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REVIEW ARTICLE

Character Strengths-Based Interventions and Their Efficacy Related to Work Engagement and Job Performance: a Meta-Analysis

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Abstract

From comprehensive theoretical models, interventions based on character strengths are considered promising tools for the development of work engagement and performance (Bakker & Demerouti, *Journal of Occupational Health Psychology*, *22*(3), 273, 2017; Salanova et al., 2006). However, there is a gap in scientific research regarding these interventions in the workplace context. The aim of the present study is to assess the efficacy of character strengths-based interventions in increasing work engagement and job performance. For this purpose, a meta-analysis focusing on repeat measures studies with experimental or quasi-experimental design and control group was conducted, providing a more accurate assessment of the long-term effects of the interventions. This methodology represents an innovative strategy, considering the widespread trend of conducting cross-sectional studies in the field of intervention on organizational psychology. The search was carried out in the Web of Science, Scopus, and ProQuest databases, following the PRISMA guidelines. Publications between January 2004 and May 2024 were analyzed. Out of 963 initial studies, only seven met the inclusion criteria, finding small effects on work engagement ($d=0.37$) and job performance ($d=0.27$). The results suggest that interventions focused on character strengths are effective in improving work engagement and job performance. Finally, the theoretical and practical implications of the study are discussed.

Keywords Character strengths · Work engagement · Job performance · Intervention · Positive organizational psychology · Workers · Meta-analysis

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1 Introduction

Currently, working conditions have been continuously affected by a series of historical events (e.g., Globalization, 2008 Financial Crisis, COVID-19 Pandemic, Acceleration of Artificial Intelligence) that have been accompanied by an increase in stress and mental health issues at work according to the World Health Organization (WHO, 2022a). Simultaneously, a report shows that only 21% of workers worldwide are truly engaged (Gallup, 2023). This is a concerning factor given that work engagement has been related to better levels of well-being and performance in organizations (Beckel & Fisher, 2022; Corbeanu & Iliescu, 2023; Hauff et al., 2022; Knight et al., 2019; Miglianico, 2020; Neuber et al., 2022). Considering this, there is a need to implement evidence-based strategies that promote the development of well-being indicators at work (WHO, 2022b) and, increase productivity and job performance (Hernández, 2023; Pan American Health Organization [PAHO], 2023).

Positive Organizational Psychology (POP) is an approach that study engagement in the workplace and it is defined as the scientific study of positive characteristics and processes that contribute to the well-being and optimal performance of individuals, groups, and organizations (Salanova et al., 2005, p. 353), through the development of character strengths (Linley et al., 2009; Salanova et al., 2016). These strengths are recognized as a series of positive traits, morally valued and moldable, and have been linked to what is considered a "good life" (Park & Peterson, 2010; Peterson & Seligman, 2004; Ruch et al., 2007).

The literature suggests that focusing on the development of strengths rather than correcting weaknesses promotes optimal human functioning, energizing workers and enhancing their performance (Mayerson, 2020; Linley & Harrington, 2006; Peterson & Seligman, 2004). In line with this, research indicates that the use of strengths at work correlates with well-being indicators (e.g., work engagement) and positive organizational outcomes (e.g., in-role job performance; task performance; Avey et al., 2012; Harzer & Ruch, 2014; Lavy & Littman-Ovadia, 2017; Littman-Ovadia et al., 2017). On the other hand, it has been observed that the lack of opportunities to employ these strengths can generate frustration and tension in individuals (Merritt et al., 2019), highlighting the importance of fostering work contexts that actively promote their use.

1.1 Theoretical Models in Positive Organizational Psychology

Despite the lack of a complete theoretical framework describing the psychological mechanisms behind the use of strengths at work, various theories illustrate how their use affects motivation and job performance (Bakker & van Woerkom, 2018). For example, the Job Demands and Resources Model (JD-R; Demerouti et al., 2001; Bakker & Demerouti, 2013; 2017) and extensions like the Dual Process Model (Llorens et al., 2008) indicate that different work contexts or characteristics can be divided into two different categories: (I) job demands and (II) job resources. Job demands are those characteristics of the job that require sustained effort and can cause physiological and psychological strain, leading to poor performance (Demerouti et al., 2001).

In contrast, job resources are those characteristics of the job that can reduce work demands and the associated physiological and psychological costs, being decisive in achieving work goals (Bakker & Demerouti, 2013; 2017).

These two categories, in turn, trigger two underlying psychological processes: job resources could generate the (i) motivational process, and job demands the (ii) health impairment process (Bakker & Demerouti, 2013; 2017). In this way, the JD-R model has contributed with extensive scientific evidence indicating that job demands and resources directly affect health and motivation and could also interact to influence work engagement, integrating personal resources as predictors, mediators, and moderators between job resources and work engagement (Bakker & Demerouti, 2013; 2017). These personal resources are understood as positive self-evaluations that influence the ability to manage job demands and value available resources (Salanova et al., 2006; Hobfoll et al., 2003; Huang et al., 2016), and from the perspective of the JD-R and Dual Process Model of Occupational Health, they can act as buffering factors in stressful work contexts, facilitating the management of job demands and efficient performance (Bakker & Demerouti, 2013; 2017; Demirović-Bajrami et al., 2022).

Moreover, it has been observed that these personal resources could cluster, attract, and reinforce each other, strengthen the proposal of the underlying motivational process (i.e., Broaden and Build (Fredrickson, 2013); Resource Caravan (Hobfoll, 2002)). This process, by increasing the likelihood of generating work engagement and improving performance levels, can lead to positive spirals over time that facilitate the development of more resources, which contribute to achieving expected outcomes (Llorens & Salanova, 2014; Llorens et al., 2008; Vera et al., 2017).

In this context, character strengths could be integrated into the JD-R theory and the Dual Process Model of Occupational Health as a personal resource. This implies that the use of strengths not only plays a predictive role in the motivational process described in the JD-R Theory but can also be an outcome of it (Bakker & van Woerkom, 2018; Bakker & van Wingerden, 2020).

1.2 Character Strengths

Character strengths has been discussed by classical philosophers both Eastern and Western and more recently addressed in psychology in fields such as education, health, military management, and lately in the workplace (Duan & Bu, 2017; Park & Peterson, 2010; Toner et al., 2012; Yan et al., 2020). The first studies in the business area began with Drucker (1967) and later with Buckingham and Clifton (2001), who emphasized the importance of focusing on personal strengths instead of weaknesses. Years later, Peterson and Seligman (2004) conducted pioneering research in the field of positive psychology. In their work "Character Strengths and Virtues: A Handbook and Classification," they defined character strengths as positive traits reflected in thoughts, feelings, and behaviors. From this perspective, although character strengths are considered generally stable traits, it does not mean they are malleable, suggesting they can be cultivated and evolve over time, being bendy to the context (Peterson & Seligman, 2004, p.13). This conception has been widely used and opens the possibility of designing specific interventions to enhance

these strengths (Niemiec, 2021). Peterson and Seligman (2004) classified character strengths through the Values in Action Classification of Strengths, identifying 24 psychological strengths grouped into 6 universal virtues (See Table 1). This classification has been fundamental in understanding people's positive qualities and their application in various areas, including work. Evaluations in different contexts have highlighted the importance of identifying and utilizing strengths in the workplace (Niemiec, 2018; VIA Institute, 2019).

Character strengths show notable differences compared to the Big Five personality traits model (John & Srivastava, 1999). While the Big Five addresses basic and general dimensions of personality, character strengths focus more on positive and morally valued aspects within personality and are considered explicitly malleable within their conceptualization (Peterson & Seligman, 2004, p.13). However, the mere possession of a character strength does not ensure its use; instead, the context plays an important role. The use of strengths is mainly conditioned by two factors (Harzer & Ruch, 2013): The first and primary condition is having the character strength to a sufficient degree to demonstrate behavior related to it (Saucier et al., 2007). The second condition is that contextual factors allow or require the demonstration of a strength (Saucier et al., 2007; Ten Berge & De Raad, 1999). In other

Table 1 24 Character strengths (Peterson & Seligman, 2004)

Virtue	Character strengths
I. Wisdom: The ability of the individual to acquire and use knowledge	1. Curiosity 2. Love of learning 3. Judgment 4. Creativity 5. Perspective
II. Courage: Requiring the exercise of individual will to achieve goals in the face of opposition	6. Bravery 7. Perseverance 8. Honesty 9. Zest
III. Humanity: Based on caring for and becoming close to others	10. Love 11. Kindness 12. Social intelligence
IV. Justice: Supporting a healthy social life among individuals	13. Teamwork 14. Fairness 15. Leardership
V. Temperance: Protecting the individual from excess	16. Forgiveness 17. Humility 18. Prudence 19. Self-regulation
VI. Transcendence: Building connections with the universe around us and providing meaning to individual life	20. Appreciation of beauty and excellence 21. Gratitude 22. Hope 23. Humor 24. Spirituality

words, the expression of behavior linked to a particular strength can be stimulated or discouraged depending on the context. Therefore, given the malleability of character strengths, it is important not only to foster their acquisition but also to create contexts that facilitate their expression and use. To this end, the study of strengths currently offers a practical and viable path for the design and implementation of interventions focused on both cultivating and enhancing them in work contexts (Niemiec, 2018).

1.3 Strengths-Based Interventions at Work

Interventions, in the classical sense, refer to specific actions carried out to alter sources of job stress, their responses, or their effects (Leka et al., 2008). So far, interventions have mainly focused on addressing the deterioration process, while research on interventions that develop resources is still in its early stages (Bes et al., 2023). However, in line with what the WHO stated in its 2015–2025 action plan (PAHO, 2023), there is an emphasis on the need to carry out evidence-based actions to promote well-being and a healthy and productive work context.

In line with this need, strengths-based interventions present themselves as a promising tool in the development of work engagement, helping people identify and apply their strengths to improve their lives, highlighting the importance of putting them into action, not just recognizing them (Wood et al., 2011; Govindji & Linley, 2007). These interventions vary in content and focus, highlighting those based on the individual's prominent strengths (Gander et al., 2013; Proyer et al., 2015; Seligman et al., 2005) and those focusing on strengths with strong connections to overall well-being (Gander et al., 2020; Huber et al., 2020; Hausler et al., 2017; Proyer et al., 2013). Strengths-based interventions, besides being cost-effective and easy to administer, can produce positive results (Dolev-Amit et al., 2021). In this way, several studies, both cross-sectional and longitudinal, have evidenced a positive relationship between the use of strengths and engagement in different areas, as reflected in research such as Harzer and Ruch (2013, 2016), Huber et al. (2020), Jin et al. (2022), Proyer (2013; 2015), Littman-Ovadia et al. (2017), and Zhang and Chen (2018). However, although many organizations implement practices to improve indicators of workplace well-being, it is not always known how effective they are in the long term, making it necessary to develop knowledge about the efficacy of strengths-based interventions (Briner & Walshe, 2015; Miguel et al., 2023). This can be achieved by evaluating the application of these interventions over time in randomized controlled trials, overcoming the preference for cross-sectional measures in the development of Positive Psychological Interventions (PPI; Carr et al., 2021).

1.4 Character Strengths, Work Engagement, and Organizational Outcomes

Within the organizational context, well-being at work refers to the "overall quality of the employee's experience and functioning" (Good et al., 2016, p. 126) and is perceived as an experience that encompasses feeling good, being satisfied, and

finding purpose in this context (Sonnentag, 2015). Positive Organizational Psychology (POP) has extensively studied workplace well-being and its relationship with productivity, job satisfaction, extra-role performance, and reduced turnover (Cannas et al., 2019; Ewen et al., 2021). One of the most robust indicators related to workplace well-being is work engagement (Bosle et al., 2021; Lin, 2010). According to JD-R theory, evidence suggests that the existence of engagement is an indicator of the motivational process in employees (Mazzetti et al., 2023). Thus, work engagement is defined as a positive, fulfilling work-related state of mind characterized by vigor, dedication, and absorption (Schaufeli et al., 2006) and is associated with positive organizational and health outcomes for employees (i.e., job performance) (Corbeanu & Iliescu, 2023; Cruz-Ortiz et al., 2013).

Job performance, in turn, is understood as a combination of competencies to fulfill basic technical activities that are important for the job, such as in-role performance (Goodman & Svyantek, 1999), task performance (Williams & Anderson, 1991), and competencies related to tasks that contribute to the organizational, social, and psychological context (extra-role performance; Arvey & Murphy, 1998). Regarding organizational outcomes, job performance is a key indicator for employees and is defined as the extent to which their actions or behaviors contribute to achieving the organization's goals and objectives (Campbell, 1990; Triansyah et al., 2023). Thus, individual-level performance has been directly influenced by the individual's well-being (Dubreuil et al., 2016; Kong & Ho, 2016; Peláez et al., 2020), not only contributing to the achievement of individual goals but also driving the overall success of the organization (Warr & Nielsen, 2018). In this sense, promoting work engagement can be considered a strategic investment for organizations, as it can boost performance, leading to superior organizational outcomes (Corbeanu & Iliescu, 2023).

To ensure the efficacy of these interventions, it is essential to consider longitudinal, controlled, and randomized research designs. For this reason, the aim of the present study is to assess the efficacy of character strengths-based interventions in increasing work engagement and job performance. Given the relevance of the topic, the present study focuses exclusively on the review of studies conducted within the workplace, differentiating itself from previous studies conducted by Quinlan et al. (2012) and Ghielen et al. (2018), which cover various contexts. On the other hand, Miglianico et al. (2020) presents a systematic review of the literature on the use and development of strengths in the workplace, summarized in a general intervention model to facilitate the development of strengths in organizations.

Following this line of research, the present study aims to expand upon what was proposed by Miglianico et al. (2020) in the Journal of Happiness Studies by addressing a critical gap in the literature, providing updated quantitative evidence on the efficacy of character strengths-based interventions. To achieve this, a meta-analysis is conducted using a rigorous approach that includes exclusively studies with repeated measures and control groups, ensuring a more precise evaluation of the long-term effects of these interventions.

Likewise, this study seeks to provide a theoretical and practical tool by focusing specifically on key variables such as work engagement and in-role or task

performance. By prioritizing these essential dimensions, the findings are directly applicable to the design of organizational interventions that promote both well-being and productivity in the workplace, using widely studied indicators (Aubouin-Bonnaventure et al., 2023; Corbeanu & Iliescu, Knight et al., 2019; Mazzetti et al., 2023; Warr & Nielsen, 2018). This approach also represents an advance in organizational psychology, a field that typically favors cross-sectional studies (Hofmann et al., 2020; Shaughnessy et al., 2008). In this context, the meta-analysis serves as a valuable tool to integrate the results of multiple studies, enabling the generation of more robust and quantifiable conclusions.

2 Method

2.1 Procedure

The meta-analysis was conducted following the guidelines of the Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page et al., 2021).

2.2 Search Methods

To ensure a comprehensive coverage of the field, the search strategy included multiple databases (Web of Science, Scopus, ProQuest) covering the period from January 2004 to May 2024, and a wide range of keywords related to character strengths, interventions, and workplace outcomes. The process followed PRISMA guidelines, minimizing the risk of missing relevant studies.

The start of the date range, January 2004, was chosen because it marks the publication of the seminal work by Peterson and Seligman, *Character Strengths and Virtues: A Handbook and Classification*. This foundational text provided the first comprehensive framework for defining and categorizing character strengths, establishing a basis for subsequent research and interventions in this field. As a result, studies published prior to 2004 were excluded, as they would not align with the standardized conceptualization of character strengths central to this meta-analysis.

The search syntax was tailored to each database using the following key terms in the title, abstract, and keywords: character strength; performance; productivity; well-being; work; organization (Appendix Table 5). The keywords selected for the search were chosen based on their relevance in previous studies on character strengths interventions within the workplace context. These terms encompass the central concepts of the study, such as the development of strengths, their impact on performance and well-being, and their organizational application. The combination of these keywords allowed for the identification of relevant studies and ensured the comprehensiveness of the process, while excluding non-workplace contexts or

approaches not directly related to the variables of interest (work engagement and job performance).

2.3 Data Extraction

Following Cochrane's recommendations (Higgins & Green, 2011), a color-coding system was used to classify the articles: green for included, red for excluded, yellow for uncertain, and orange for not found. Microsoft Excel from the Microsoft 365 suite was used for data collection and extraction.

2.4 Study Selection

Two independent reviewers, psychologists specialized in positive psychological interventions (MPV, HAA), manually evaluated the obtained studies to establish their inclusion in the meta-analysis before data extraction. Titles, abstracts, or full documents were reviewed if necessary, and the following inclusion criteria were applied: (1) primary quantitative studies; (2) experimental or quasi-experimental studies; (3) controlled group trials studies (4) studies that establish work engagement and job performance as dependent variables; and (5) studies with statistical measures (i.e., Mean, SD, n, F, t). The following exclusion criteria were also applied: (1) language other than English or Spanish; (2) non-scientific articles (3) articles without character strengths-based intervention; (4) non-organizational context.

2.5 Quality Analysis

The assessment of methodological integrity and the potential impact of biases in each selected study was conducted using the "Quality Assessment of Controlled Intervention Studies" tool from the National Institutes of Health (NIH, 2021). This tool addresses 14 domains of analysis, focusing on key elements such as: conception of the research question, profile of the investigated population, recruitment strategies, study power, methodologies for quantifying exposures and outcomes, dropout rate, and implemented statistical methods. This procedure has been employed by similar studies (Takahashi et al., 2019; Kwon & Lee, 2021) and aims to quantify results consistently.

A detailed description of each criterion is presented in Table 2. According to the final classification criterion, studies scoring 7 or more are labeled as high quality, those scoring between 5 and 6 are considered acceptable (moderate), and those scoring less than 5 points are classified as low quality. Quality assessment was independently conducted by two researchers (MVP, HAA), and the results were subjected to thorough analysis and discussion. Any emerging discrepancies were resolved through constructive dialogue.

Table 2 Quality assessment of controlled intervention studies

Criteria/Studies	1	2	3	4	5	6	7
Q1. Was the study described as randomized, a randomized trial, a randomized clinical trial, or an RCT?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q2. Was the method of randomization adequate (i.e., use of randomly generated assignment)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q3. Was the treatment allocation concealed (so that assignments could not be predicted)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q4. Were study participants and providers blinded to treatment group assignment?	Yes	P/A	Yes	Yes	Yes	Yes	Yes
Q5. Were the people assessing the outcomes blinded to the participants' group assignments?	No	Yes	Yes	Yes	Yes	No	N/R
Q6. Were the groups similar at baseline on important characteristics that could affect outcomes (e.g., demographics, risk factors, co-morbid conditions)?	No	Yes	Yes	P/A	Yes	Yes	Yes
Q7. Was the overall drop-out rate from the study at endpoint 20% or lower of the number allocated to treatment?	P/A	Yes	Yes	Yes	Yes	N/R	No
Q8. Was the differential drop-out rate (between treatment groups) at endpoint 15% points or lower?	N/A	Yes	N/A	Yes	Yes	N/A	N/R
Q9. Was there high adherence to the intervention protocols for each treatment group?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q10. Were other interventions avoided or similar in the groups (e.g., similar background treatments)?	Yes	Yes	Yes	No	Yes	Yes	Yes
Q11. Were outcomes assessed using valid and reliable measures, implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Q12. Did the authors report that the sample size was sufficiently large to be able to detect a difference in the main outcome between groups with at least 80% power?	No	No	No	No	No	No	No
Q13. Were outcomes reported or subgroups analyzed prespecified (i.e., identified before analyses were conducted)?	No	Yes	Yes	No	Yes	No	Yes
Q14. Were all randomized participants analyzed in the group to which they were originally assigned, i.e., did they use an intention-to-treat analysis?	Yes	Yes	Yes	N/R	N/R	Yes	N/R
Score	8.5/14	12.5/14	12.5/14	9.5/14	12/14	9/14	9/14
Evaluation	High	High	High	High	High	High	High

The ratings were conducted according to the "Quality Assessment of Controlled Intervention Studies" (NIH, 2021). A score of 1 is given for "Yes" responses, 0.5 for "Partial Affirmations" (P/A), 0 for "No" responses, "N/A" for "Not Applicable," and "N/R" for "Not Reported." 1 = Meyers and van Woerkom (2017); 2 = Pang and Ruch (2019); 3 = Peláez et al. (2019); 4 = Bakker and Van Wingerden (2020); 5 = Peláez et al. (2020); 6 = Coo et al. (2021); 7 = Bratty and Dennis (2024)

2.6 Data Analysis

The verification of the efficacy of the interventions was carried out by calculating the Standardized Mean Difference (SMD) using the Practical Meta-Analysis Effect Size Calculator software (Wilson, 2016) and the variance of the SMD using the rECSMA software (Villacura-Herrera & Kenner, 2020). The SMD, which indicates the magnitude of the effect of an intervention in a study compared to the variability between participants for a specific outcome, is expressed through Cohen's *d* (Higgins & Green, 2011). This statistical method was chosen because the analyzed studies evaluated the same outcome (i.e., work engagement or job performance) using different approaches (via varied concepts or scales), necessitating the normalization of values (Higgins & Green, 2011). To perform these calculations, data on the mean, standard deviation, and sample size in each group after the intervention were collected. In cases where these data were unavailable, the authors were contacted via email to request them. This was required specifically for the articles by Meyers and van Woerkom (2017), Peláez et al. (2019), Peláez et al., (2020), and Coo et al. (2021). In the article by Meyers and van Woerkom (2017), since specific information about the sample size (n) for the second measurement time in each group individually (i.e., experimental group and waiting list control group) was not reported, a proportional calculation was used to estimate these sample sizes. This means that the total sample size reported for the second measurement time was distributed between the experimental and waiting list control groups according to the proportion of the sample size reported at the first measurement time.

To conduct the separate meta-analyses for work engagement and job performance, the MAJOR module of Jamovi 2.3.28 software (The Jamovi Project, 2022) was used, and data were pooled according to the random effects model to account for variation between studies (e.g., participant samples, intervention procedures, and outcome measures). The interpretation of the magnitudes of the effect size for each comparison between the intervention and the control group was carried out following Cohen's (1998) convention, where 0.2 means a small effect size, 0.5 a moderate effect size, and 0.8 a large effect size.

A heterogeneity test was implemented to assess the existence and degree of variation between the studies, using the Cochran's Q and I^2 statistics. These represent the intensity of the evidence of heterogeneity and the percentage of variability in effect estimates attributable to heterogeneity rather than sampling error, respectively (Higgins & Green, 2011). The interpretation of Q dictates that a low p-value (<0.05) suggests the presence of heterogeneity in the intervention effects, while a non-significant p-value (≥ 0.05) denotes its absence (Higgins & Green, 2011). Regarding I^2, the values are understood as follows: from 0 to 40% may be insignificant, from 30 to 60% indicate moderate heterogeneity, from 50 to 90% denote substantial heterogeneity, and from 75 to 100% signify considerable heterogeneity (Higgins et al., 2003; Huedo-Medina et al., 2006). Additionally, a sensitivity analysis was performed through influential diagnostics plots to check for outliers (Viechtbauer & Cheung, 2010).

3 Results

3.1 Study Selection

Initially, 963 articles were identified through the search conducted in Web of Science (WOS), Scopus, and ProQuest databases, along with 2 additional studies identified from other sources (*Frontiers in Psychology*), resulting in a total of 965 articles. After an initial review based on title and abstract, 282 articles were excluded. The remaining 674 articles were assessed for eligibility through a full-text review. During this stage, studies were excluded for not meeting one or more of the following inclusion criteria: Primary quantitative studies ($n=71$); Experimental or quasi-experimental designs ($n=116$); Controlled group trial studies ($n=4$); Studies establishing work engagement and job performance as dependent variables ($n=51$). Additionally, studies were excluded based on the following exclusion criteria: Language other than English or Spanish ($n=17$); Non-scientific articles ($n=35$); Articles without interventions ($n=10$); Studies conducted outside of organizational contexts ($n=370$).

Ultimately, of the 963 studies initially identified, only 7 met the strict inclusion criteria established in this meta-analysis. Only studies with experimental or quasi-experimental designs, control groups, and repeated measures were selected, ensuring a robust evaluation of long-term effects. Additionally, only studies focused on character strengths interventions within the workplace context were considered, excluding those conducted in other settings or with less rigorous methodologies.

The final seven articles correspond to eight studies that explore different interventions in the workplace focused on the development of character strengths (Meyers & van Woerkom, 2017; Bakker & van Wingerden, 2020), and in some cases combined with mindfulness (Coo et al., 2021; Pang & Ruch, 2019), and coaching (Peláez et al., 2019; Peláez et al., 2020), and how these influence work engagement and job performance. While the field of strengths-based interventions has grown in recent years, most existing studies use cross-sectional designs or lack a control group, which limits their methodological rigor and their inclusion in this meta-analysis. The study selection procedure is presented in Fig. 1.

3.2 Quality Assessment

In terms of the quality assessment, all these studies were classified as "high quality" according to the "Quality Assessment Tool for Controlled Intervention Studies" (NIH, 2021) (See Table 2).

3.3 General Characteristics of the Studies

The included studies had samples ranging from 40 to 148 participants in the posttest conditions, with a total of 922 individuals, with an average age of 41.28 years and a standard deviation of 9.65 years. Regarding participant assignment

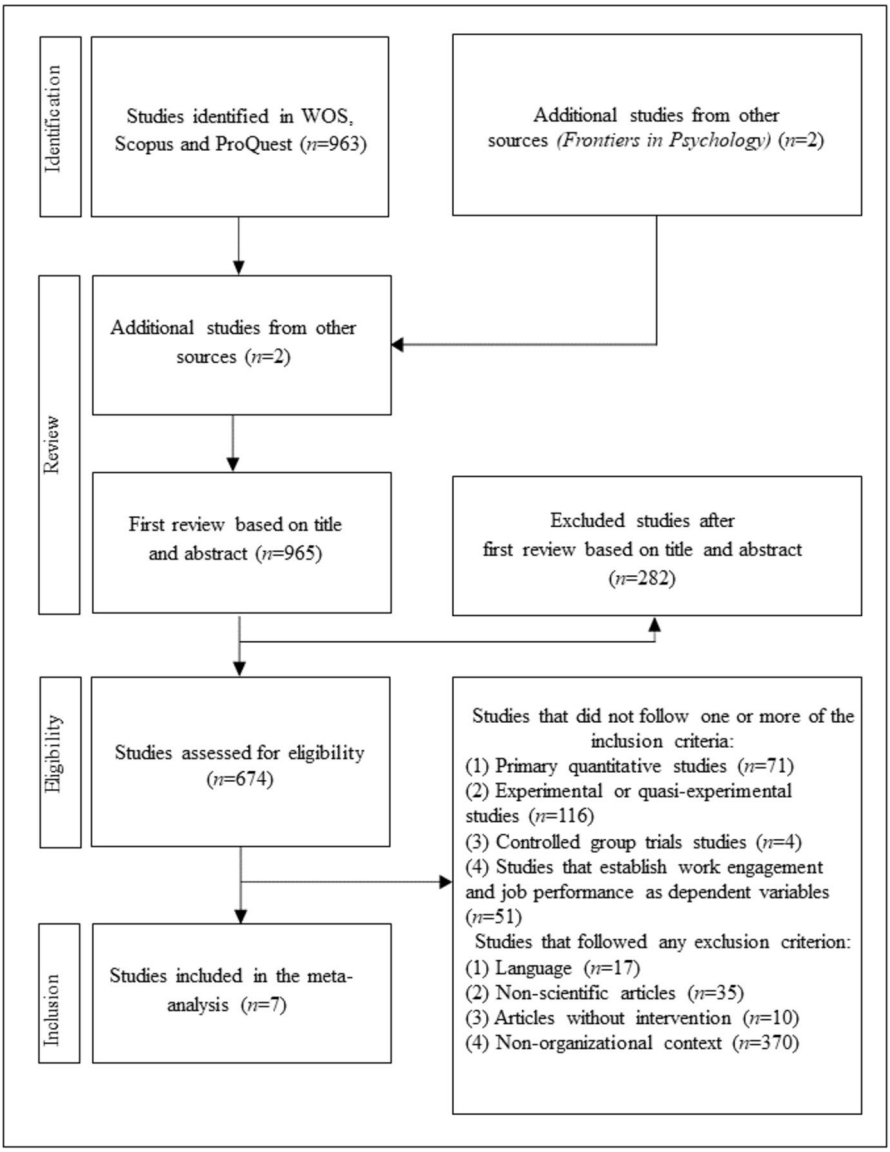

Fig. 1 Data collection process

in the eight studies, four employed random assignment (Coo et al., 2021; Pang & Ruch, 2019; Bratty & Dennis, 2024), two used blind self-selections (Meyers & van Woerkom, 2017; Bakker & Van Wingerden, 2020), and the remaining two assigned participants based on their work schedules (Peláez et al., 2019; Peláez et al., 2020). A detailed description of these studies is presented in Table 3.

Table 3 Summary of the controlled studies included in the meta-analysis (K = 8)

Study	Year	Design	Sessions	Assignment	*N* (Pre, Post)	PRE N_{EX}; N_{WL}	POST N_{EX}; N_{WL}	Age (M; SD)	Variables	Instrument (α)	Mt; Mc	SDt; SDc
1. Meyer & van Woerkom.	2017	QE	Half-day session	AC	Pre = 130 Post = 116	N_{EX}=67 N_{WL}=63	N_{EX}= n. i* N_{WL}= n. i*	M = 42.3 SD = 8.9	WE	UWES-9 (α = 0.95; Schaufeli et al., 2006)	M_{EX}= 4.96 M_{WL}= 4.99	SD_{EX}= 1.14 SD_{WL}= 1.20
2. Pang & Ruch.	2019	RCT	8 sessions (1 per week / 2 h per session)	A	Pre = 63 Post = 48	N_{EX}=16 N_{WL}=16	N_{EX}=16 N_{WL}=16	M = 42.3 SD = 10.1	TP	TPQ (α = 0.82; Harzer & Ruch, 2014)	M_{EX}= 5.99 M_{WL}= 6.15	SD_{EX}= 0.62 SD_{WL}= 0.44
3. Peláez et al.	2019	QE	6 sessions (1 per week / 2 h per session)	C	Pre = 60 Post = 56	N_{EX}=35 N_{WL}=25	N_{EX}=35 N_{WL}=21	M = 36.3 SD = 7.5	WE	UWES-9 (α = 0.95; Schaufeli et al., 2006)	M_{EX}= 5.01 M_{WL}= 4.79	SD_{EX}= 0.64 SD_{WL}= 0.93
									IP	Job performance HERO (α = 0.75. Salanova et al., 2012)	M_{EX}= 5.18 M_{WL}= 4.80	SD_{EX}= 0.75 SD_{WL}= 0.91
4. Bakker & Van Wingerden.	2020	QE	3 sessions (over 6 weeks / 3 h per session)	AC	Pre = 102 Post = 102	N_{EX}=54 N_{WL}=48	N_{EX}=54 N_{WL}=48	M = 41.3 SD = 10.5	WE	UWES-9 (α = 0.95; Schaufeli et al., 2006)	M_{EX}= 3.90 M_{WL}= 3.42	SD_{EX}= 0.96 SD_{WL}= 0.82

Table 3 (continued)

Study	Year	Design	Sessions	Assignment	*N* (Pre, Post)	PRE N_{EX}; N_{WL}	POST N_{EX}; N_{WL}	Age (M; SD)	Variables	Instrument (α)	Mt; Mc	SDt; SDc
5. Peláez et al.	2020	CT	5 sessions (1 per week / 3 h per session)	C	Pre = 41 Post = 40	N_{EX}=25 N_{WL}=16	N_{EX}=24 N_{WL}=16	M = 45.3 SD = 9.3	WE	UWES-9 (α = 0.95; Schaufeli et al., 2006)	M_{EX}= 5.24 M_{WL} = 4.39	SD_{EX}= 0.52 SD_{WL} = 0.25
									IP	Job performance HERO (α = 0.75. Salanova et al., 2012)	M_{EX}= 5.23 M_{WL} = 4.55	SD_{EX}= 0.81 SD_{WL} = 0.26
6. Coo et al.	2021	QT	6 sessions (1 per week / 2 h (sessions 1–3) 4 h (sessions 4–6))	A	Pre = 75 Post = 55	N_{EX}=20 N_{WL}=33	N_{EX}=15 N_{WL}=27	M = 41.3 SD = 8.7	WE	UWES-9 (α = 0.95; Schaufeli et al., 2006)	M_{EX}= 4.81 M_{WL} = 4.26	SD_{EX}= 0.58 SD_{WL} = 0.65
									IP	Job performance HERO (α = 0.75. Salanova et al., 2012)	M_{EX}= 5.17 M_{WL} = 4.89	SD_{EX}= 0.46 SD_{WL} = 0.45

Table 3 (continued)

Study	Year	Design	Sessions	Assignment	*N* (Pre, Post)	PRE N_{EX}; N_{WL}	POST N_{EX}; N_{WL}	Age (M; SD)	Variables	Instrument (α)	Mt; Mc	SDt; SDc
7. Bratty and Dennis (2024) 1	2024	RTC	2-week online intervention	A	Pre = 188 Post = 148	N_{EX}=56 N_{WL}=46	N_{EX}=44 N_{WL}=35	M = 41.2 SD = 10.57	IP	In-Role Behavior (IRB) (α = 0.91; Williams & Anderson, 1991)	M_{EX}= 4.77 M_{WL} = 4.63	SD_{EX}= 1.99 SD_{WL} = 2.48
						N_{EX}=35 N_{WL}=46	N_{EX}=29 N_{WL}=35	M = 41.2 SD = 10.57	IP	In-Role Behavior (IRB) (α = 0.91; Williams & Anderson, 1991)	M_{EX}= 4.79 M_{WL} = 4.63	SD_{EX}= 1.62 SD_{WL} = 2.48
						N_{EX}=51 N_{WL}=46	N_{EX}=40 N_{WL}=35	M = 41.2 SD = 10.57	IP	In-Role Behavior (IRB) (α = 0.91; Williams & Anderson, 1991)	M_{EX}= 4.72 M_{WL} = 4.63	SD_{EX}= 2.59 SD_{WL} = 2.48
8. Bratty and Dennis (2024) 2	2024	RTC	4-week online intervention	A	Pre = 806 Post = 82	N_{EX}=306 N_{WL}=503	N_{EX}=51 N_{WL}=31	M = 40.4 SD = 9.66	WE	UWES-9 (α = 0.95; Schaufeli et al., 2006)	M_{EX}= 4.30 M_{WL} = 4.75	SD_{EX}= 8.71 SD_{WL} = 4.84

Table 3 (continued)

Study	Year	Design	Sessions	Assignment	*N* (Pre, Post)	PRE N_{EX}; N_{WL}	POST N_{EX}; N_{WL}	Age (M; SD)	Variables	Instrument (α)	Mt; Mc	SDt; SDc
									IP	In-Role Behavior (IRB) (α = 0.91; Williams & Anderson, 1991)	M_{EX} = 4.54 M_{WL} = 4.64	SD_{EX} = 3.71 SD_{WL} = 3.06

Design (*QE* Quasi-experimental Study, *RCT* Randomized Controlled Trial, *CT* Controlled Trial); Allocation (*AC* Blinded Self-Selection, *A* Randomized, *C* Convenience); *N* Total number of subjects in this study, N_{EX}Number of subjects in the treatment group, N_{WL}number of subjects in the control group (waiting list), *n. i* does not report, Age (*M* Mean, *SD* Standard Deviation), Variables (*WE* Work Engagement, *TP* task performance, *PI* In-Role performance); *α* Cronbach's Alpha, M_{EX}Mean in the treatment group, M_{WL}mean in the control group (waiting list), SD_{EX} Standard Deviation in the treatment group, SD_{WL} Standard Deviation in the control group (waiting list). *Ratio is used based on total N of follow-up time, relative to the distribution of N_{EX} and N_{WL} of the first reported evaluation

3.4 Description of the Studies

In the study by Meyers and van Woerkom (2017), an intervention was implemented with the main objective of encouraging participants to develop and use their strengths in the workplace, thereby increasing their overall and work-related engagement. This intervention showed a significant increase in Positive Affect and Psychological Capital (PsyCap) compared to a waiting list control group. However, no direct positive effects were found on life satisfaction, work engagement, or burnout. Nevertheless, a marginally significant trend towards a positive effect on work engagement was found as a result of the strengths-based intervention. Although this effect did not reach conventional statistical significance, it indicates a possible positive trend in the work engagement of the participants who experienced the intervention, suggesting a potential beneficial effect of the intervention on this variable. In this study, 179 workers from the Netherlands participated, of whom 130 completed all necessary questionnaires for analysis. Within this group of 130 participants, 67 were part of the experimental group and 63 of the waiting list control group. The study methodology included a half-day training facilitated by two professional trainers and a preparatory task for groups of 40–45 people to identify their three most dominant strengths using a set of strength cards. Additionally, a follow-up task involved a chosen partner monitoring their progress in using and developing their strengths. Participants completed questionnaires (e.g., Utrecht Work Engagement Scale [UWES-9], $\alpha = 0.95$; Schaufeli et al., 2006) before, immediately after, and one month after the intervention to assess its effects.

In the study by Pang and Ruch (2019), the impact of combining mindfulness and character strengths interventions on work engagement and performance was investigated. This study demonstrated that Mindfulness-Based Strengths Practice (MBSP) and Mindfulness-Based Stress Reduction (MBSR) interventions had positive effects on job satisfaction, general well-being, and task performance compared to a waiting list control group. This study included 63 participants from Zurich, Switzerland, who were randomly divided into three groups: 21 participants in the MBSP group, 21 in the MBSR group, and 21 in the waiting list control group. The study methodology included eight-week interventions where participants met weekly. Each session lasted approximately two hours and was led by qualified trainers. The MBSP group received training integrating mindfulness and character strengths, starting with an opening meditation, followed by dyad or group discussions, a theoretical introduction to new materials, practical exercises, and concluding with a closing meditation. The MBSR group participated in a two-hour version of the standard MBSR curriculum. Between sessions, daily tasks of 20 to 40 min, including mindfulness and character strengths practices, supported by reflective journals and audio recordings, were assigned. The measures used included the Applicability of Character Strengths Rating Scale, the WHO-5 Well-Being Index, the Perceived Stress Scale-10, and job satisfaction and task performance questionnaires (i.e., Task Performance Questionnaire [TPQ], $\alpha = 0.82$; Harzer & Ruch, 2014) applied before the intervention, after the intervention, and at three follow-up points: one month, three months, and six months after the intervention.

In the study by Peláez et al. (2019), an intervention aimed at exploring the impact of a strengths-based micro-coaching program on work engagement and job performance was implemented. The study showed significant effects in increasing work engagement and job performance compared to a waiting list control group. Additionally, job performance maintained its positive effects over time. This study included 60 workers from an automotive industry company in Spain, divided into two groups by convenience self-selection, with 21 participants in the waiting list control group. The intervention procedure included a two-hour group workshop session, followed by three individual coaching sessions of 90 min each, and a final follow-up session of 60 min. The goal of the interventions was to enhance engagement and performance at work by focusing on character strengths in an automotive industry company in Spain. Participants completed questionnaires (e.g., UWES-9, $\alpha = 0.95$; Schaufeli et al., 2006; Job performance HERO, $\alpha = 0.75$; Salanova et al., 2012) at the beginning and end of the study.

The study by Bakker and Van Wingerden (2020) aimed to evaluate whether an intervention focused on personal resources and the use of character strengths could increase work engagement. The study showed efficacy in improving assertiveness and work engagement through participants' self-efficacy and resilience compared to a waiting list control group. Regarding participants, from the voluntarily enrolled training staff, 102 people from the Netherlands were selected, with 54 people included in the intervention group and 48 people in a waiting list control group. The intervention, designed to strengthen social skills and personal resources, consisted of three three-hour sessions distributed over six weeks. Cognitive-behavioral techniques were employed to increase participants' assertiveness, self-efficacy, and resilience, and the identification and use of character strengths were encouraged, integrating these elements into daily work activities to promote engagement and well-being in the workplace. Participants completed questionnaires (e.g., Utrecht Work Engagement Scale [UWES-9], $\alpha = 0.95$; Schaufeli et al., 2006) at the beginning and end of the study.

The study by Peláez et al. (2020) aimed to evaluate the efficacy of a coaching-based leadership intervention in developing coaching skills and increasing Psychological Capital (PsyCap), work engagement, and in-role and extra-role performance. The findings provided evidence regarding the potential benefits of a coaching-based leadership style in organizations, highlighting its positive influence on work-related outcomes such as PsyCap, work engagement, and in-role and extra-role performance. However, a repeated measures ANOVA for performance did not show significant interaction effects between time (T1 and T2) and group (experimental and waiting list) for supervisor scores, although levels were higher at T2 compared to T1. The total number of participants in the study was 41 executives and middle managers from the automotive sector in Spain. Of these, 25 were assigned to the experimental group and 16 to the waiting list control group. The intervention design consisted of a two-hour group leadership workshop, followed by three individual executive coaching sessions of 90 min each over three months. Between sessions, participants performed daily tasks and exercises related to personal strengths, supported by resources such as reflective journals and audio recordings. Additionally, a 60-minute follow-up session was conducted two weeks after the individual sessions.

Participants completed questionnaires (e.g., UWES-9, $\alpha = 0.95$; Schaufeli et al., 2006; Job performance HERO, $\alpha = 0.75$; Salanova et al., 2012) at the beginning and end of the study.

The study by Coo et al. (2021) aimed to evaluate the differential effects of two mindfulness-based intervention programs on psychological well-being, work engagement, performance, and stress in two organizations in Spain (A and B). Organization A offered a six-week program called "Mindfulness and Self-Compassion Intervention" (MSCBI) based on Mindfulness-Based Cognitive Therapy (MBCT) and self-compassion. In contrast, Organization B implemented a customized three-week program called "Mindfulness and Positive Stress Management" (MPSM), integrating MBCT and Acceptance and Commitment Therapy (ACT), focusing on character strengths practice and work stress management. The results showed that both interventions had a significant effect compared to the waiting list control group, improving aspects such as mindfulness, psychological well-being, work engagement, and job performance, while reducing perceived stress. The total number of participants in the study was 41 executives and middle managers from the automotive sector in Spain. Of these, 22 were initially assigned to the MSCBI program, of which 13 completed the program, and a total of 20 were assigned to the MPSM program, of which 15 completed the program. Additionally, 33 participants were assigned to the control group, of which 27 completed the evaluations. The measures used to evaluate the outcomes included the Five Facet Mindfulness Questionnaire (FFMQ), the Psychological Well-Being Scale (SPWB), the UWES work engagement scale, an adapted job performance scale by Goodman and Svyantek (Salanova et al., 2012; $\alpha = 0.75$), and the Perceived Stress Scale. These instruments allowed for a comprehensive assessment of character strengths, work engagement, and job performance at the beginning and end of the study.

In the study by Bratty and Dennis (2024), two studies were conducted in which strengths-based interventions were implemented to evaluate their impact on various desirable outcomes in the work context. In the first study, the impact of using top strengths, bottom strengths (weaknesses), or both on job performance and flourishing at work was investigated. The results showed a significant increase only in job performance, with no significant differences in flourishing at work. A post hoc analysis revealed that participants whose strengths use increased experienced significant improvements in job performance. The study included 148 full-time workers from the United States, divided into four distinct samples: (i) control group, (ii) use of top strengths, (iii) use of bottom strengths, and (iv) use of both. The intervention lasted two weeks and included an instructional video and practical exercises.

In the second study, a more extensive and comprehensive four-week intervention on strengths use, job performance, organizational citizenship behavior (OCB), and work engagement was evaluated. The results indicated significant increases in all variables after the intervention, with the greatest impact observed in OCB. A post hoc analysis showed that participants who increased their strengths use experienced significant improvements in job performance, OCB, and work engagement. The study included 82 workers who were randomly assigned to an intervention group or a waiting list control group. The intervention was based on the "Strengths Builder" program and was adapted for online and workplace application.

Table 4 Effect of character strengths intervention based on a pre- and post-comparison of work engagement and job performance

Result		Intervention effect				CI 95%		Heterogeneity		
	k	*N*	d	SE	*p*	Min	Max	I^2	Q	*p*
Work Engagement	6	452	0.37	0.15	0.01	0.08	0.65	49.38%	9.936	0.08
Job Performance	4	470	0.27	0.11	0.02	0.04	0.49	37.69%	11.880	0.10

k number of effect sizes included in the analysis, *N* number of participants, *d* mean effect size according to Cohen's d, *SE* standard error, CI 95%, *Min-Max* minimum and maximum confidence interval limits, I^2 percentage of the standard error of the effect size that can be attributed to heterogeneity, *Q* heterogeneity estimate, *p* significance level

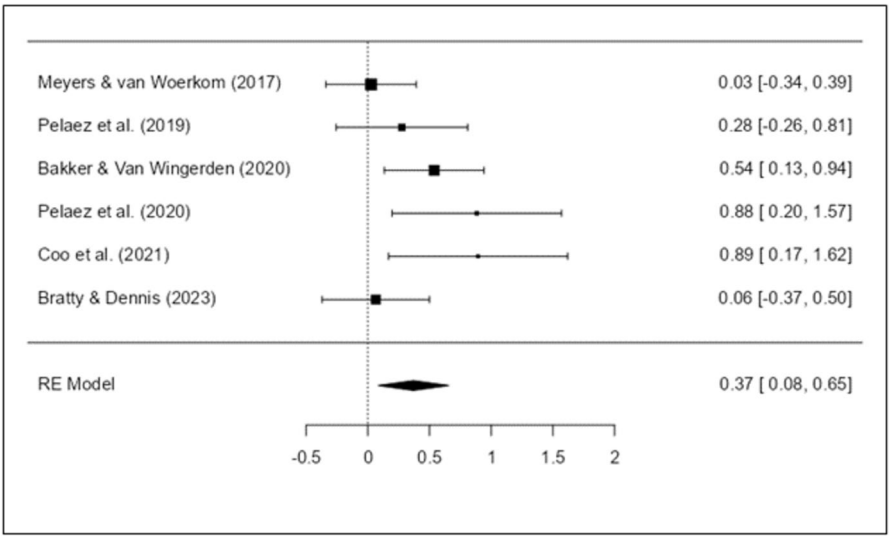

Fig. 2 Forest plot work engagement

3.5 Meta-Analysis

The meta-analysis showed a moderate positive effect on work engagement ($d = 0.37$, 95% CI [0.08, 0.65]) and a lower but significant effect on in-role performance ($d = 0.27$, 95% CI [0.05, 0.49]). These findings highlight the efficacy of character strengths-based interventions (see Table 4; Figs. 2 and 3).

Specifically, for work engagement, six effect sizes with a total of 452 participants were analyzed. Regarding the heterogeneity of the studies, an I^2 value of 49.38% indicates moderate variability among the studies. The value of Cochran's Q statistic was 9.94 with a *p*-value of 0.08, suggesting insufficient evidence of heterogeneity beyond chance.

For the random effects model (RE Model), the intercept has a significant estimated value of 0.37 (SE = 0.15; $p = 0.01$), with a confidence interval of 0.08 to 0.65.

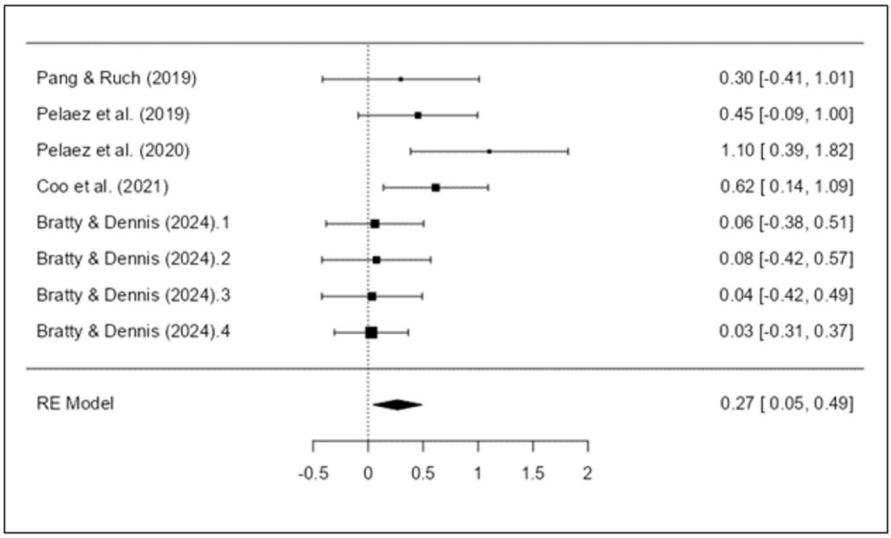

Fig. 3 Forest plot job performance

This interval suggests that, on average, there is a positive increase in work engagement as a result of the character strengths intervention. The average influence of the intervention is statistically significant, as the confidence interval does not cross the null value of 0, and the effect size is above it, indicating an improvement in the work engagement of participants in the studies. This can also be graphically observed through the forest plot (see Fig. 2), which shows the six studies included in the meta-analysis, each with its estimated effect size and associated confidence intervals.

Regarding job performance, measured through in-role performance and task performance, eight effect sizes with 470 participants were included. The heterogeneity among the studies is evaluated with an I^2 of 37.69%, suggesting moderate variability among the studies. Cochran's Q statistic is 11.88 with a p-value of 0.11, indicating no significant heterogeneity.

For the random effects model (RE Model) in this meta-analysis, the intercept presents a significant estimated value of 0.27 (SE = 0.11; $p = 0.02$), with a confidence interval of 0.05 to 0.49. This interval indicates that, on average, there is a positive increase in job performance as a result of the character strengths intervention. The average influence of the intervention on job performance is statistically significant, as the confidence interval does not include the null value of 0, and the effect size is above this value, indicating an improvement in the job performance of subjects who participated in the studies included in the analysis. These results can be observed graphically in the forest plot (see Fig. 3), illustrating each of the eight analyzed studies with their respective estimated effect sizes and corresponding confidence intervals.

Additionally, the sensitivity analysis examined the presence of outliers in the data. It was observed that no outliers were found in the data analyzed to evaluate work engagement (See Supplementary Fig. I). However, outliers were identified in

the data analyzed to evaluate job performance (See Supplementary Fig. II). As a result of this finding, an analysis excluding these studies (Coo et al., 2021; Peláez et al., 2020) was conducted to evaluate how the inclusion of these studies impacts the results of the meta-analysis. This can be seen in the influential and outlier diagnostics shown in Supplementary Fig. II. The adjusted model, with k = 6 studies, reveals an estimated effect size of 0.11, with a standard error of 0.10, resulting in a 95% confidence interval ranging from −0.08 to 0.30. This result is not statistically significant ($p = 0.24$), indicating that, after excluding the outliers, the estimated effect does not significantly differ from zero. Furthermore, the heterogeneity statistics after exclusion reflect a lack of variability among the studies, with an I^2 value of 0%, indicating no variability among the effect sizes of the studies beyond what would be expected by chance. Additionally, the heterogeneity Q value is not significant ($p = 0.82$), supporting the decision to treat the studies as homogeneous after the exclusion of the outliers.

These adjusted findings are graphically represented in the updated forest plot, with an effect size estimate for the random effects model of 0.11 with a 95% confidence interval from 0.08 to 0.30, as illustrated in Supplementary Fig. III. The exclusion of the outlier studies has led to a more precise and homogeneous estimation of the effect size of job performance in the study population.

4 Discussion

The present study aimed to assess the efficacy of character strengths-based interventions in increasing work engagement ($d = 0.37$) and job performance ($d = 0.27$). The findings from studies with controlled interventions show a small but statistically significant effect, suggesting the potential of these interventions in organizational settings. Consistent with existing literature (e.g., Harzer & Ruch, 2014; Littman-Ovadia et al., 2017; Miglianico et al., 2020), the results of this meta-analysis suggest that besides fostering greater work engagement, focusing on character strengths could contribute to improving productivity indicators such as in-role and task performance. These results support the idea that interventions have a positive impact on both work engagement and job performance, albeit with a smaller magnitude.

Participants in these studies not only experienced improvements in work engagement and job performance but also in other work-related aspects such as job satisfaction, resilience, and reduced perceived stress, showing that these interventions not only positively impact job performance but also contribute to creating a more positive and rewarding work context. This, in turn, can help workers manage job demands more effectively and experience less work-related tension and greater overall well-being in the workplace (Coo et al., 2021; Pang & Ruch, 2019). Together, these results support how effective character strengths-based interventions can be in promoting a healthier and more productive work context after participating in these interventions. However, it is important to highlight that these interventions have been understudied, and there is a lack of extensive literature and conclusive evidence. The mixed results, including both positive effects and the absence of significant effects, emphasize the need for further research in this field.

Regarding the theoretical implications of this study, these findings align with the JD-R theory (Bakker & Demerouti, 2013; 2017) and other complementary theoretical models related to the motivational process (i.e., Dual Process Model (Llorens et al., 2008); Broaden and Build (Fredrickson, 2013); Resource Caravan (Hobfoll, 2002)), confirming that character strengths can act as personal resources that foster engagement and mitigate the negative effects of job demands. These results are consistent with previous research showing a favorable correlation between character strengths, engagement in work contexts (Harzer, 2020; Meyers & Woerkom, 2017; Peterson et al., 2010; Quinlan et al., 2012), and organizational outcomes, such as job performance (Bakker & van Woerkom, 2018).

In terms of methodological implications, these findings provided insights into important aspects to consider in interventions focused on character strengths. A key difference in the efficacy of these interventions has been observed, related to the number and duration of sessions. For example, Meyers and Van Woerkom (2017) reported non-significant results with a single half-day session, while other more successful studies employed three to eight extended sessions from four weeks to six months (Bakker & Van Wingerden, 2020; Coo et al., 2021; Pang & Ruch, 2019; Peláez et al., 2019; Peláez et al., 2020). This suggests that the number and duration of sessions could be critical factors in the efficacy of these interventions.

Additionally, this study provides important practical implications. First, the findings are significant for the design of organizational programs that promote the use of character strengths. Their positive impact on specific indicators, such as work engagement, can be leveraged by various organizations and Human Resources departments as compelling evidence of the benefits of implementing character strengths-based PPIs using an evidence-based approach. Second, as noted by Meyers et al. (2013), these interventions are characterized by low cost, adaptability, and ease of implementation. Miglianico et al. (2020) highlight that these interventions are applicable across different cultures and emphasize individual qualities. In this regard, potential applications may focus on the development and implementation of training programs aimed at identifying and cultivating employees' character strengths, either individually or collectively. Third, organizations could incorporate character strengths assessments into their organizational policies to help workers achieve greater well-being and job satisfaction through the diagnosis and intervention of personal resources. Additionally, these assessments could be included in selection processes as complementary hiring criteria to the required job profiles.

Regarding the limitations and strengths of this study, it is important to highlight, first, that although the primary goal was to evaluate the efficacy of character strengths-based interventions in relation to work engagement and job performance, this could be considered a limitation due to the exclusion of other potential effects of these interventions. Examples include reducing job stress, fostering prosocial behavior, and developing leadership (Donaldson et al., 2019). However, this focus is also a strength, as it allows for a more detailed exploration of key aspects in the organizational domain and within theoretical models grounded in Positive Organizational Psychology (Salanova et al., 2016).

On the other hand, although the limited number of studies and the influence of some outlier studies suggest that the results should be interpreted with caution,

requiring further research to confirm these findings (Meyers et al., 2013), the significant results obtained through meta-analytical analyses, such as the standardized mean differences calculated using Cohen's *d*, offset this limitation. Added to this is the quality of the studies included, which were published in indexed journals with recognized scientific credibility. Thus, this study is pioneering in addressing this specific topic, offering valuable opportunities for leadership development and improvement of the work climate.

In this regard, it is recommended that future research broaden the scope of these interventions, exploring additional strengths, more diverse populations, and longitudinal designs that allow for the evaluation of sustained effects. For instance, future studies could examine the impact of specific strengths, such as optimism, zest or gratitude, on well-being and job performance. Given that these types of strengths have been identified as significant predictors of resilience and mental health (Brdar & Kashdan, 2010; Bunjak et al., 2022; Martínez-Martí & Ruch, 2017), their inclusion could provide deeper insights into how individual strengths contribute to the success of character strengths-based interventions in organizational contexts. Furthermore, given that the reviewed studies suggest that the duration and frequency of the sessions may influence the results, future work should investigate optimal protocols to maximize the efficacy of these interventions. Finally, although there are some instruments for measuring character strengths in the workplace (Gallup Strengths Center, 2021; Linley et al., 2010; Peterson & Seligman, 2004), it is crucial to develop and validate tools that are sensitive to cultural and contextual variations to accurately assess character strengths in different work populations. This is particularly relevant given that research on character strengths interventions in the workplace is still in relatively early stages (Ruch et al., 2020).

5 Conclusions

In conclusion, the meta-analysis showed that character strengths-based interventions have a significant, albeit moderate, effect on work engagement and job performance, highlighting their viability as effective tools in workplace contexts. At a theoretical level, they support JD-R theory by demonstrating how strengths can act as personal resources that foster well-being. Methodologically, this study provides more robust evidence by including research with repeated measures and control groups, allowing for a precise evaluation of long-term effects. Practically, the results have important implications for human resources, as these interventions can be integrated into training and well-being programs to improve performance. Although the number of studies was limited, the methodological quality ensures the validity of the findings and opens opportunities to explore interventions in broader contexts with greater diversity of strengths. Overall, these findings reinforce the potential of strengths-based interventions to enhance key indicators such as work engagement and job performance.

Appendix

Table 5 Search strategy sequences according to the database used

Database	Access path	Syntax
ProQuest	Remote Access Universidad de Talca Library System	noft((character strength) AND ((performance) OR (task performance) OR (productivity) OR (in-role performance) OR (work engagement) OR (well being)) AND ((work) OR (organization)))
Scopus	Remote Access Universidad de Talca Library System	TITLE-ABS-KEY ("character strength*") AND (("performance") OR ("productivity") OR ("well being") OR ("work engagement")) AND (("work*") OR ("organization*") OR (task performance) OR (productivity) OR (in-role performance)) AND (LIMIT-TO (DOCTYPE, "ar"))
Web of Science	Remote Access Universidad de Talca Library System	ALL=("character strength*") AND (ALL=(performance) OR ALL=(productivity) OR ALL=(well being) OR ALL=(work engagement) OR ALL= (task performance) OR (productivity) OR ALL=(in-role performance)) AND (ALL=(work) OR ALL=(organization*))

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Author Contributions MVP and HAA conceptualized the study and were responsible for the database search, the study selection and data extraction process. MPV was responsible for the quality assessment of the studies. MVP and HAA was responsible for the data analysis and interpretation of the results and for drafting the first version of the manuscript. MLB was responsible for revision of the manuscript. All authors contributed to the writing of the manuscript and the final review of the document. All authors gave their approval for submission.

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Data Availability Documentation for all steps on this study, along with raw exports from the two databases and the dataset used for analysis are publicly available on an Open Science Framework repository on [Link have been included for reviewers: https://osf.io/r3bdq].

Declarations

Ethical Standard This article is a systematic review; therefore, it did not require an ethics committee or informed consent as data is collected exclusively from secondary sources.

Conflict of Interest The authors declare that there are no conflicts of interest associated with this study.

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