information with the aim of improving doctor's mental wellbeing. If you have any questions about the study, please contact the main researcher:

Corinna Milroy

C.milroy1@lancaster.ac.uk

B31, Health Innovation One

Sir John Fisher Drive

Lancaster University

Lancaster

LA1 4AT

Tel: [insert research phone number]

Should you feel distressed either as a result of taking part, or in the future, the following resources may be of assistance.

BMA Support Directory for medical students and doctors:

https://www.bma.org.uk/media/3074/bma-uk-wellbeing-support-services-for-medics-august-2020.pdf

Doctors Support Network:

https://www.dsn.org.uk/support-for-doctors

Samaritans 116 123

https://www.samaritans.org/how-we-can-help/contact-samaritan/

NHS UK:

https://www.nhs.uk/conditions/stress-anxiety-depression/mental-health-helplines

Advertising Materials

Advertising material 1 – to be shared on doctors' forums

I am conducting some research for my Doctorate in Clinical Psychology exploring if there is an association between a personality trait, their experience of their workplace and the mental wellbeing of doctors. The hope is that any relationships observed could help understand the high prevalence of psychological distress found in doctors.

Participants must have a license to practice medicine (including provisional), be currently working as a doctor and who has contact with patients.

There is no reward/benefit to entering the study apart from adding to the research exploring the mental wellbeing of doctors.

The survey takes approximately 10 minutes to complete.

***insert survey link here ***

Many thanks for your assistance and please let me know if you require any further details on the study.

Best wishes,

Corinna Milroy

Trainee Clinical Psychologist

Lancaster University

c.milroy1@lancaster.ac.uk

Tel: [insert research phone number]

Advertising material 2 – to be sent to doctor contacts via email who have agreed to assist in the recruitment process and the Louise Tebboth Foundation (if needed)

Hello,

Thank you for agreeing to assist in the distribution of the survey link for my research project. Please note, there is no obligation to do so if you know longer wish to assist. By distributing the survey link to others, you are consenting to assist in this process. Below is some information about the study along with the link to the survey. Please note if you meet the criteria to take part in the study, you are welcome to participate also.

When distributing to potential participants please forward on this email to potential participants, so that all information about the study is relayed. **Please do not send to NHS email addresses.**

I am conducting some research for my Doctorate in Clinical Psychology exploring if there is an association between a personality trait, their experience of their workplace and the mental wellbeing of doctors. The hope is that any relationships observed could help understand the high prevalence of psychological distress found in doctors.

Participants must have a license to practice medicine (including provisional), be currently working as a doctor and who has contact with patients.

There is no reward/benefit to entering the study apart from adding to the research exploring the mental wellbeing of doctors.

The survey takes approximately 10 minutes to complete.

<div align="center">***insert survey link here ***</div>

There is no obligation for you to complete the survey or to forward this email on to others who meet the inclusion criteria. However, if you would you like to share this email with other potential participants, please do. **However, please do not send to NHS email addresses.**

Many thanks for your assistance and please let me know if you require any further details on the study.

Best wishes,

Corinna Milroy

Trainee Clinical Psychologist

Lancaster University

c.milroy1@lancaster.ac.uk

Tel: [insert research phone number]