

Resilience at the workplace: A systematic review and meta-analysis of mindfulness-based, cognitive-behavioural, and multimodal interventions

Master Thesis

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Abstract

Background: Developing resilience is crucial in fast-paced organisations for enhancing performance and managing stress-related issues. However, the current literature hovers unclear about the definition of resilience and the mechanisms by which it can be improved. To address this issue, this systematic review and meta-analysis were conducted to examine the effects of specific individual work-related resilience interventions. Interventions were categorised into three main groups: mindfulness-based, cognitive-behavioural (CB), and multimodal interventions. In addition, this study aimed to analyse and integrate the most effective psychological procedures provided by the most solid intervention category to enhance work-related resilience.

Methods: For this meta-analysis, we searched EBSCO Discovery Service, PsycARTICLES, PsycBOOKS, PsycINFO, ProQuest, Scopus, and Web of Science, as well as backward citations. It included all experimental and quasi-experimental studies of resilience work-based interventions that measured resilience as one of the outcomes and published until December 2021, without any language restrictions. We analysed the data through random-effects meta-analyses for mindfulness-based, CB, and multimodal interventions. To determine the differences between workers who participated in resilience-focused interventions and those who did not, the evidence from the primary studies was synthesised as differences between standardised mean differences (SMDs) through Cohen's *d*.

Findings: One thousand nine hundred and twenty-five records were identified, 37 were eligible, and data were available for 26 studies. One study had a moderate risk overall bias. Mindfulness-based interventions (four studies, 401 observations) showed a more robust effect size compared with control groups (dSMD = .86 95% CIs [.63; 1.04], $I^2 = 0\%$). No significant differences in response to interventions were seen in workers participating in CB (dSMD = .15 95% CIs [-.06; 0.35], $I^2 = 80\%$), and multimodal interventions (.05 95% CIs [-.12; .22], $I^2 = 6\%$).

Interpretation: Resilience interventions based on mindfulness techniques are considered to present better results in workers' resilience levels. However, further research is needed to investigate publication bias and whether different populations may affect the general effect size of interventions.

Keywords: resilience, work-based resilience, resilience intervention, meta-analysis

Introduction

Finding alternatives to build a resilient workforce has been a popular research topic in the fields of human resources and organisational management (Hillmann & Guenther, 2021; Huang et al., 2019; Kerksieck et al., 2019). The main reason for this interest was that resilient workers are capable of adapting and thriving in the face of severe disruptions (Kuntz et al., 2016). This type of performance has been specially critical during global crises, such as the spread of COVID-19, the war in Ukraine, and geopolitical sanctions that may have impacted international markets, compelling organisations to reduce budgets, merge and downsize (Aruväli et al., 2023; Vu et al., 2022). In addition, it was important to note that such circumstances can potentially contribute to a significant increase in the incidence of psychological disorders among employees (Akbari et al., 2023).

In the last three years, the global labour market has been severely affected by overlapping crises, resulting in high levels of uncertainty (International Labor Organization [ILO], 2022). According to the ILO (2021), the global employment-to-population ratio declined from 57.6 in 2019 to 54.9 per cent in 2020. Indeed, unemployment remained high in most countries with the emergence of COVID-19 variants in 2021 and renewed safety measures. However, with the emergence of multiple economic and political disruptions, the global economy could not recover as expected (ILO, 2021, 2022). The disproportionate crises' impact on different workforce groups may have increased labour market inequalities and amplified job stressors such as job insecurity, consequently leading to negative impacts on employee performance and well-being (ILO, 2021; Stankevičiūtė et al., 2021).

As a result of recent changes, employees who could keep their occupations faced the challenge of new work arrangements, such as remote work (Kniffin et al., 2021; Luebstorff et al., 2023). While remote work proved to offer many advantages, such as high flexibility and autonomy, it was noteworthy to acknowledge that it can also cause poor social interaction

and disrupt the work-life balance, leading to adverse outcomes (Eurofound, 2021; Kniffin et al., 2021; Parent-Lamarche & Boulet, 2021).

Even before such disruptions, the acronym “VUCA”, an abbreviation for Volatility, Uncertainty, Complexity and Ambiguity, was used in the Industrial Revolution 4.0 era by the organisational field to illustrate the unceasing changes in the business market (Murugan et al., 2020). Hence, coping with the increasing labour market uncertainties, new job demands, and job-related learning tasks was an utmost requirement (Meyer & Hünefeld, 2018; Obschonka et al., 2012). Considering that the significant resource of an organisation is its employees, implementing effective policies to strengthen resilience in the workforce to better respond to this uncertain scene was beneficial at individual and organisational levels (Jabbour & Thomas, 2015; Messer & Messer, 2021; Robertson et al., 2015).

In this way, the call for adaptability and flexibility has been accelerating for organisations and their members to face growing uncertainty, sustain competitiveness and go through disruptions and discontinuities in their operating environment (Burnard & Bhamra, 2011; Tarba et al., 2019). To acquire these characteristics, resilience stood as a good asset for both individuals and businesses, considering that both might experience adversity and stress at some point in their course (Huang et al., 2019; Karam et al., 2014; Linnenluecke, 2017; Tarba et al., 2019). Drawing from the job demands-resources (JD-R) model, personal resources, such as resilience, are relevant predictors of motivation and can buffer the negative impacts of job demands (Bakker & Demerouti, 2014). Indeed, earlier studies in the organisational field found significant and positive implications of resilience in subjective well-being. In addition, resilience mitigated unfavourable effects (e.g., reduced performance, turnover, health symptoms) of the chronic state of work-related psychological stress, defined as burnout (Bogaerts et al., 2021; Cantante-Rodrigues et al., 2021; Ceschi et al., 2017; Maslach & Leiter, 2017; Safiye et al., 2021; Schaufeli, 2017).

Despite its presumed simple character, resilience was a multifaceted, multidimensional and complex concept to define (Liu et al., 2020; Ponomarov & Holcomb, 2009; Southwick et al., 2014; Windle, 2011). The work of Masten et al. (1990) was considered one of the pioneers in resilience research from developmental psychology (Windle, 2011), and they defined resilience as “the process of, capacity for, or outcome of successful adaptation despite challenging or threatening circumstances” (p.426). In the business and management fields, the resilience literature has been fragmented across different research streams (Linnenluecke, 2017) and still faces high ambiguity in conceptualisation and operationalisation. This scene requires a clear understanding of the definition of the concept to enhance its scientific relevance (Amann & Jaussaud, 2012; Hillmann & Guenther, 2021; Linnenluecke, 2017).

Therefore, a significant body of research explored resilience intentional development to achieve its benefits at work. Those resilience development programs in the workplace must be continuously evaluated (Vanhove et al., 2016). Resilience research in early development was well explored, but adult resilience, specifically in the organisation setting, was preliminary in 2016 (Sherlock-Storey, 2016).

A previous literature review focused on strategies to improve resilience in nursing because resilience fosters a positive healthcare setting, adjusts to adversity, and nurtures personal strengths (Jackson et al., 2007). Delgado et al. (2017) and Foster et al. (2019), in their reviews, investigated the state of knowledge on nurse resilience. They supported the hypothesis that resilience was a relevant variable in interventions to address emotional disturbance in nursing work. Moorfield and Cope (2020) and Angelopoulou (2021) aimed to assess the effectiveness of resilience interventions in medical practitioners and found significant positive evidence of the practice within this population. The van der Meulen et al. (2020) meta-analysis investigated whether resilience was predictive of military mental health

and functioning, getting controversial indications regarding the effectiveness of resilient training among military personnel. In contrast, the scoping literature review of Voth et al. (2022) evaluated the evidence-based quality and effectiveness of resilience-building in military, veteran, and public safety workers, identifying favourable effects of such intervention. In a broader scope, studies concentrated on resilience promotion in clinical settings or with adolescent groups confirmed the improvement of resilience through such interventions (Jing et al., 2021; Joyce et al., 2018; Leppin et al., 2014; Liu et al., 2020).

Some reviews also centred on resilience interventions in business-as-usual contexts (Robertson et al., 2015; Scheuch et al., 2021; Vanhove et al., 2016), and, despite sustained indications of resilience development in different scenes, there was still a loose understanding of what type of intervention contributes to higher levels of resilience in workers. The systematic review by Robertson et al. (2015) concluded that resilience-building programs may positively affect employees. However, they could not find solid results due to the unclarity of the primary studies' conceptual, design, and implementation. They also indicated the shortage of studies measuring resilience at the time, the need for results with effect sizes to make quantitative meta-analysis doable and more systematic research in work-based resilience. Scheuch et al. (2021) found a significant positive effect of resilience training in 63% of the studies analysed. Despite the encouraging results, they did not aim to find the most effective intervention category. Lastly, the only meta-analytic evidence to our knowledge so far provided by Vanhove et al. (2016) found small but immediate effects of resilience-building interventions on performance and mental health outcomes. It recommended the analysis of different factors that potentially affect interventions' effectiveness.

In this stream of studies, the present study aimed to identify, synthesise, and assess the evidence of the impact of work-related resilience interventions in three main categories:

mindfulness-based, cognitive behavioural (CB), and multimodal through the meta-analysis approach. Considering the fickleness of resilience conceptualisation, we scanned the resilience definitions to ensure that all the primary evidence addressed the same study object. Finally, we analysed and integrated the explanations about the psychological mechanisms through which the most effective programs impact resilience.

This research can provide different insights for the practical and scientific field of the Work, Organizational and Personnel Psychology area. First, a thorough analysis of primary pieces currently available provide to the research field a state-of-art perspective of the quality of what has been developed and efficient to nurture resilience in the workplace. Second, this can be a scientific evidence for practitioners in the field when analysing where to set investments when seeking for resilience as a great resource to have in the workforce.

This research provides valuable insights for the practical and scientific fields of Work, Organizational, and Personnel Psychology. Firstly, an in-depth analysis of the existing literature offers a state-of-the-art perspective on the current research developments and their effectiveness in fostering resilience in the workplace. Secondly, this study serves as scientific evidence for practitioners in the field to make knowledgeable decisions and better practices about investing in resilience as a significant resource for the workforce.

The following sections were dedicated to deepening the conceptualisation of resilience, particularly in the work-related contexts, its relationship with other concepts (e.g., burnout, work engagement, performance), the state-of-the-art resilience interventions literature and the research questions.

Resilience as a concept

As previously mentioned, the difficulties in defining resilience have been recognised in the scientific community (Liu et al., 2020; Ponomarov & Holcomb, 2009; Southwick et al., 2014; Windle, 2011). Resilience had its etymologic definition from the Latin “resilire”,

which means ‘to rebound, to recoil’ (Brandão et al., 2011; Garcia-Dia et al., 2013; Windle, 2011). Similarly, the Oxford Dictionary of English defined the word in two manners: “the capacity to recover quickly from difficulties; toughness” and “the ability of a substance or object to spring back into shape; elasticity” (Stevenson, 2010, p. 3922).

The particular mechanisms of the construct guided psychological resilience as a domain of study in the 1970s, initially in developmental and clinical psychology (Garcia-Dia et al., 2013; Gamezy, 1974; Windle, 2011), advancing up to our days in several directions (Liu et al., 2020). However, the continued lack of conceptual clarity and the growing general discourse in loose terms of the word may have contributed to its interchangeable use of it with other constructs (Britt et al., 2016; Denckla et al., 2020; Jing et al., 2021; Southwick et al., 2014) such as coping (O’Dowd et al., 2018), hardiness (Bartone et al., 2005), and psychological flexibility (Bryan et al., 2015). Many authors stressed the relevance of a more focused empirical perspective to outline operational conceptualisations of resilience analogous to its complex and contextual characteristics (Hillmann & Guenther, 2021; Linnenluecke, 2017; Southwick et al., 2014). In addition, such complexity requires specification of whether resilience was seen as a trait, a state, a process or a result, or even the above combination (McEwen & Boyd, 2018; Southwick et al., 2014).

The American Psychological Association (APA, 2020) offered a functional delineation, which stated that resilience was a way of thriving even in adverse and stressful events. Still, there was a solid criticism of this definition as not as comprehensive enough considering the nature of resilience (Southwick et al., 2014). Although there was no universal conceptualisation of resilience, most authors gathered some commonalities in defining it (Winwood et al., 2013). In a systematic review of resilience definitions, Johnston et al. (2015) found that most of the reviewed studies (11 out of 12) had at least three components in common while defining the term: First, the need of experienced adversity to show resilience.

Second, resilience could sustain operating function despite hardships or rebound to average functioning after troubles. Third, resilience was viewed as a dynamic concept rather than a rigid personality trait.

The definition provided by Bonanno (2004) is often cited in the literature (Johnston et al., 2015), and this may reflect the prominent character of his contributions to contemporary research (Garcia-Dia et al., 2013). He defined adult resilience as an individual's competence to sustain healthy psychological and physical functioning despite unusual and disruptive situations (Bonanno, 2004). In this view, resilience was seen as a trajectory characterized by a short and unbalanced period but with maintained health (Bonanno, 2004; Bonanno et al., 2011). Similarly, resilience was also seen as a capacity to adjust favourably to disturbances of the dynamic scheme (Masten, 2014; Masten & Cicchetti, 2016).

Using a longitudinal perspective, Netuveli et al. (2008) defined resilience as bouncing back move after adversity, a common concept understanding (Southwick et al., 2014). However, some researchers debated this notion of 'bouncing back', mainly because some individuals may be in an unhealthy setting in the first place, which means that they will return to a hostile environment anyway. Hence, resilience should consider where people initiate the process of confronting hardship and mobilising resources to sustain well-being because it is where they start to display healthy functioning (Denckla et al., 2020; Panter-Brick & Leckman, 2013).

Seeing resilience as a process that may work differently across life's domains was well aligned with the literature. For instance, a person may be resilient in their personal or academic life but not at work (Pietrzak & Southwick, 2011). In a similar understanding, a concept analysis done by Windle (2011) reached the following definition:

Resilience is the process of effectively negotiating, adapting to, or managing significant sources of stress or trauma. Assets and resources within the individual,

their life and environment facilitate this capacity for adaptation and ‘bouncing back’ in the face of adversity. Across the life course, the experience of resilience will vary. (p.163)

Regarding work-related resilience, significant attention was directed to resilience in response to sudden events as well as concerning its potential as an asset in the landscape of daily challenges at work (Kuntz et al., 2016; Sherlock-Storey, 2016). Kuntz et al. (2016, p. 458) proposed a merger of two approaches in conceptualising employee and organisational resilience: the inherent and adaptive resilience. Inherent resilience is linked to “developing resilience capability in an environment characterised by low to moderate levels of adversity exposure (i.e., business as usual)”. This notion of resilience underpins the idea of deliberation by businesses and their members in developing resilience abilities. Whilst adaptive resilience is the ability to respond efficiently to substantial adversity. Then, employee resilience, in their perspective, was the ability to continually adapt and prosper at work through resilient behaviours even in challenging situations. Although connected, worker and organisational resilience were considered separate concepts. Interpreting organisational resilience as an evolving construct, Ahmed et al. defined it as a “process and outcome of strategic preparedness for, adaptive response to, and capitalising on disruption for organisational survival, positive transformation, and prosperity” (p. 397).

Moreover, resilience was also included among the personal resources of the job demands and resources (JD-R) model (Demerouti et al., 2001). King et al. (2016) proposed that this model should be used for future research to explain how resilience supports workers in tackling job demands while working positively. The core of the JD-R model is that every work may have its factors related to job stress, and such elements can be in two categories, job demands and job resources (Bakker & Demerouti, 2007). This model was broadly used as a conceptual framework in the workplace to increase work engagement and prevent burnout.

Job burnout experiences occur when individuals have incessant job demands and poor job and personal resources to tackle and reduce those demands (Maslach et al., 1996; Maslach & Leiter, 2017; Schaufeli, 2017).

Personal resources are evaluations made by productive individuals on their ability to manage and positively impact their environment (Xanthopoulou et al., 2009). They were positively related to work engagement, helpful in managing job demands and may support improving performance (Bakker et al., 2012; Sweetman & Luthans, 2010). This is because personal resources can help individuals interact and impact their contexts more productively through more positive and active behaviours, displaying a resilient way of operating (Schaufeli & Taris, 2014).

In a different path, Luthans et al. (2006) proposed resilience as one of the dimensions, also specified as a positive organisational behaviour (POB) (Luthans, 2002), of the psychological capital (PsyCap). PsyCap is a vital asset to deal with the exponential challenges of current organisations, and it was strongly correlated with job satisfaction, work happiness, organisational commitment, and performance (Luthans et al., 2007; Luthans & Youssef, 2007). Within this positive approach to a psychological state of development, resilience was seen as a competency possible to be developed through work-based interventions, defined as the ability to recoil or bounce back from adverse situations or even positive ones in a progressive movement (Luthans, 2002; Luthans et al., 2006).

As aforementioned, we also examined the definition of resilience adopted in the retrieved studies to determine whether the different studies considered the same study object. To this goal, we adopted the broadest possible definition of resilience, guaranteeing a sufficient level of similarity, allowing accurate comparisons and a robust combination of studies in one meta-analysis. In this way, we defined resilience as a multi-level, dynamic process of adaptation and coping within a stressful context (Connor & Davidson, 2003;

Denckla et al., 2020). Analysing resilience as an interactive and dynamic capacity, we assumed that resilience could be developed, taught, and practised; although solid at certain times, it is also adjustable (Hartmann et al., 2020; Winwood et al., 2013).

The broad range of theoretical definitions of resilience was related to the several measures used across studies (Fisher & Law, 2021). Windle et al. (2011) found no current best standard for measuring resilience. Nevertheless, they identified the Connor-Davidson Resilience Scale (CD-RISC), the Resilience Scale for Adults, and the Brief Resilience Scale (BRS) as the scales with the best psychometric properties to that date, measuring resilience as an ability that can be developed (Hartmann et al., 2020).

Hartmann et al. (2020) identified 30 measurement instruments used in a workplace context, although 13 of them did not have a work focus but identified resilience as a “general phenomenon” (p.16). Examples of specific work-related measures are Resilience at Work (RAW) (Winwood et al., 2013) and Work Team Scale (McEwen & Boyd, 2018).

Resilient workforce

Earlier studies endorsed individual work-based resilience as a core element in shaping a psychologically healthy work context (Joyce et al., 2019). Thus, a significant part of the literature embodied individual worker resilience as the root of resilience at teams and organisational levels (Hillmann & Guenther, 2021; Pádár & Pataki, 2012). To better understand individuals' resilience in the workplace, Cooper et al. (2013) drew a framework where they analysed the interaction between employees' personal traits, the primary source of workplace demands and resources, and the mechanisms by which resilient results are accomplished. In their review of occupational resilience, Kossek and Perrigino (2016) stated that the ability to recover from challenging situations effectively was an essential attribute in personal and professional domains. Individuals who exhibit resilience overcome these

obstacles and undergo personal growth and development, which is vital to their success in any career.

Historically, the terrorist attacks in the US on September 11, 2001, changed the course of resilience research substantially, from the concern with intra-organizational reliability to coping mechanisms and strategies under turbulent and unprecedented situations (Linnenluecke, 2017). Coutu (2002) discussed how workers' abilities to react to uncertainty underpinned resilience in business when he exemplified the successful result of a preparedness program in the reaction to the attacks on 11/9. At that stage, positive organisational scholarship emerged with the belief that individuals can respond to challenging conditions when trained and have knowledge support to keep going in the face of failures and changes (Sutcliffe & Vogus, 2003). This may justify the majority of resilience research in the workplace at the individual level of analysis (Hartmann et al., 2020).

It seemed sure that resilience—regardless of the multiple theoretical positions it may have—is a developable concept and a growing area of interest within organisations management due to its potential as a valuable asset in this volatile context (Heather et al., 2019; Southwick et al., 2014; Voth et al., 2022). Therefore, resilience programs have been growing in the organisational setting and provided insights into their results (Scheuch et al., 2021). However, there remained little accuracy concerning what was fundamentally needed for an intervention to improve individual resilience, let alone in the workplace context (Leppin et al., 2014; Robertson et al., 2015).

Reasons for resilience-building interventions for some workers involved with crisis response seemed proven (e.g., military and emergency services) (Pusey et al., 2020). However, resilience was also relevant for workers, where stress can be experienced in minor proportions but repeatedly over time (Vanhove et al., 2016). Research findings reported that occupations related to finances (Giorgi et al., 2019), education (Asaloei et al., 2020) and

customer service (Yun et al., 2019) showed low rates of psychological well-being, performance, and job satisfaction due to work-related stress. There was a high potential for interventions focusing on improving resilience in restraining the detrimental psychosocial effects of work stress and fostering a better quality of work-life (Vanhove et al., 2016).

Although there was a clear relationship between resilience and stress, several authors stated that resilience-developing programmes and stress-management interventions (SMIs) had a strong interconnection but were not identical (Cooper et al., 2013; Vanhove et al., 2016). Both categories had the same features, overlapped each other, and it could be ambiguous to distinguish if resilience or stress management is the focus of the intervention (Vanhove et al., 2016). However, resilience-building interventions were at the secondary level of SMIs, and they aimed to improve workers' capacity to deal with sources of workplace stress. In contrast, SMIs generally fell within the primary level, seeking to eradicate or diminish the origins and effects of stress or the tertiary level, which focuses on the individual's recovery from the adverse effects of stress (Cooper et al., 2013).

The utmost fact here was that workers who were the target audience of resilience interventions were usually already under significant stress levels and were more likely to benefit from the outcomes of these programs in the future. At the same time, SMIs also targeted those who were not yet experiencing stress. Thus, both interventions' categories supplemented each other (Vanhove et al., 2016). Such programmes share a similar goal but are distinguished in content, delivery, and length (Leppin et al., 2014). Van der Klink et al. (2001) categorised SMIs into four intervention groups: cognitive-behavioural (CB) approaches, relaxation techniques, multimodal interventions, and organization-focused interventions.

Cooper et al. (2013) encompassed relaxation techniques as part of mindfulness, which involves the ability to view oneself objectively (Kossek & Perrigino, 2016), and they were

considered one of the most effective techniques for promoting relaxation and positive emotions. Mindfulness-based interventions usually guide participants through repeated practice to be aware of body sensations, thoughts, and feelings in a state of acceptance, interest, and openness (Alberts & Hülshager, 2015; Cooper et al., 2013). They are instructed to focus on a single object or an idea, be observant of any distractions and return their attention to the object (Richardson & Rothstein, 2008). Previous studies indicated manifold benefits of mindfulness-based programmes, such as improved resilience, task performance, psychological well-being, employee turnover intentions and resonant leadership (Alberts & Hülshager, 2015; Christopher et al., 2018; Joyce et al., 2018, 2019).

Alberts and Hülshager (2015) discussed the assortment of mindfulness programmes that were increasingly developed and experimented with in non-therapeutic approaches. They differentiate between formal (e.g., body scan, sitting meditation, and three-minute breathing space) and informal practices (e.g., awareness of routine activities, body awareness, awareness of impulsive and reactive patterns, and awareness during social interactions). Moreover, mindfulness-based interventions vary in delivery mode (e.g., self-administered, online, face-to-face) and duration.

Long-term mindfulness interventions usually require two or more hours weekly for eight or ten weeks, and participants are invited to daily practice formal activities at home for about forty-five minutes. Traditional programmes are structured with the primary aim of mindfulness, cultivating an aware and observative mindset, and shifting automatic and prejudicial modes of thinking and behaving that demand time and continual practice.

However, in the high-speed work context, the time-consuming feature of traditional practices would be a barrier (Alberts & Hülshager, 2015). Thus, researchers developed different low-dose mindfulness interventions (e.g. weekly one-hour group meetings for eight

weeks) that showed no decreased effectiveness compared to standard versions, revealing the low-dose interventions as an attractive solution (Carmody et al., 2008; Klatt et al., 2008).

The structure of CB interventions, particularly in non-therapeutic circumstances, is usually based on education. CB interventions at the workplace are intended to educate individuals about what can be done by their work-related thoughts, emotions, and behaviours when facing stressful situations. Furthermore, this intervention category also aims to support the participants in developing assertive skills to access, monitor and modify such patterns of thoughts, leading to better responsive behaviours and problem-solving decisions (Minzlaff, 2019; Proudfoot et al., 2009; Richardson & Rothstein, 2008). A group of several studies in the organisational context attested the high efficacy of CB interventions in reducing stress-related, turnover and anxiety issues and increasing job satisfaction, productivity and employee well-being (Dalgaard et al., 2017; Proudfoot et al., 2009; Richardson & Rothstein, 2008; Van der Klink et al., 2001).

Underpinned by ongoing learning and personal development, previous research argued about CB-based approaches, such as training, psychoeducation and coaching (Cooper et al., 2013; de Haan, 2019). Coaching was considered a non-clinical and future-oriented intervention that primarily aims to support people in growing, adapting and changing behaviours to help the individual achieve goals related to professional and personal well-being (Grant et al., 2009; McGonagle et al., 2014). The coaching principles are mainly to recognise individuals as autonomous learners, to develop trust, clearness of goals and commitment in the coach-coachee relationship (de Haan, 2019; Minzlaff, 2019). Through support networks, coaching programs enhanced well-being, job satisfaction, resilience, and fulfilment in occupations with high exposure to stress (Dyrbye et al., 2019). Like mindfulness-based interventions, CB and its variations interventions have endless examples of designs and structures and are recognised as practical, straightforward and effective in

showing real-time results (Choudhury, 2013). Lastly, multimodal approaches are usually based on two or more theoretical bases and use multidimensional components (Scheuch et al., 2021). The meta-analysis by Joyce et al. (2018) concluded that multimodal approaches, in this case, CB and mindfulness-based, positively impacted individual resilience.

This study had two main objectives. First, we intended to determine the effective general size of primary evidence in resilience interventions within the organisational context. Second, we analysed and integrated the psychological procedures provided by the most solid intervention category to enhance work-related resilience. Previous studies classified the programmes into more homogenous subcategories to explore them better (Joyce et al., 2018; Richardson & Rothstein, 2008; Van der Klink et al., 2001). Accordingly, we formulated our first research question:

Q₁: How strong are the effects of mindfulness-based training, CB, and multimodal interventions in strengthening workers' resilience?

Nevertheless, it is noteworthy that interventions act differently for different public depending on some variables, such as context and mechanisms used by such interventions. Analysing these aspects allowed us to understand better how interventions get the planned results (Nielsen & Miraglia, 2017). In addition, Robertson et al. (2015) suggested that researchers should find the processes through which resilience programmes affect resilience measures. Performing a brief integrative literature review, we intended to answer the second research question:

Q₂: What explanation articulates the theoretical reasons the primary evidence's authors provide regarding the more robust intervention?

Methods

Search strategy

A systematic literature search was performed in February 2022, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021) through online databases EBSCO Discovery Service, PsycARTICLES, PsycBOOKS, PsycINFO, ProQuest, Scopus and Web of Science. The search covers studies until December 2021. Search terms included “resilience” or “resiliency” or “resilient” and “intervention” or “program” or “programme” or “development” or “training” in the title, and “work” or “workplace” or “work environment” or “organisation” or “organization” or “organisational” or “organizational” or “business” or “company” in the abstract. There were no language restrictions during the initial search. A backwards citation of previous systematic reviews and meta-analyses of resilience intervention studies (Robertson et al., 2015; Scheuch et al., 2021; Vanhove et al., 2016) was also done for significant resilience intervention studies. It was also searched in the online database B-ON the Boolean expression with the terms “resilience” and “literature review” or “meta-analysis” in the abstract to find studies on workplace-related resilience. All references were imported from online databases into Endnote online software. The duplicates were removed manually. The search strings are the following:

EBSCO Discovery Service, PsycARTICLES, PsycBOOKS, PsycINFO, ProQuest, Scopus and Web of Science: [TITLE (resilience OR resiliency OR resilient AND intervention OR programe OR programme OR development OR training)] AND [ABSTRACT (work OR workplace OR work environment OR organisation OR organization OR organisational OR organizational OR business OR company)];

B-ON: [TITLE (resilience AND literature review OR meta-analysis)] AND [ABSTRACT (intervention OR program)].

Inclusion, and exclusion criteria

As recommended by PRISMA 2020 (Page et al., 2021), the PICOS framework was used to frame the reporting of eligibility criteria, described in table 1. 897 references went for complete title screen the following hierarchical eligibility criteria: (a) encompassed in Work, Organizational and Personnel Psychology (WOP-P); (b) with employees and workers in the workplace; (c) interventions – before abstract review. Following, 112 references had abstracts viewed based on: (d) in experimental or quasi-experimental design; (e) with the explicit aim to improve resilience and (f) employed a measure of resilience as one of the outcome measures.

Fifty-three references had full texts single-screened. Studies that were not reported in academic articles, or impossible to be found in full format in English, or without postintervention measures were excluded. No restrictions were made based on the type of comparator used or the scale. Prior to the onset of the screening process, a thorough discussion of the criteria was conducted among the first three authors. Subsequently, one of the authors was designated to carry out the initial screening, and the results were meticulously reviewed by all four authors until a unanimous consensus was reached. Disagreements about exclusion and implications for other exclusions were resolved through discussion between the student and tutors. Twenty-six articles were included in the analysis.

Data extraction

Definitions adopted by each reference were extracted to analyse the study object. The extracted data included the author/s name, publication year, the study's country, the sample size, interventions and control characteristics and the instruments used. For the meta-analysis, data comprised the number of participants (preintervention and postintervention), mean scores (M), and standard deviation (SD) of outcome measures for worker participants in both

conditions (intervention and control groups). If additional information or clarification was required for effect size calculations, the reference's lead author was contacted by e-mail.

Table 1

PICOS framework

Groups	Criteria
Population	Employees and/or workers
Intervention	Mindfulness-based, CB, and multimodal interventions
Comparison	Random and non-random control groups
Outcome	Resilience improvement
Study Design	Experimental and quasi-experimental

Contact details were obtained through the correspondence addresses in the reference's publication. In some cases, website searches were also performed to ensure that contact details were still valid. The intervention description of the conceptual basis and examples of the content of each included study were thoroughly reviewed to verify whether the intervention in the analysis was based on mindfulness, CB, or multimodal components.

This study did not seek ethical approval as a systematic review and meta-analysis. The primary studies included in the analyses obtained ethical approval independently.

Data synthesis and statistical analysis

Descriptive statistics were used to describe the features of the studies. The meta-analyses were done using the software R version 4.3.0 (R Core Team, 2022), alongside seven statistical packages (meta), (Matrix), (metadat), (numDeriv), (tidyverse), (LaplacesDemon), and (esc), as recommended by (Harrer et al., 2021). The primary outcome of interest was the measure of psychological resilience. The heterogeneity was expected considering the different interventions and measures applied by included studies, so two aspects were

considered. First, Cohen's d (Cohen, 1988) was used to evaluate the standardised mean difference (SMD) assessed by the difference between the score of the control group from that of the intervention group and dividing the result by the pooled SD since different scales were employed across studies. The pooled mean effect sizes were expressed as SMD with 95%. Second, pooled size estimates were calculated using the random-effects model (REM) of analysis using the method Restricted Maximum-Likelihood Estimator (REML) (Viechtbauer, 2005). The I^2 and T^2 statistics reported represent the level and impact of heterogeneity and the percentage of result variability. The analysis of influential and outliers studies that could impact the general SMD was also conducted with the (meta) package (Harrer et al., 2021), where the Baujat plot (Baujat et al., 2002) was performed to diagnose influential studies (Appendix B, C, D and E). Publication biases were accessed through visual inspection of a funnel plot (Appendix A). These analyses were conducted to answer Q₁. Furthermore, an integrative literature review was done to answer Q₂.

Results

The search identified 1872 references. Given that there were no date restrictions to run the research, the earliest identified paper related to the topic dates to 1993. Further, 54 were identified by manual screening of citations (Figure 1). After excluding 968 duplicates, we screened 897 references, of which 816 were excluded from the original search and 24 from the backwards citation. We screened the abstracts of 112 remaining references; 53 were eligible for full-text screening. Thus, 26 studies were considered eligible for inclusion. The reasons for exclusion are listed in Figure 1. Table 2 illustrates the data retrieved from the studies that satisfied the eligibility criteria. Twelve studies were experimental, twelve were quasi-experimental, and two were cluster-experimental designs, all with pre-and post-intervention measures. Twelve applied CB, nine multimodal, and four studies described mindfulness-based interventions. Seventy-three per cent of interventions were delivered in group or mixed format.

Table 2

Overview of interventions included in the subgroup analyses

Interventions category	Study	Year	Country	Design	Format	Assign.	DV. Measure	Definition
Mindfulness-based	Christopher et al.	2018	USA	B	G	R	CD-RISC25	From DVM.
	Sharma et al.	2014	USA	W	GI	NR	CD-RISC25	“Ability to handle stress” (p.248).
	Bonamer & Aquino-Russell	2019	USA	W	GI	NR	CD-RISC25	From DVM.
	Werneburg et al.	2018	USA	W	G	NR	CD-RISC25	“Ability to recover from adversity and setbacks” (p.40).
Cognitive-behaviour	Concilio et al.	2021	USA	B	DI	R	CD-RISC25	From DVM.
	Dobson et al.	2021	Canada	B	G	CR	R2MR5	From DVM.
	Im et al.	2016	South Korea	B	G	R	ER14	“Personal attribute for coping with stress and adversity” (p.1379).
	Ramey et al.	2017	USA	B	G	NR	SES22	“Capacity to prepare for, recover from, and adapt in face of stress, trauma, or challenge” (p.440).
	Dyrbye et al.	2019	USA	B	I	R	CD-RISC10	From DVM.
	Luthans et al.	2008	USA	B	DI	R	PSQ24	“One’s ability, when faced with adversity, to rebound or “bounce back” from a setback or failure” (p.211).

Continued

Table 2 (Continued)

Interventions category	Study	Year	Country	Design	Format	Assign.	DV. Measure	Definition
Cognitive-behaviour	Waite & Richardson	2004	USA	B	G	CR	Spirit Core Scale	“A force within everyone that drives them to seek self-actualization, altruism, wisdom, and be in harmony with a spiritual source of strength” (p.179).
	Wong et al.	2019	China	B	GI	R	CD-RISC25	“The ability to adapt and function competently after adversity” (p.230).
	McGonagle et al.	2014	USA	B	DI	R	CD-RISC10	“The positive adaptability or ability to thrive in the face of adversity” (p.387).
	Johnson et al.	2020	UK	W	GI	NR	BRS6	“Capacity to maintain emotional equilibrium in response to difficult experiences” (p.2).
	Bennett et al., 2018a	2018	USA	-	M	NR	CD-RISC4	“Overall ability of employees to bounce back from an obstacle or negative event in the workplace [...] and, together, use of various resources to address that obstacle in a positive manner [...]” (p.2)

Continued

Table 2 (Continued)

Interventions category	Study	Year	Country	Design	Format	Assign.	DV. Measure	Definition
Cognitive-behaviour	Babanataj et al.	2019	Iran	W	G	NR	CD-RISC25	“Positive capacity to cope with the stresses and catastrophes that involves the individuals’ ability to restore the initial balance after an interruption or failure” (p.2)
	Mao et al.	2021	China	B	G	R	CD-RISC25	“Ability to maintain a stable equilibrium and bounce back from adversity” (p.2)
Multimodal	Magtibay et al.	2017	USA	W	M	NR	CD-RISC2	“Ability to overcome challenges and to bounce back stronger and wiser” (p.392)
	Wild et al.	2020	England	B	GI	R	CD-RISC25	From DVM.
	Tonkin et al.	2018	New Zealand	B	M	NR	CD-RISC10	“Outcome of processes that underlie effective human responses to adversity, including gene, and environment interaction” (p.108).
	Weber et al.	2019	UK	B	DI	R	RS13	From DVM.

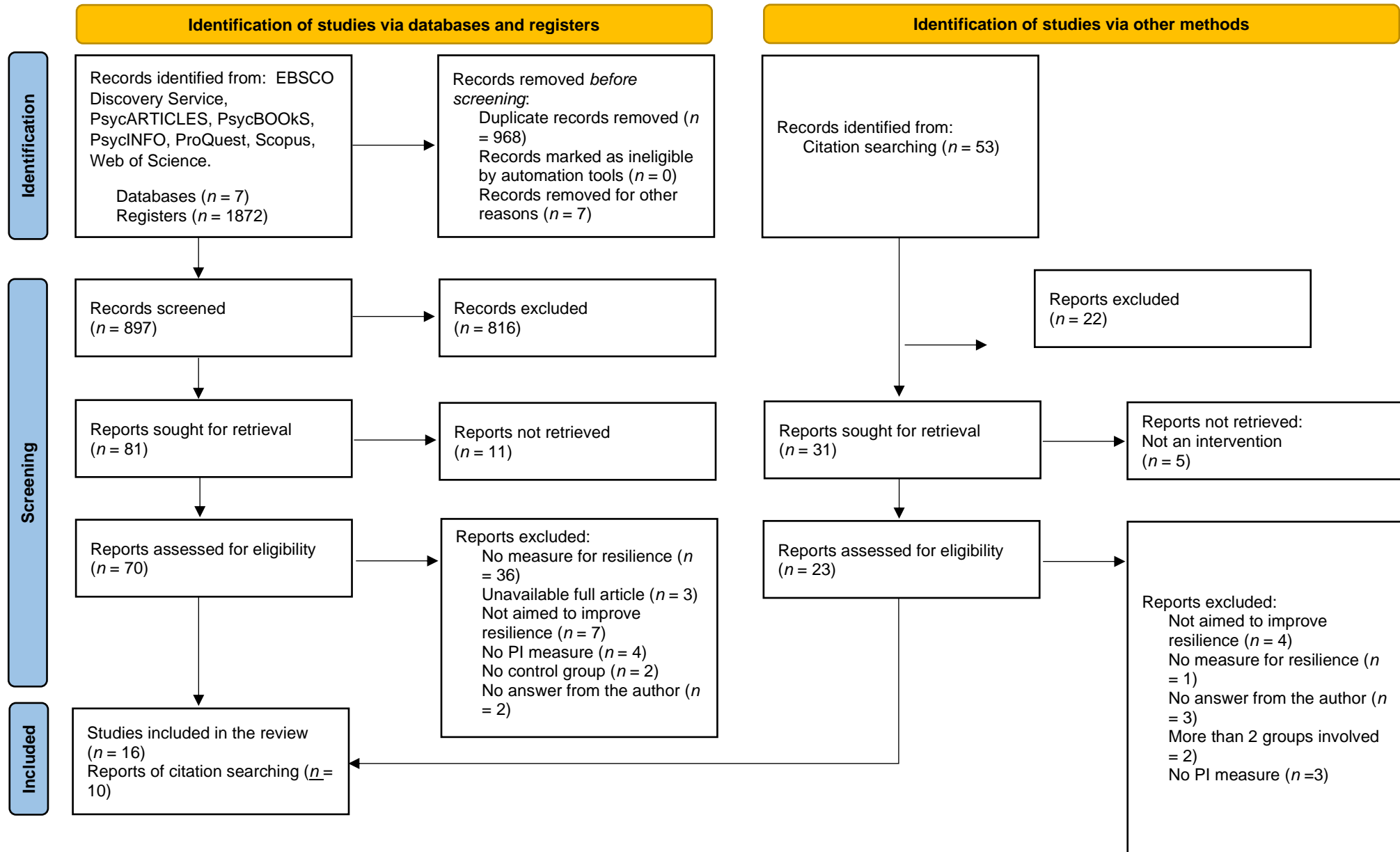
Continued

Table 2 (Continued)

Interventions category	Study	Year	Country	Design	Format	Assign.	DV. Measure	Definition
Multimodal	Slatyer et al., 2018)	2018	Australia	B	G	NR	CD-RISC10	“The process of adapting well in the face of adversity, trauma, tragedy, threats or significant sources of stress” (p. 453).
	Brennan & McGrady	2015	USA	W	G	NR	CD-RISC-25	“Ability of an individual to respond to stress in a healthy, adaptive way [...]” (p.106).
	Mascaro et al.	2021	USA	B	G	R	CD-RISC25	From DVM.
	Sood et al.	2011	USA	B	GI	R	CD-RISC25	“Ability of an individual to withstand adversity” (p.858).
	Romosiou et al.	2017	Greece	B	G	NR	CD-RISC25	From DVM.

Note. Study design (Design): B = between-participants; W = within-participants. Intervention delivery format (Format): D = digital-based delivery; DI = digital and individual-based delivery; G = group-based delivery; GI = group and individual-based delivery; I = individual-based delivery; M = mixed-based delivery. Method of participant assignment (Assign): CR = cluster-random; NR = non-random; R = random. DV. = dependent variable. Definition (From DVM) = from the dependent variable measure.

Figure 1
PRISMA 2020 flow diagram

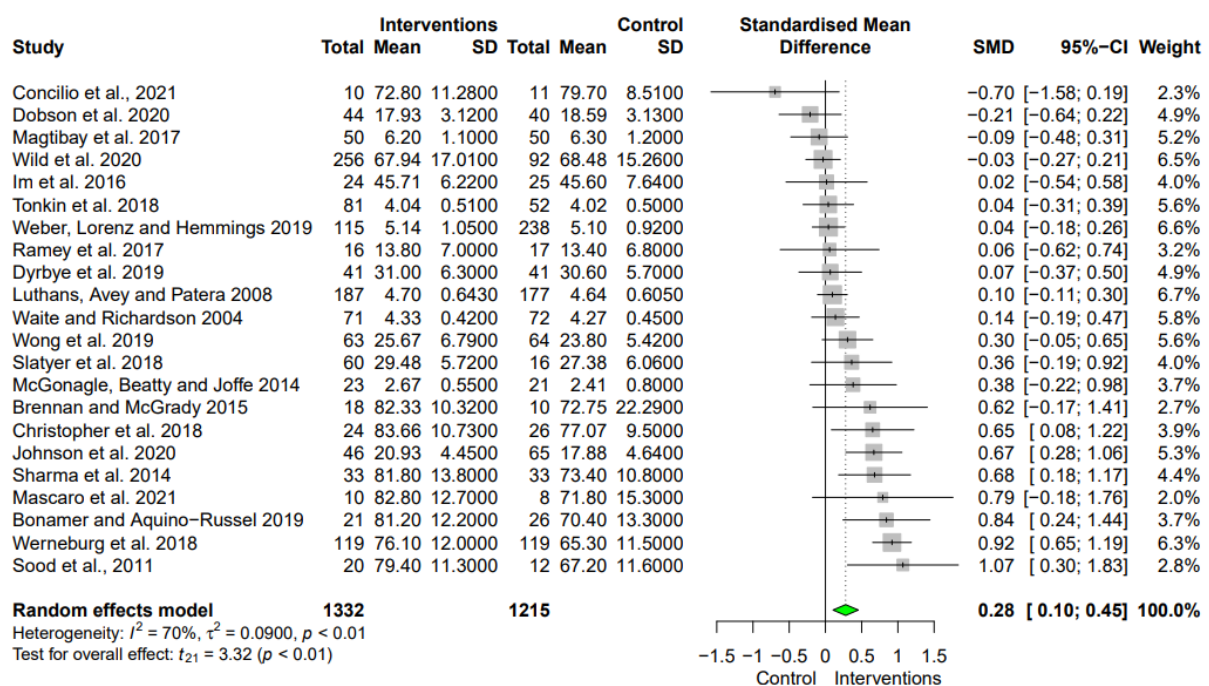


Effects of resilience interventions compared with control conditions

The SMDs of resilience levels at the post-intervention measure and the pooled mean effect size using the REM for the twenty-six studies included in the meta-analysis, alongside additional data, are represented in Figure 2. In this analysis, two studies were identified as outliers with 95% CIs [4.10; 5.81]; [6.80; 10.43] (Mao et al., 2021; Romosiou et al., 2019), then they were automatically removed. The influence analysis showed one study that overly contributed to the heterogeneity in this meta-analysis with 95% CIs [0.78; 1.27] (Bennett et al., 2018a). The visual inspection of a funnel plot of the SMD and SE of each study showed one study with a high likelihood of publication bias, 95% CIs [1.43; 2.69] (Babanataj et al., 2019), so it was excluded from the final funnel plot reported in Appendix A. Figure 2 reports the results without the influential, outliers and possible biased studies, which were 0.28 95% CIs [0.10; 0.45], indicating a small to moderate positive effect size favouring the intervention group. The heterogeneity was evaluated as potentially substantial (Cochrane, 2022), with an I^2 estimate of 70%.

Figure 2

A meta-analysis examining the effect of resilience interventions

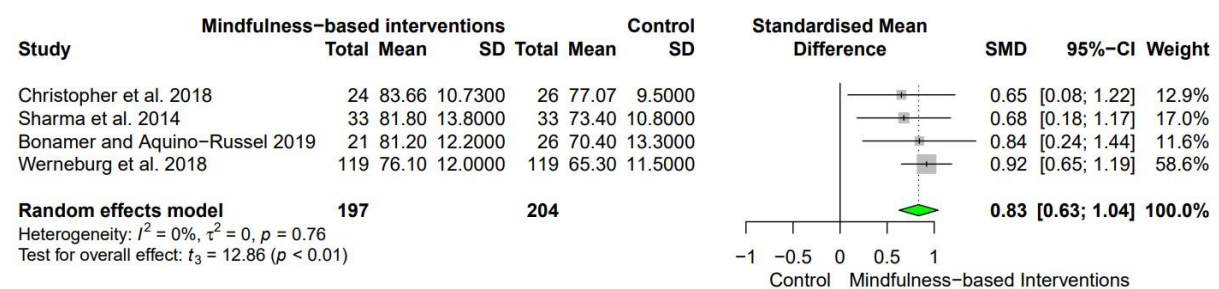


Effects of mindfulness-based resilience interventions

Mindfulness-based resilience interventions category had four studies eligible for the analysis; none was categorised as an outlier or influential. The results illustrated in Figure 3 indicated that the SMD between mindfulness-based interventions and the control groups was 0.86 95% CIs [0.63; 1.04], indicating a largely positive effect. The heterogeneity diagnostic showed an I^2 of 0%. However, the Baujat plot presented in Appendix C shows that one study (Wernerburg et al., 2018) may overly contributed to the heterogeneity of the meta-analysis. Thus, heterogeneity was an inconclusive factor in this analysis.

Figure 3

A meta-analysis examining the effect of mindfulness-resilience interventions



Effects of CB resilience interventions

One of the outliers was in the CB intervention category (Mao et al., 2021). One was considered influential (Bennett et al., 2018b), so they were automatically excluded from the CB meta-analysis. In addition, this analysis identified one more reference as a possible biased study (Babanataj et al., 2019), so it was removed. Figure 4 shows the results without both studies, 0.15 95% CIs [-0.06; 0.35], a small positive effect with no significant heterogeneity of $I^2 = 40\%$. The results with possible biased and influential studies were 0.27 95% CIs [-0.17; 0.71], $I^2 = 80\%$. The Baujat plot is in Appendix D, offering a better inspection of the heterogeneity of this meta-analysis.

Effects of multimodal resilience interventions

Nine studies were eligible for the analysis in the multimodal resilience category. One study was previously found as an outlier (Romosiou et al., 2019), and another was identified in this analysis and consequently excluded (Sood et al., 2011). The SMD between multimodal interventions and the control group (figure 5), without the outlier reference, was 0.05 95% CIs [-0.12; 0.22], with no important heterogeneity $I^2 = 6\%$ demonstrating a small positive effect of multimodal interventions. A better view of the Baujat plot is offered in Appendix E. The results with the outlier study were 0.08 95% CIs [-0.13; 0.29], $I^2 = 46\%$.

Figure 4

A meta-analysis examining the effect of CB resilience interventions

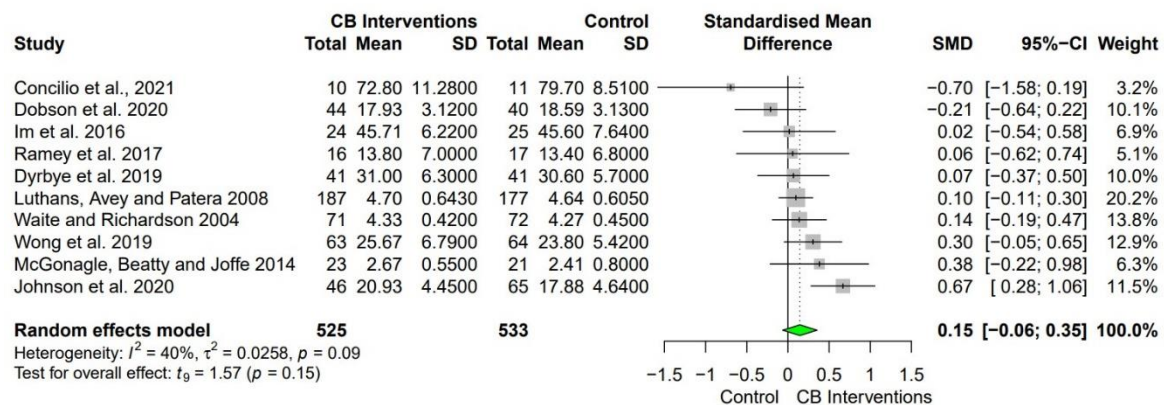
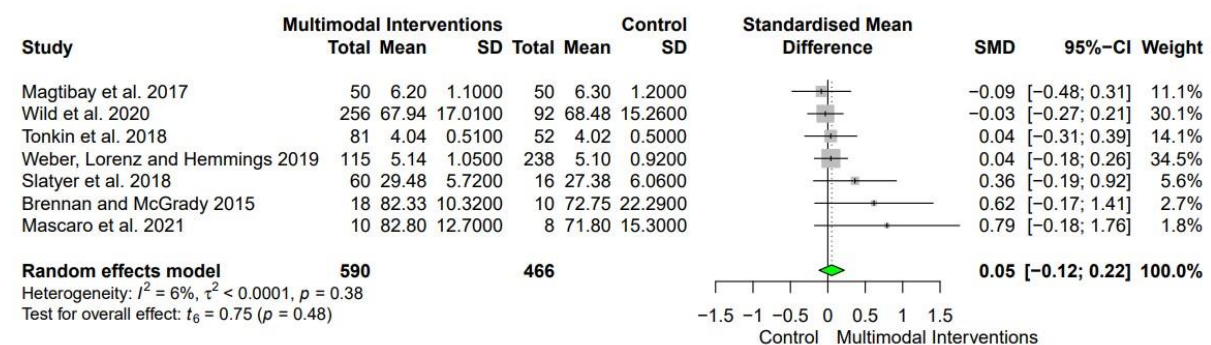


Figure 5

A meta-analysis examining the effect of multimodal resilience interventions



The integrative review: Mindfulness-based resilience interventions

The results of the meta-analyses revealed that mindfulness-based interventions were the more robust category in increasing resilience levels, which answers Q₁. Accordingly, this

section reviewed articles to provide an integrated explanation of theoretical reasons for the robustness of mindfulness-based programmes.

Three of four studies focused on the healthcare industry ($n = 27$) (Bonamer & Aquino-Russell, 2019), ($n = 37$) (Sharma et al., 2014), ($n = 137$) (Werneburg et al., 2018), while two explicitly focused on nurses (Bonamer & Aquino-Russell, 2019; Werneburg et al., 2018), one addressed healthcare employees in general, including nurses, physicians and allied health staff. Only one study was focused on a different population, law enforcement officers (LEO) ($n = 61$) (Christopher et al., 2018).

Two of them adopted the same program, Stress Management and Resiliency Training (SMART) (Sharma et al., 2014; Werneburg et al., 2018). However, one adapted SMART using only written materials for twelve weeks, a self-directed therapy called bibliotherapy, a practice where exercises are self-administered with minimal therapy interaction. Participants were given a book called “Train Your Brain Engage Your Heart Transform Your Life” (Sharma et al., 2014). No session time was provided. Alternatively, the study of Werneburg et al. (2018) had the same duration (twelve weeks) but with 60-90 minutes of attention training sessions, awareness of neural predispositions to stress, and learning core principles of emotional resiliency. However, the results of Wernerburg et al. (2018) should be cautiously interpreted due to their publication bias rate.

SMART program and the use of the bibliotherapy practice highlight the importance of emotional regulation at the workplace as one psychological mechanism displayed by mindfulness-based interventions. Studies have shown that regulating emotions at the individual level can lead to significantly improved psychological health, overall well-being, work performance, and communication with colleagues (Troth et al., 2018). Emotional regulation requires internal strategies that enable individuals to rationally determine which emotions they experience, when they experience them, and how they express and feel those emotions.

Moreover, the bibliotherapy technique fosters a non-judgmental attitude towards oneself and colleagues, resulting in better interpersonal relationships (Sharma et al., 2014).

In their study, Bonamer & Aquino-Russell (2019) utilised the Transcendental Meditation technique (TM) to help individuals manage stress. The technique involved an introductory session, a personal interview, and four consecutive days of 90-120 minute sessions in either individual or group formats. Participants were also required to practice two 20-minute meditation sessions daily for four months. This practice helped employees become more self-aware of their thoughts, emotions, and physical reactions, reducing stress levels and increasing readiness to deal with uncertainty. Such practice has been linked with greater job satisfaction and fulfilment (Vanhove et al., 2016).

Lastly, the study of Christopher et al. (2018) was based on Mindfulness-Based Resilience Training (MBRT), adapted for LEOs, delivered in eight weekly 2-hour sessions, with an extra 6-hour class in the seventh week. The intervention included body scan, sitting and walking meditation, mindful movement, and group discussions. Such mechanisms can also be related to better self-awareness and enhanced cognitive abilities due to improved resilience. All four studies adopted CD-RISC 25 scale as a measure for resilience, providing similarity regarding the study's object, and applied focused attention and meditation, which can answer Q2.

Discussion

The appealing benefits of enhancing resilience in the organisational setting have attracted focus to resilience-focused interventions. However, such primary evidence needs deeper reasoning about its likely results. The principal purpose of this study was to summarise the efficiency of different programmes to enhance resilience, which was a novel approach to resilience meta-analysis at the workplace. Second, we aimed to provide an integrative review

of the most robust category's theoretical basis, able to provide a conceptual foundation for this efficacy.

The findings of this research hold significant practical and theoretical implications for the field. Through the meta-analysis conducted, a more comprehensive understanding and clarification of the resilience concept has been achieved, particularly in relation to resilience interventions in organizations. This has allowed for a thorough examination of the overall effect size and patterns of the results. Additionally, this study has identified areas with conflicting evidence, underscoring the need for further research. From a practical perspective, organizations and professionals can utilize scientifically-proven practices to enhance resilience and compare their interventions with the results of this study to identify possible similarities or differences.

Our findings are consistent with other studies that found resilience interventions have a statistically positive, although small, effect on resilience levels (Joyce et al., 2018; Vanhove et al., 2016). Mindfulness-based interventions have shown a significant impact, as these techniques involve focusing one's attention on a particular object or aspect. This practice enhances self-awareness, leading to a better understanding of one's thoughts and feelings. In turn, this can result in personal development and positive outcomes, as opposed to relying on external factors, which may explain Q2. However, it is noteworthy that these techniques may take some time to yield noticeable results, and certain factors may affect their effectiveness during the process.

It has been observed that both multimodal and CB interventions show similar effectiveness as control groups. Multimodal interventions involve a range of diverse procedures such as learning, coaching, and mindfulness. Similarly, CB interventions comprise of psychoeducation, coaching, training, and continuous learning. The combination of different mechanisms in these interventions may lead to outcomes that nullify each other or reduce the

overall positive effect on resilience levels. Moreover, identifying and analyzing a specially technique in a mix may be easier in an evaluation, impacting in the final results of the primary evidence. However, this should not shadow the applicability of resilience programmes. It is stated that multi-level interventions can yield positive spiral outcomes when combined, even if mainly alone, they are not so relevant (Nielsen & Miraglia, 2017; Sorensen et al., 1998). Future research can apply a more specific approach toward CB interventions and analyse the possible moderator effect of each technique in resilience measures.

It is noteworthy to mention several differences between intervention categories that may be relevant to our results. The mindfulness-based type was smaller ($k = 4$) and more congruent, considering that all primary evidence used the same instrument, compared to CB ($k = 12$) and multimodal ($k = 12$) categories. However, three mindfulness-based studies were single-arm non-randomized interventions, so the results require a conservative interpretation. Moreover, differences in the populations of the studies may also affect the results. Positions with intrinsic stress levels involved in daily activities, which require typically high levels of resilience, may already display better resilient personal resources than business-as-usual works (Vanhove et al., 2016). All the mindfulness-based interventions were conducted with considered stressful and non-routine jobs, such as officers and healthcare staff. Previous analysis of the best beneficiaries of these programmes is a demanding but necessary task.

Limitations and future directions

This study highlights significant limitations of our review process and the primary literature on resilience. Meta-analytic studies can work with current data, and the literature is shown to be unclear and distorted. Foremost, interventions had high levels of heterogeneity in design, conceptual definition, content, and outcome measurement, as well as high indications of publication biases and low methodological quality. Congruent, solid resilience definitions

and measures should be explored in the literature to shed light on scales capable of measuring the same concept of resilience.

Due to time and resource constraints, we could not run a quality assessment of the studies and incorporate one more researcher during the study search, selection, and screening process, which may be essential for future studies. In addition, more publication bias procedures can be adopted to enhance the quality of this study, such as Egger's test and the inclusion of different papers (e.g., unpublished studies, white papers).

Moreover, the results of this study should advance for future developments. Meta-analysis with longitudinal studies to consider the extent to which participants are still engaged in the interventions after they are completed or how the different occupations may affect the general effect of resilience interventions can enhance the understanding of the role of resilience interventions in the workplace.

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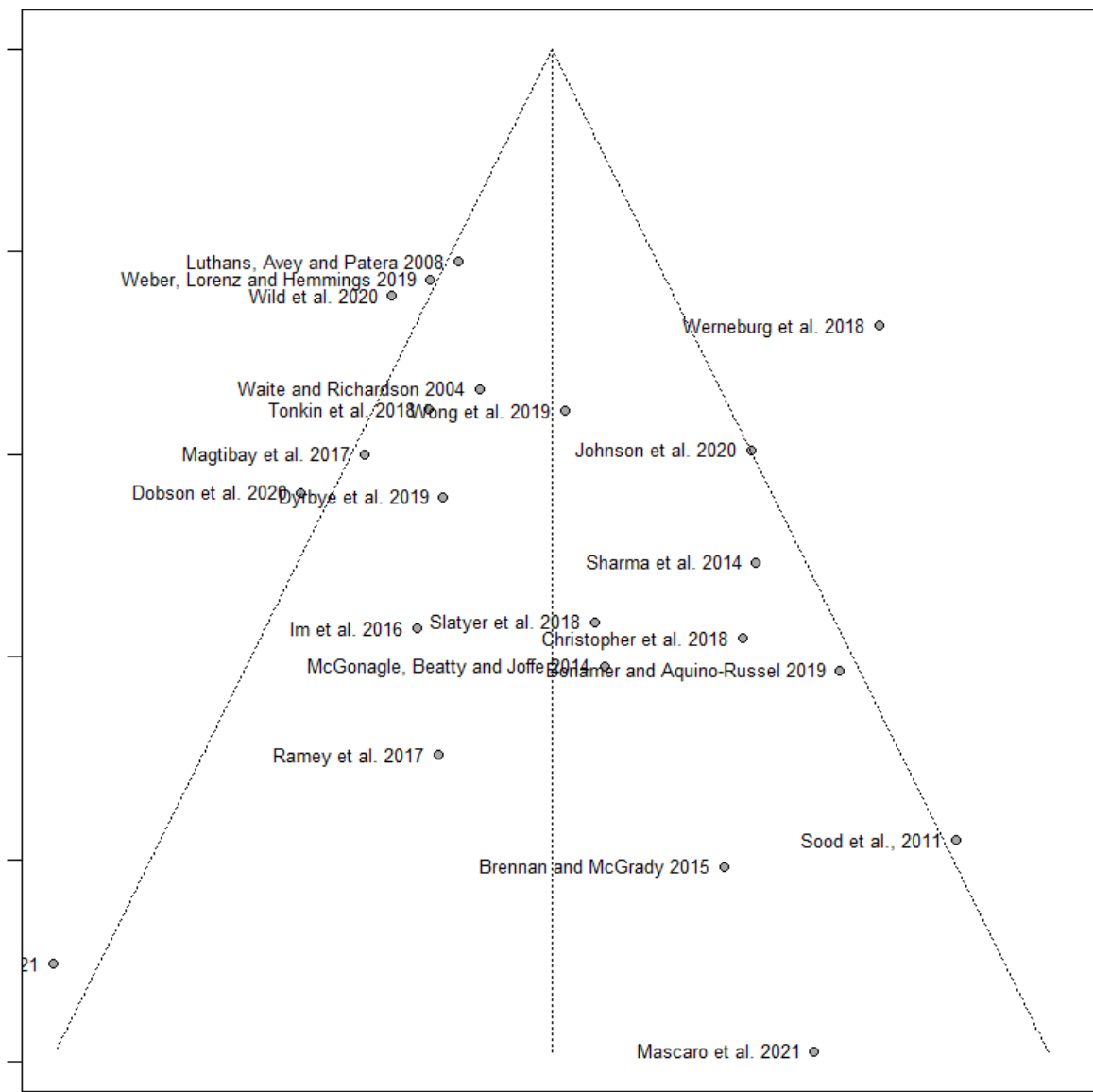
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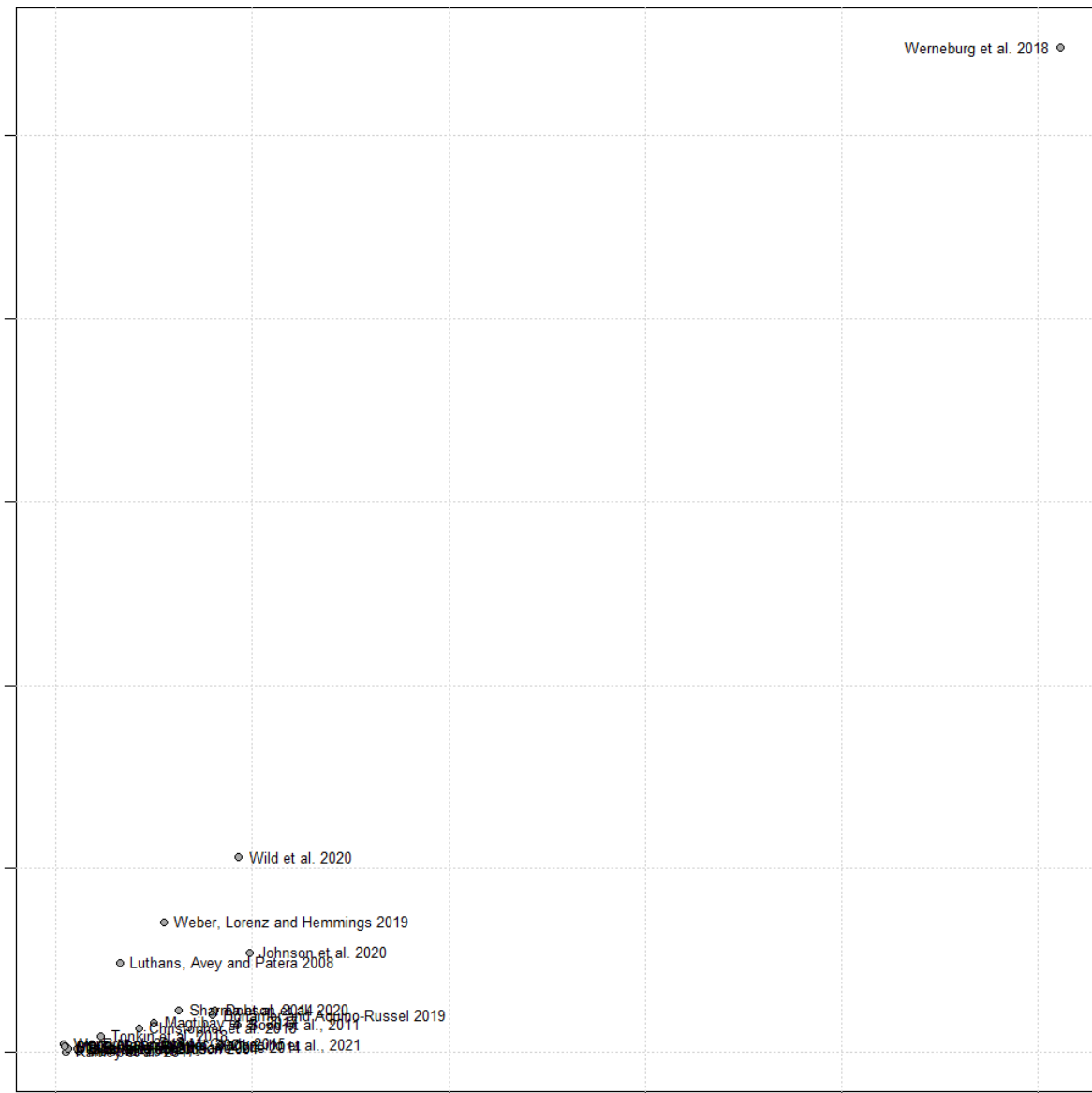
Appendix A

Funnel plot of the meta-analysis of all resilience interventions



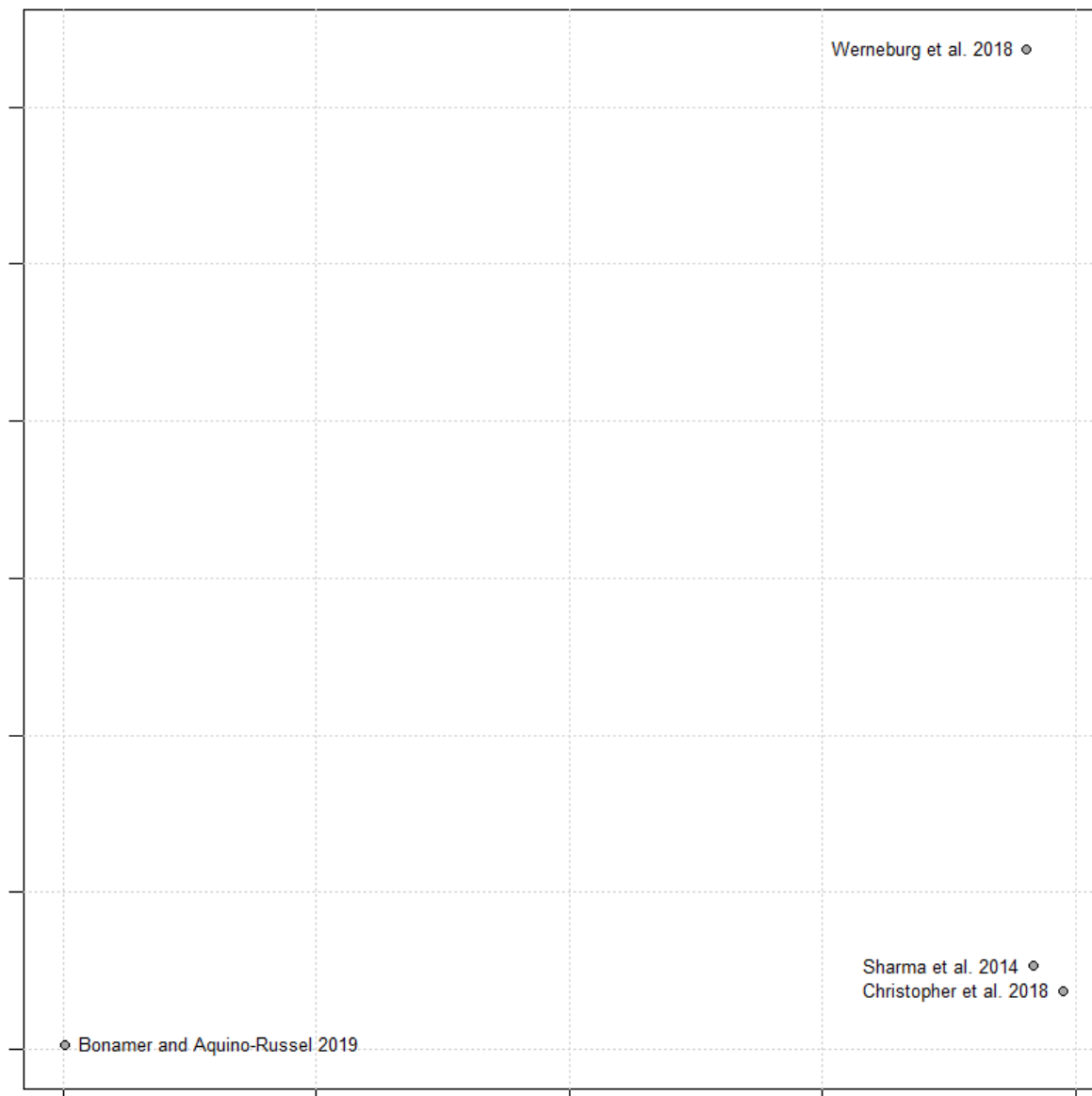
Appendix B

Baujat plot of the meta-analysis of resilience interventions



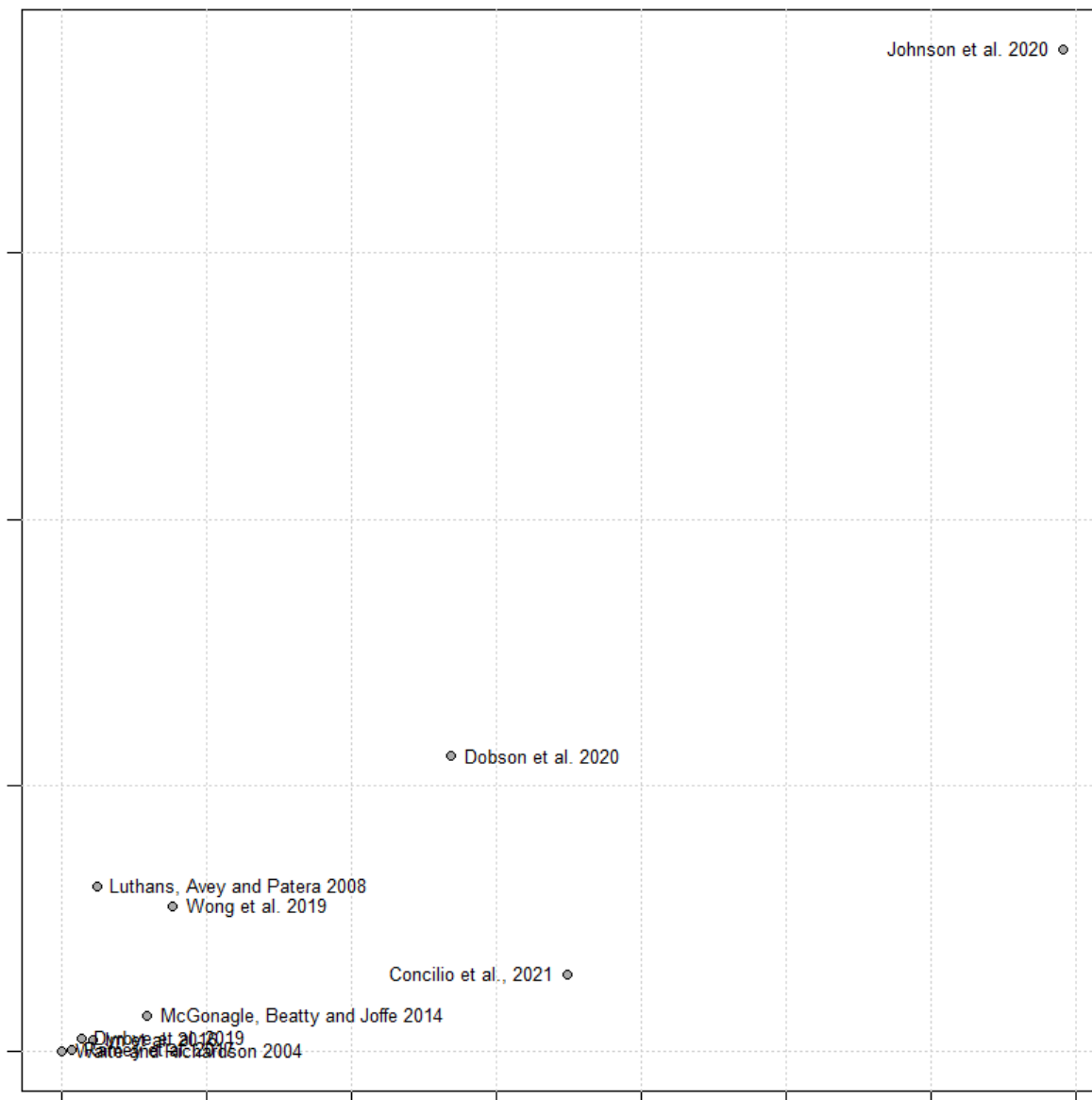
Appendix C

Baujat plot of the meta-analysis of mindfulness-based interventions



Appendix D

Baujat plot of the meta-analysis of the CB interventions



Appendix E

Baujat plot of the meta-analysis of the multi-modal interventions

