INTRODUCTION

1.1 ABOUT THE TOPIC

MULTIPLE HAPPINESS-ESS

Modern societies seem to be captivated by the elusive idea of “happiness”. The ubiquity can be corroborated by how global the appeal of this idea has become. From Thomas Jefferson replacing material wealth with happiness when interpolating “Life, Liberty and pursuit of Happiness” in the United States declaration of Independence (Jefferson, 1976), to modern corporations having increasingly extensive and specialised human resource segments focusing on employee well-being (Guest, 2017; Van De Voorde et al., 2012); and from a booming consumer demand for “self-help” products (McGee, 2005; Dolan 2014) to Bhutan surrogating its Gross Domestic Product with Gross National Happiness (Alkire, 2008; Royal Government of Bhutan, 2024).

But the elusive nature of this concept is equally well captured by this arbitrary set of instantiations. There has been speculation amongst scholars anent who influenced the inclusion of this statement in the declaration of independence, but as per the Lockean root hypothesis (Hamowy, 2008), it is a modification of the father of Liberalism, John Locke, writing in Two treatises of Government (Locke, 1689/1988) and extending in A Letter concerning Toleration (Locke, 1689/2010), “Life, Liberty and Estate”, or “life, liberty, health, and indolency of body; and the possession of outward things". Clearly, the idea of happiness derived from the value of bottom up liberty and freedom.

A volte face to this exists in Bhutan government's Gross National Happiness index, which was enacted as the government's "goal" in the constitution enacted in 2008 (Royal Government of Bhutan, 2008). Since its inception as a philosophy via Bodhisattva Druk Gyelpo (Ura et al., 2012), it has been criticized for enforcing a myopic conception of "happiness" as an ultimate goal, arguably enabling the ethnic cleansing and persecution of a significant portion of the nation's population (Hutt, 2003; Mishra, 2013). Yet in 2011, the United Nations General Assembly passed resolution 65/309, (United Nations General Assemble, 2011) urging more states to erect similar standards and assessments. While it has been contended that the index is an "evolving" construct that has outgrown its inception in parochial conceptions of happiness, it is undeniable that the 33 sub-indicators dispersed across the ten domains of happiness continue to include "Driglam Namzha" (or the traditional code of conduct enforced by the Bhutanese monarchy since the 17th century), and the Native Language. Thus, the construct clearly uses top-down values as indicators of happiness.

The goal in this introduction or the forthcoming paper is not to perform a comparative analysis of the regimes of happiness prevalent in two very distinct sovereign nations. The reason we emphasized such a difference was to illuminate how our conceptualization of happiness across time and cultures is extremely different, and this has veritable effects on the outcomes of research, which needs to be pragmatic and self aware when developing models related to the construct.

HAPPINESS IN PSYCHOLOGY

The narrative of psychology having shifted its focus from psychopathology towards the study of human flourishing and well being has become deeply embedded in the minds of everyone who

has gone so far as to ever indulge a propedeutic in the field. During the olden days, in the dull and gloomy kingdom of psychopathology, the sage Martin Seligman, labouring through his dalliances with the hopelessness of the depressed, saw a glimmer of hope. Through his immeasurable sagacity, he reckoned that hope can undo this anathema thus cast. Henceforth, he began practicing the dark arts of hope, engagement, and ultimately, happiness. Upon his ascension to the throne of the American Psychological Association, he declared to all the critters in the realm, our spells and magic hitherto has been misguided and misdirected, and ergo, we shall all shift towards "positive psychology" (Seligman, 1998; Seligman & Csikszentmihalyi, 2000)

This shift, when it began in the 2000s, did not emerge out of a void. The idea of a "science of happiness and flourishing" was deeply contingent upon how happiness was operationalised by those studying it (Bridgman, 1928; Stevens, 1935) On the one hand, happiness is a historical artefact, and as per the proposal of (Murthukrishna & Henrich, 2019)**,** psychology is indeed a historical science, and thus, should pay heed to how various cultures and traditions have defined it. On the other hand, psychology is the "scientific study of mind and behaviour" (Ciccarelli & White, 2021) and thus, should focus on developing models with the highest level of predictive capacity.

In practice, both of these blended, causing early theoreticians like (Diener, 1984; Ryff, 1989; Seligman, 2011; Ryan & Deci, 2001) to develop historical conceptions into formal models. Thus, our real goal, when trying to navigate the plethora of ways of conceptualising happiness in the present, especially in specific fields like industrial organisational psychology, is not to explore the history and culture behind happiness, but to explore the models derived from them, and developing an iterative analysis of their evolution.

PRODUCTIVITY IS ANOTHER TALE

Productivity, unlike happiness, is not a concept as old as time. Agricultural productivity, even in modern research, concerns itself with land productivity or the effectiveness of tools and techniques (Hayami & Ruttan, 1985), with the human seen as a fungible conduit through which farming materialises. The desire to capture human productivity only emerged as a result of the proliferation of the industrial revolution. This is fundamentally because industry allowed the persistent growth of human productivity. For millenia, real per capita income had remained unchanged (Clark, 2007) an idea immortalised by the trepidations of Malthus (Malthus, 1798/1998). Howbeit, with the industrial revolution, worker productivity kept going up ((Mokyr, 1990; Gordon, 2016), which sparked interest in apprehending this process, which has become increasingly central to the economy over the past 150 years.

In his watershed text "Principles of Scientific Management" (Taylor, 1911/2004), F.W Taylor provided the first prescriptive assessment of this, where he argued that the worker is a biomechanical system whose ideal way of doing a task can be engineered, and then the knowledge of this must be retained with the management, who galvanizes the worker to stick to this standard of optimal productivity, deviations from this being treated as inefficiency. This primary idea about standard time for unit output was extended into motion (Gilbreth & Gilbreth, 1917), timelines (Gantt, 1919) and ultimately cross task comparability with the infamous Bedaux Unit system (Nyland 1998).

During World War 1, the army had to recruit soldiers en masse, which led to the development of assessment tools like the army alpha and beta by Robert Yerkes (Yerkes, 1921). This measured predictive rather than observed performance, which became a core interest of organisations who wanted to recruit better workers, and especially better managers (who dealt with more complex

tasks). Foundational figures like Hugo Munsterberg and William Dill Scott developed tools for better person - job matching (Münsterberg, 1913/2010; Scott, 1911) and continuous employee rating (Scott & Clothier, 1923) to address these emerging demands, instituting the field of I/O psychology, under which the current dissertation had been undertaken.

By the end of the 2nd world war however, a major criticism of the trait based predictive models (of aptitude, intelligence, or ability) came to prominence. Lee Cronbach (Cronach, 1955) famously argued that the quality of the criterion (what is being measured) is s important as the predictor itself. Since I/O psychology had shifted the focus of worker management from simple to complex jobs, finding a high quality criterion could not be limited to time and movement based measures. Cronach also exhibited that using ratings of supervisors led to inconsistent judgements (Borman, 1974) and established a tent which remains unmoved - that psychological constructs (including productivity) are not directly observable, but latent, and must be indirectly assessed through a network of evidence (Cronbach & Meehl, 1955).

Our dissertation will attempt to discern the latent construct of workplace happiness through an analysis of productivity, remaining informed by this evolving conceptions of happiness and productivity that has been discussed, as well as the quantitative synthesis that we perform.

1.2 RESEARCH AIM AND OBJECTIVES

Our goal is to examine the relationship between happiness and workplace performance in a historical, theoretical, and empirical manner. Our focus will remain on understanding how various conceptualisations of the constructs and moderators mediate this relationship, as well as how the impact of interventions on this relationship. More specifically, we focused on;

1. Tracing the historical revolution of the relationship between workplace performance and employee happiness from the beginning of the Human Resources movement to the 21st century HPWT
2. To study the effect of how different conceptualisations of happiness - such as job satisfaction, engagement, psychological well-being, flourishing, and positive affect - on workplace performance
3. To study the effect of different conceptualisations of workplace happiness - such as task performance, contextual performance, creativity, organisational citizenship behaviour - on the relationship between happiness and performance.
4. To integrate the evidence about moderators and mediating variables into a theoretical model.
5. To assess strength of relationship across different levels of happiness analysis.
6. To examine the effectiveness of workplace well-being interventions in terms of improved workplace performance.

1.3 RESEARCH METHODOLOGY

We adopted a quantitative meta-analytic research design to assess the relationship between happiness and workplace performance. We relied exclusively on secondary data collected from empirical literature published on academic databases such as Scopus, Web of Science, PsycINFO, PubMed/MEDLINE, ProQuest. Citation tracking was done to improve coverage. No lower data limit was applied, and the keyword selection was extremely broad, allowing retrieval of over 18,000 initial studies.

Studies were included if they examined the relationship between employee well being and workplace performance, reported sufficient statistical data for effect size computation, used empirical quantitative models, and were conducted within an organisational setting.

The screening involved title and abstract screening followed by full-text retrieval and screening based on predefined criteria. Deduplication was done via an automated process. A structured codebook was prepared to extract study characteristics, methodological variables, happiness constructs, performance measures, and statistical outcomes.

We found 428 studies, 612 effect sizes, and 74,893 participants across multiple countries.

1.4 DATA ANALYSIS PROCEDURE

The extracted data was analysed using meta-analytical procedures in JAMOVI with the MAJOR meta-analysis library. Effect sizes were converted into Fisher's z transformed correlations to enable comparability.

A multilevel random-effects meta-analysis was done because of the expectation of differences in research design, occupational contexts, and construct operationalisations. We assessed heterogeneity using Cochran's Q statistic, I^2 statistics, Tau^2 estimates, and prediction intervals.

Subgroup and moderator analyses were subsequently conducted to examine the influence of - Different happiness constructs; Different performance constructs; Job complexity; Study design; Measurement methods; and Methodological quality indicators.

We used leave-one-out diagnostics and publication bias assessment through funnel plot, Egger's regression test, and trim-and-fill procedures to evaluate the robustness of our findings.

We also undertook a separate intervention-based meta-analysis to develop an understanding of the effectiveness of workplace well-being interventions on employee performance outcomes.

MASEM allowed us to use a small subset of studies for developing mediating pathways between interventions, employee well-being and workplace performance.

1.4 IMPLICATIONS OF THE STUDY

The present study has important theoretical, methodological, and practical implications for industrial-organisational psychology and contemporary management research. The findings support the Happy–Productive Worker Thesis by demonstrating a moderate positive relationship between employee well-being and workplace performance, while simultaneously revealing that this relationship is highly contingent upon contextual and methodological factors. The results indicate that broader and more eudaimonic conceptualisations of happiness, such as engagement, flourishing, and psychological well-being, possess stronger relationships with performance than traditional measures of job satisfaction. Similarly, happiness demonstrated stronger associations with contextual performance, creativity, and organisational citizenship behaviour than with narrow objective productivity measures.

These findings suggest that workplace happiness should be conceptualised as a multidimensional psychological construct rather than a singular evaluative attitude. Methodologically, the study highlights the importance of longitudinal and multi-source research designs due to the inflation of effect sizes in cross-sectional and self-report studies. Practically, the results provide evidence that investments into employee well-being may generate meaningful organisational benefits, particularly within knowledge-intensive and high-complexity work environments where creativity, adaptability, and collaboration are central to performance.

LITERATURE REVIEW

2.1 LITERATURE REVIEW OF PREVIOUS STUDIES

HISTORY OF THE HPWT

The study of sentiment and employee performance started in the 1920's with Elton Mayo's Hawthorne experiments (Mayo, 1933). Although not expressly focusing on happiness or positive affect (Roethlisberger & Dickson, 1939/1941), the findings enforced the idea that employee productivity is determined by social factors and sentiments in a palpable manner. Early research concerning happiness and performance came in the form of "employee attitude", which was less formally operationalised (Kornhauser & Sharp, 1932), but became a major method of assessing employee's attitudes (Latham & Budworth, 2007; Uhrbrock, 1934) This became more widely discussed by the end of the war (Brode, 1945) with more and more evidence pointing to the lack of a relationship between happiness and performance (Katz, 1950; Katz, 1951) summarised by Brayfield and Crockett (1955) in their influential review, which challenged the fundamental assumptions of the human relations movement in Industrial/Organisational psychology, which Vroom summarised as "it was typically assumed by most people associated with the human relations movement that job satisfaction was positively associated with job performance. In fact human relations might be described as an attempt to increase productivity by satisfying the needs of employees" (Vroom, 1964) An alternative, and marginally less influential review by Herzberg maintained that the relationship was in fact significant.

Finally in 1964, Vroom did an imperative synthesis of the work available on the subject, and found a "median correlation" of r = 0.14 (Vroom, 1964) in 20 studies conducted between 1949 and 1963. This convinced scholars that positive attitudes and performance were what Chapman

& Chapman (1967) , called an “illusory relationship”, one that makes it intuitively true but empirically false. As stated by Organ (1977) - “it would appear that the last

nail has been driven into the coffin of the 'Human Relations' notion that satisfaction causes performance, insofar as its respectability among theorists and researchers in organizational psychology is concerned.”

However, the analysis of Vroom was a) not based on a formal operationalisation of happiness, b) had a narrow conception of performance (Organ, 1977) and c) was not a meta analysis. These criticisms were indirectly captured in qualitative reviews from (Locke, 1970; Schwab & Cummings, 1976) who emphasized the need for “theory-based” analysis of the relationship, emphasizing the need for models, in line with the general shift towards the cognitive movement (Neissar, 1967).

Edwin A Locke’s “Range of Affect” model allowed job satisfaction to be operationalised in a more formal manner (Locke 1970) as did Oldham and Hackman’s Job Characteristics model (Hackman & Oldham, 1976). This led to studies using scales like Job Diagnostic Survey (Hackman & Oldham, 1975), and Job Descriptive Index (JDI) or the Minnesota Satisfaction Questionnaire (MSQ) (Weiss et al., 1967) Simultaneously, statistician Gene Glass introduced the tool of meta analysis in 1976 (Gene, 1976) as an “analysis of analyses”, and the first meta analysis was published by him and Mary Lee Smith in 1978 (Smith & Glass, 1977/1978).

Petty et al. (1984) used this technique, as extended by Hunter, Schmidt, and Jackson (1982), to analyse a cohort of 20 studies (n = 3,140) on the subject of employee satisfaction and performance (Petty et al., 1984). They concluded that the higher r = .23 could be attributed to higher inclusion of managerial roles, but that such a conclusion would require separate analysis of each job role, which was not possible with the amount of studies available to them.

Additionally, they emphasized that improvement in the psychometric properties of the constructs being measured is essential, since most variance can be attributed to error in measurement, which is perhaps why such contradictory evidence regarding the subject existed in the first place (Petty et al., 1984).

In 1985, Michelle Iaffaldano and Paul Muchinsky conducted a more comprehensive and sophisticated meta-analysis on the subject (Iaffaldano & Muchinsky, 1985). Using 74 empirical studies and 217 effect sizes (n = 12,192), they found that the cumulative effect size was r = 0.17, closer to the original findings of Victor Vroom (Vroom, 1964) than the latter analysis by Petty et al. (1984). The landmark review challenged what Frank Landy later described as the “holy grail” of industrial-organisational psychology (Landy, 1989). In response, a few explanations emerged;

1. Job Satisfaction causes Job Performance - This model is derived directly from the work of early human relations theorists. As per George Strauss, "Early human relationists viewed the morale-productivity relationship quite simply: higher morale would lead to improved productivity" (Strauss, 1968, p. 264). This direct model was largely repudiated by Michelle Iaffaldano and Paul Muchinsky (Iaffaldano & Muchinsky, 1985), especially because the earlier analysis by Petty and colleagues (Petty et al., 1984) with a higher effect size got significantly less attention. However, it is interesting to note that few studies used in these analyses were actually unidirectional, with a review finding only 2 such studies in the time period of 1985–2001 (Judge et al., 2001), namely those conducted by Keaveny and Nelson (1993) and Shore and Martin (1989).
2. Job performance causes Job Satisfaction - James Olson and Mark Zanna (1993) did a paramount review in social psychology concerning the idea that behaviour causes attitudes. This potentially bolstered the viewpoint that has been presented by scholars for

a while (Naylor, Pritchard, & Ilgen, 1980; Victor Vroom, 1964; Edward Lawler & Lyman Porter, 1967; Edwin Locke, 1970; Edward Deci & Richard Ryan, 1985) that performance itself leads to higher job satisfaction. Thus, this became another major explanation for Michelle Iaffaldano and Paul Muchinsky's findings (Iaffaldano & Muchinsky, 1985).

3. Job Satisfaction and Job Performance have a reciprocal relationship - Like the previous two models, this model has been upheld in reviews since before the 1985 meta analysis (Nord, 1976; Schwab & Cummings, 1970), and thus, it also lacks a theoretical basis, acting as a hybrid of the two previous explanations (the closest attempt to a model was undertaken by Schwab and Cummings (1970), adapting March and Simon's (1958) model).
4. Job Satisfaction and Job Performance have a common underlying determinant - This model received a lot of attention from researchers, who proposed variables like role ambiguity (Brown & Peterson, 1993), self esteem (Pierce, Gardner, Cummings, & Dunham, 1989; Gardner & Pierce, 1998), organisational commitment and job involvement (Keller, 1997), trust in management (Rich, 1997), and participation in decision making (Abdel-Halim, 1983). However, the counterpoint to these findings was that a direct nonsignificant relationship between job satisfaction and job performance does not indicate the lack of a meaningful relationship, but that this relationship can be mediated by other variables.
5. Job satisfaction and Job performance's relationship is moderated by a third variable - Initially the dominant model after 1985 involved the analysis of moderator variables in the job satisfaction and job performance relationship, particularly for reward contingency, which Podsakoff and Williams (1986) found to significantly improve the effect size (r =

0.27). Job characteristics and complexity (Ivancevich, 1978, 1979), self esteem (Dipboye, 1977), attributions and organizational tenure (Norris & Niebuhr, 1984), cognitive ability (Varca & James-Valutis, 1993), need for achievement (Steers, 1975), career stage (Stumpf & Rabinowitz, 1981), pressure for performance (Ewen, 1973), time pressure (Bhagat, 1982), job fit (Carlson, 1969), occupational group (Doll & Gunderson, 1969), dyadic duration (Mossholder, Bedeian, Niebuhr, & Wesolowski, 1994), similarity in problem-solving styles (Goldsmith, McNeilly, & Ross, 1989), perceived appropriateness of supervisory task allocation decisions (Jabri, 1992), affective disposition (Hochwarter, Perrewe, Ferris, & Brymer, 1999), and situational constraints (Herman, 1973) were all proposed as moderators. The primary issue was that most of these moderators were only tested in one or two studies, making it impossible to do meta-analysis, and again highlighting the importance of a theory which the field lacked.

6. No relationship exists between Job performance and job satisfaction - Authors generally used these as separate variables without any relationship (Greenberger, Strasser, Cummings, & Dunham, 1989), which severely limited the evidence present for review and analysis, further hampering theory formation.
7. Alternative conceptualisations of Job Satisfaction and Job Performance - Over the past four decades, this has been the primary explanation for Iaffaldano and Muchinsky's dampening findings about the holy grail. We will decompose the changes brought about by this explanation in terms of a) conceptualising happiness, b) conceptualisation of performance, and c) levels of analysis, after briefly discussing the landmark meta-analysis by Judge et al. (2001), that altered the understanding of this relationship,

and ushered in the era of the Happy-Productive Worker Thesis, which has been the dominant paradigm for the past 25 years.

Judge et al 2001 performed a seminal meta analysis of the 312 samples from 254 studies (N = 54,417). While the uncorrected effect size was still r = 0.18, they found a much more significant relationship (r = 0.30) when corrected for unreliability in satisfaction and performance measures. They attributed these differences in the estimate of effect size to a) correcting for interrater reliability instead of internal consistency, b) using a broader conception of satisfaction by creating a composite of individual facets.

Furthermore, in their moderator analysis, they found that effect sizes were higher in higher quality journals, even when accounting for publication bias; global measures of satisfaction were more significant than narrower measures; cross-sectional designs yielded higher effect sizes than longitudinal studies (p = 0.31 vs p = 0.23); and that job complexity significantly moderated the relationship (p = 0.29 for low and medium complexity vs p = 0.52 for high complexity). This was not a direct relationship, because even though scientists and engineers had the highest correlation, clerical workers had a higher correlation than nurses and accountants.

Most importantly, based on their comprehensive analysis of the subject, Judge et al (2001) provided a tentative and integrative model for the relationship between satisfaction and performance;

Figure 1

Model of Relationship between Happiness and Productivity

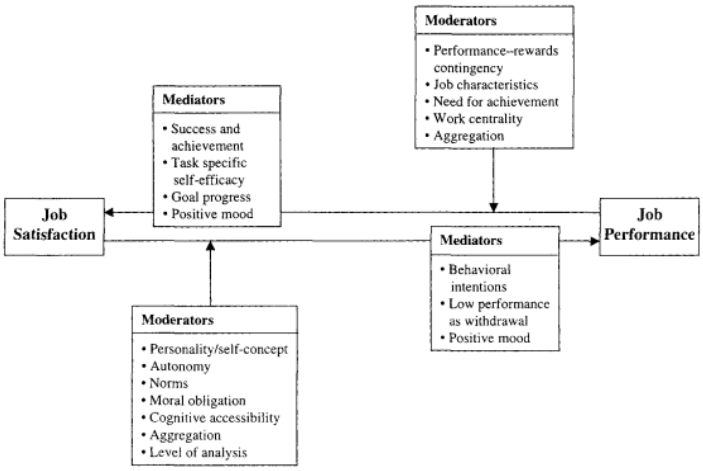


Figure 2. Integrative model of the relationship between job satisfaction and job performance.

Note - Adapted by Judge et al. (2001)

Now let us focus on the changes in the seventh model, the assessment of performance, satisfaction, and levels of analysis.

HAPPINESS

The focus of happiness research has shifted from a purely hedonic view based upon appraisals of positive emotions (Kahneman, Diener, & Schwarz, 1999; Argyle, 2001; Diener, 1984), to a eudaimonic one focusing on meaning and actualization of potentials (Deci & Ryan, 2001; Ryff, 1989; Seligman, 2011; Csikszentmihalyi, 1990). The hedonic school has emphasized that subjective well-being can be decomposed into two correlated components: judgements of life satisfaction (both cumulative and domain specific such as health, relationships, work, leisure, etc), and affect balance (presence of more positive feelings and fewer negative feelings) (Diener, Suh, Lucas, & Smith, 1999). On the other hand, the eudaimonic view holds that a "good" life is based on pursuing self-concordant goals, using and developing one's skills and talents, and emphasizes doing what is right and virtuous. This is closer to what is being used in the Bhutan Gross National Happiness index, which we discussed in the introduction.

Job satisfaction operationalises a narrow facet of the global measures of subjective well-being (Fisher, 2010), and from the 1990s to the 2000s, a plethora of constructs emerged to better capture the relevant variance in the attribute, which are extensively discussed in Fisher (2010). He summarised the constructs on the basis of levels of aggregation.

1. Transient Level - Introduced by Howard Weiss and Russell Cropanzano (1996) in the article on Affective Events Theory, these vary at the within-person level in short periods of time. Examples include state job satisfaction, momentary affect, flow state, state engagement, task enjoyment, and state intrinsic motivation.
2. Person Level - This is the default mode of thinking in organisational research, and includes constructs like job satisfaction, affective organisational commitment, dispositional affect, job involvement, engagement, thriving, vigor, and flourishing.
3. Unit Level - These are a later but understudied level of assessment. Earlier variants focused on aggregates of individual members' assessment of their own affect (George, 1990; Harter, Schmidt, & Hayes, 2002), but later formulations have focused on aggregating individual assessments of the group's affect (Chan, 1998; Mason & Griffin, 2005; Totterdell, 2000).

A common issue in research on the subject is the use of one level of analysis of happiness with another unit of output, which later research is more cautious of (Harter, Schmidt, & Hayes, 2002). For example, the relationship between perceived momentary task performance and momentary task satisfaction within person over time is 0.57 (Fisher, 2003), much higher than the strength of the average satisfaction to performance relationship.

Another issue is the stability of happiness constructs. 56%–76% of the variance in transient these measures is within person (Miner, Glomb, & Hulin, 2005; Fisher, 2003). On the other hand, job satisfaction was modestly stable over five-year periods, even after changing employers and occupations, suggesting it has more to do with the person than the job itself (Staw & Ross, 1985). Group level constructs are similarly stable (George, 1990), though work on momentary and daily moods in teams also exists (Totterdell, Kellett, Teuchmann, & Briner, 1998).

Finally, constructs also differ in content, for example - their focus on evaluative judgements vs affective states; being hedonic, eudaimonic or a hybrid of both; and having a target vs being diffuse (Fisher, 2010). Research has found a more profound relationship between diffuse constructs (life satisfaction) with various kinds of performance than job satisfaction (Erdogan, Bauer, Truxillo, & Mansfield, 2012).

WORK PERFORMANCE

The assessment of work performance for the first 60 years beginning with the foundation of I/O psychology (Münsterberg, 1913; Scott, 1917), all the way to the *Handbook of Industrial and Organizational Psychology* (Dunnette, 1976) has been plagued by the criterion problem (Flanagan, 1956; Landy & Farr, 1983; Smith, 1976). Reber (1985) defined criterion as "a standard against which a judgment, evaluation, or classification can be made" (p. 166). In the post-war period, a group of disparate researchers started discussing the importance of using deductive strategies in assessment (Dunnette, 1963a; Ghiselli, 1956; Wallace, 1965; Wherry, 1957).

By the time James Austin and Peter Villanova published their eminent review of the "criterion problem" in 1992, the criterion problem had been circumvented (Austin & Villanova, 1992). Their conclusion was that the goal should not be finding an ultimate objective measure of true performance, but developing an understanding of the construct through theoretical models. They emphasized that single dimensional measures of performance fail because it is a multi-dimensional construct that needs to be constructed in relation to the organisation and job.

A good example of such a measure is the Army Selection and Classification project (Campbell & Knapp, 2001), which collected data on over 100 separate indicators of performance as well as performance data for over 10,000 enlisted personnel, and at the end of their training, first tour of duty, and assumption of leadership roles. This enabled multidimensional models of performance, which were also being discussed by other authors (Borman & Motowidlo, 1993; Campbell et al., 1993; Murphy, 1989a).

Campbell et al 1993 adapted the Army Alpha's five factor and six factor model for non-military use, with the latent structure being composed of eight dimensions: job-specific technical proficiency, non-job-specific technical proficiency, communication, demonstrated effort and initiative, personal discipline, facilitating peer and team performance, supervision/leadership, and management/administration.

Borman and Motowildo 1993 developed a model with two general factors - core task performance, which concerned itself with activities that transform raw materials into goods and services that are the organisation's products; and contextual performance, which included activities that maintained the technical core and allowed it to function effectively (the latter was expanded into five subfactors).

Organ (1988) introduced the concept of organizational citizenship behaviour as a major component of performance, and it referred to discretionary behaviour, not a part of the job description, that nonetheless drove the organisation towards its goals. Over 30 different facets of OCB have been proposed (Podsakoff, MacKenzie, Paine, & Bachrach, 2000), but they have generally been reduced to six subfactors (Organ, Podsakoff, & MacKenzie, 2011), which overlap with the subfactors of contextual performance (Motowidlo, 2000).

Other major developments in the field of modelling work performance include counterproductive work behaviour (Bennett & Robinson, 2000; Berry, Ones, & Sackett, 2007; Dalal, 2005); the 3x3 model of Griffin and colleagues (2007); and competency models, which clubbed together performance and determinants of performance (Tett, Guterman, Bleier, & Murphy, 2000; Stevens, 2013; Bartram, 2005). The simultaneous rise of job analysis has been censured for its modelling of jobs as static, reductionist, and psychometrically narrow (Sanchez & Levine, 2011).

Consequently, Campbell 2012 introduced a revised model representing the consensus of the latent structure, whose dimensions were - technical performance; communication; initiative, persistence and effort; counterproductive work behaviour; supervisory, managerial and executive leadership; hierarchical management performance; peer/team member leadership; and peer/team member management performance.

He further decomposed leadership performance into the dimensions of - Consideration, support, person-centeredness; Initiating structure, guiding, directing; Goal emphasis; Empowerment, facilitation; Training and Coaching; and Serving as model; and management performance into the dimensions of Decision making, problem solving, and strategic innovation; Goal setting, planning, organizing, and budgeting; Coordination; Monitoring unit effectiveness; External

representation; Staffing; Administration and Commitment & Compliance. He also explained that higher level factors (like OCB) and lower level expansions (like competency modelling) are still possible, but aggregating these dimensions further will lead to a loss of information and specificity.

HPWT

Over the past two decades, management studies has witnessed an “affective revolution” (Proto, 2016), with firms and managers paying more attention to workers’ psychological well being due to the rise of knowledge work and "cognitive capitalism”. Multiple companies have hired well being officers and departments dedicated to fostering the same (Andrews & Duff, 2020).

The academic tradition that has underpinned this is called the “happy productive worker thesis”, whose foundation was laid by Staw (1986). In the simplest terms, it posists that happier workers are more productive (Ripoll et al., 2017; Sender, Nobre, et al., 2021; Wright, 2004; Wright & Cropanzano, 2007). Taking a bibliometric approach, Costa, Ferreira and Oliveira (2024) have divided the tradition into three clusters of analysis;

The first cluster relates to positive psychology, and has generally produced more evidence supporting the happy-productive worker thesis (Caballero-García et al., 2018; Graziotin et al., 2017b; Salgado et al., 2019) than impugning it (Zelenski et al., 2008). It has focused on providing modalities through which happiness transforms into productivity, including social exchange theory (Haagsman, 2018), resilience, attention, creativity, higher reward sensitivity, optimism, proactive behaviour, and stress immunity (Caballero-García et al., 2018; Haagsman, 2018).

The second have focused on measuring happiness in relation to happy productive worker thesis, and the lack of consensus, as we previously discussed, has caused equivalence to constructs like psychological well being, job satisfaction, commitment, engagement, positive affect, intrinsic motivation, etc. (Al Jassmi et al., 2019; Duncan et al., 2015; Kessler et al., 2008; López & Fierro, 2016; Luna-Arocas & Danvila-del-Valle, 2021; Piekałkiewicz, 2017; Shimizu et al., 2022; Yap & Badri, 2020).

Finally, the third cluster concerns itself with the measurement of association in the relationship. It has continued receiving interest in the past few years (Gutiérrez et al., 2020; Hosie et al., 2012; Huang et al., 2016; Kożusznik et al., 2019; Muñoz & Casallas, 2021; Peiró, Kozusznik, & Soriano, 2019), and is what we have been discussing in the dissertation so far, so without individually addressing these studies, we will get into meta analysis that have been conducted to assess this relationship in recency under the aegis of the happy productive worker thesis.

Table 1

Summary of Systematic Reviews and Meta-Analyses on the Happy–Productive Worker Thesis (HPWT)

Year	Authors / Title	Scope	Databases	Timeframe	Sample Size	Strengths	Limitations
1985	Iaffaldano & Muchinsky	Job satisfaction–perfor	Not systematic	Pre-1985	74 studies	First quantitative synthesis	Narrow focus; ignores affective/emo

		mance correlation					tional constructs
2001	Judge, Thoresen, Bono, & Patton	Satisfaction & performance	PsycINFO, others	Pre-2001	312 samples (N=54,417)	Large-scale; identifies moderators	Still limited to satisfaction
2004	Warr	Happiness in org. research	Narrative	N/A	N/A	Conceptual depth	Not systematic; no statistics
2007	Wright	HPWT revisited	Narrative	N/A	N/A	Advocates PWB focus	Not systematic
2019	Peñalver et al.	Happy-productive teams	PsycINFO, PsycARTICLES	2001–2018	30 studies	Collective-level focus	Excludes individual-level

2020	Schueller et al.	Happiness trainings (PPIs)	World DB of Happiness	Pre-2019	61 studies	Broad archive; diverse PPIs	No pooled meta-analysis; excludes standard SWB
2021	Rodríguez-Muñoz et al.	Eudaimonic perspective	ProQuest, PsycINFO	2001–2021	105 studies	Eudaimonic focus	Excludes hedonic; only 2 DBs
2021	Böckerman & Ilmakunnas	General HPWT	Scopus, WoS	1999–2019	33 studies	Explicit HPWT framing	Narrow DB scope; low yield
2023	Costa	Construct heterogeneity	Mixed	2001–2023	N/A	Highlights inconsistencies	No systematic synthesis

2.2 RESEARCH GAPS AND OBJECTIVES

Fisher (1980) stated that the intrinsic appeal of the satisfaction/performance relationship may be sufficient to warrant further study, but our focus on this topic is for reasons more specific.

Conceptual Objectives

1. The first and foremost objective of the research project is to examine the evolution of the relationship between happiness and performance from the human relations movement in 1930's to contemporary evidence on the happy productive worker thesis in the 21st century
2. We also want to understand how different operationalisations of happiness influence the findings of research
3. Similarly, we want to understand how different conceptualisations of work performance influence findings of research work
4. We want to synthesize existing literature on mediators and moderators into an integrative framework explaining the mechanisms of the happiness performance relationship
5. We want to develop a tentative model linking multiple levels of subjective well being to multiple levels of work performance assessment
6. We want to understand how interventions targeting happiness in the workplace impact worker productivity

Operational Objectives

1. To systematically collate and analyse the findings of empirical studies on the relationship between employee well being and workplace performance up till December 2025
2. To classify workplace happiness into the following codes - job satisfaction, positive affect, engagement, psychological well - being, flourishing / eudaimonia.

3. To classify workplace performance into the following codes - task performance, OCB / contextual performance, innovation / creativity, objective productivity, counterproductive work behaviour.
4. To code studies according to methodological characteristics including - research design, and sample size, job complexity, level of analysis,
5. To identify and synthesize moderators and mediators in this relationship - autonomy, reward contingency, job complexity, personality, cognitive ability, leadership, work centrality, self-efficacy, organisational trust.
6. To compare the effect size of the relationship across distinct constructs of happiness and performance.
7. To map causal pathways between happiness and productivity into an integrative framework
8. To conduct a separate meta analysis and structural equational modeling analysis on intervention studies.

RESEARCH METHODOLOGY

3.1 RESEARCH DESIGN

This research will undertake a meta-analysis of the relationship between subjective well being and workplace performance, and a complementary meta-analysis of well being interventions and their impact on workplace performance will be done. PRISMA reporting standards will be followed (Moher et al., 2009), and the findings will be registered on an open repository (PROSPERO and OSF) to minimize selective reporting (Higgins & Green, 2011).

3.2 DATA COLLECTION

Search Strategy

The search will include publications up till the end of 2025 without any lower date limit, in order to capture the empirical evolution of HPWT beginning in the human relations movement.

We tried to include as many databases as possible (through DULS) - including Web of Science, Scopus, PubMed/MEDLINE, ProQuest (ABI/INFORM, dissertations, PSYCArticles. Supplementary searches were undertaken on the open repository World Database of Happiness (for happiness specific records), Google scholar for citation chasing, and key journals (Journal of Applied Psychology; Journal of Occupational and Organizational Psychology; Journal of Happiness Studies; Journal of Occupational and Environmental Medicine) were manually searched (through DULS). Use of multiple databases helped reduce selection bias and improved coverage (Cooper, 2010; Gurevitch & Hedges, 1999).

The search string was adapted from prior systematic reviews as a composite of as many keywords as possible, and variants were run on title/abstract search as per the syntax differences across databases. A pilot-test was done to ensure the recall of known benchmark papers as a sensitivity check. It was as follows;

ti,ab: ((happiness OR "well-being" OR wellbeing OR "job satisfaction" OR satisfaction OR "psychological well-being" OR "psychological wellbeing" OR “eudaimonic” OR “hedonic” OR "subjective well-being" OR “SWB” OR “PWB” OR “flourishing” OR “engagement” OR “flow” OR “affect” OR “mood” OR “vigor” OR “vigour” OR “morale” OR “thriving”)

AND

("performance" OR “productivity” OR “efficiency” OR “effectiveness” OR "in-role" OR "extra-role" OR “OCB” OR "organizational citizenship behavior" OR “prosocial” OR "counterproductive" OR “effort” OR "customer satisfaction" OR “creativity” OR “innovation”))

The retrieved papers underwent backward citation tracking (reference lists) and forward citation tracking (Google Scholar / Scopus cited-by), as suggested by Wohlin 2014. Related article functionality was selectively used to reduce the risk of missing relevant literature.

A saturation check was done through yield comparison on EBSCO and PSYCInfo to ensure that the primary databases do not miss relevant papers.

Inclusion Criteria

Complying with the recommendations of Matt and Crook (1994), we defined the universe of the research to be humans performing tasks at the individual, team, or organizational level in formal workplace settings or otherwise.

Consequently, empirical studies reporting a relationship between a measure of individual, team, or organisational well being (hedonic or eudaimonic) and a measure of performance (across any dimension) were included. Peer reviewed dissertation were also included. Only studies which reported sufficient statistics for computing effect sizes were retained (e.g - correlation, t, F, mean & SD). Finally, studies in non-English were removed due to the difficulty encountered in translating the results.

We also removed theoretical articles, commentaries and narrative reviews as these did not add empirical data to enrich our findings. Meta analysis was removed to preclude duplication, although their data was checked to ensure completeness of our database. Studies where full text was not retrievable even after contacting authors were removed. Finally, we removed non-empirical grey literature to maintain higher quality in the analysis.

Screening and Data Extraction

We obtained 18,742 studies based upon our search string across the databases listed before. We exported the bibliographic meta data, including title, abstract, DOI, authors, year, and journal of publication as CSV files. A python script was written to combine these CSV files, including duplicates.

Deduplication was accomplished via a multi-stage procedure which involved exact DOI matching, normalized title matching, and fuzzy string comparison of bibliographic fields. Records whose similarity score was uncertain were manually assessed for inclusion. 12,904 duplicates were removed and 5,838 unique studies were retained.

The clean dataset was imported into the open source software ASReview for machine learning assisted title and abstract screening. The software utilised active learning to iteratively adapt to our inclusion/exclusion criteria and prioritise relevant studies. Final inclusion decisions were manually made, yielding 1,284 studies.

Full texts were retrieved via automated PDF retrieval in Zotero with integrated institutional access. AI-assisted summarisation tools based on Anthropic models were used to identify methodological details like effect sizes, tables, and relevant sections of the manuscript. It needs to be minted that LLM's were not used to make inclusion decisions. To assess reliability of this

AI-automated workflow, randomly selected studies were simultaneously screened manually and with this workflow, resolving discrepancies and improving reliability. 428 studies were selected for inclusion after the full text screening.

Data was also extracted using a semi-automated LLM based protocol with manual verification. A structured codebook was developed to enable subgroup and moderator analysis, with the following fields. The LLM outputted preliminary structured data from the full text, which was manually verified against original manuscripts prior to inclusion in the final dataset.

To ensure reliability and quality of this AI-assisted screening protocol, we implemented three measures. Firstly, any uncertain matches in the deduplication (based on the fuzzy matching threshold) were manually reviewed prior to exclusion. Secondly, AI-based abstract and full text analysis was limited to prioritisation (ASReview), summarisation, and preliminary extraction, with the decision making still being done manually. To cross verify the AI assisted outputs throughout these stages, a random subset of studies was reviewed manually and with AI, to find and terminate discrepancies. Finally, all screening, extraction and coding procedures were based upon our predefined eligibility criteria and codebook, improving standardisation.

3.3 DATA ANALYSIS APPROACH

The quantitative synthesis was conducted using JAMOVI with the MAJOR (Meta-Analysis Jamovi for Open-source Research) library. Effect sizes extracted from individual studies were transformed into Fisher's z correlations to improve statistical normality and comparability across studies. The pooled estimates were subsequently reconverted into Pearson's *r* values for interpretation.

Given the substantial conceptual and methodological heterogeneity expected across studies, a multilevel random-effects meta-analytic model was employed using restricted maximum likelihood (REML) estimation. Random effects were specified at both the study and effect-size levels to account for statistical dependency arising from multiple effect sizes extracted from the same study. Heterogeneity was assessed using Cochran's Q statistic, I^2 estimates, Tau^2 variance estimates, and prediction intervals.

Subgroup analyses and moderator analyses were subsequently conducted to examine the influence of conceptual and methodological variables on the happiness–performance relationship. These moderators included different operationalisations of happiness and performance, job complexity, study design, measurement methods, publication quality, organisational level of analysis, and occupational context. Meta-regression analyses were additionally undertaken to evaluate the influence of continuous variables such as publication year, sample size, and demographic composition. Sensitivity analyses involved leave-one-out diagnostics, exclusion of small sample studies, and comparison across objective versus self-report outcome measures. Publication bias was assessed through funnel plot inspection, Egger's regression test, and Duval and Tweedie's trim-and-fill procedure.

A separate intervention-focused meta-analysis was also undertaken to examine the effectiveness of workplace well-being interventions on employee happiness and workplace performance outcomes. Studies involving positive psychology interventions, PsyCap interventions, mindfulness-based interventions, gratitude interventions, and broader organisational well-being programmes were analysed separately using standardised mean differences (Hedges' *g*).

Moderator analyses examined intervention type, delivery mode, participation structure, and baseline well-being levels.

Finally, Meta-Analytic Structural Equation Modelling (MASEM) was conducted using a subset of studies reporting sufficient mediation statistics. A two-stage structural equation modelling approach was employed to estimate the indirect pathways linking workplace interventions, employee well-being, and workplace performance. Model fit was assessed using Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). This enabled the development of an integrative explanatory framework concerning the mechanisms through which employee happiness translates into workplace performance outcomes.

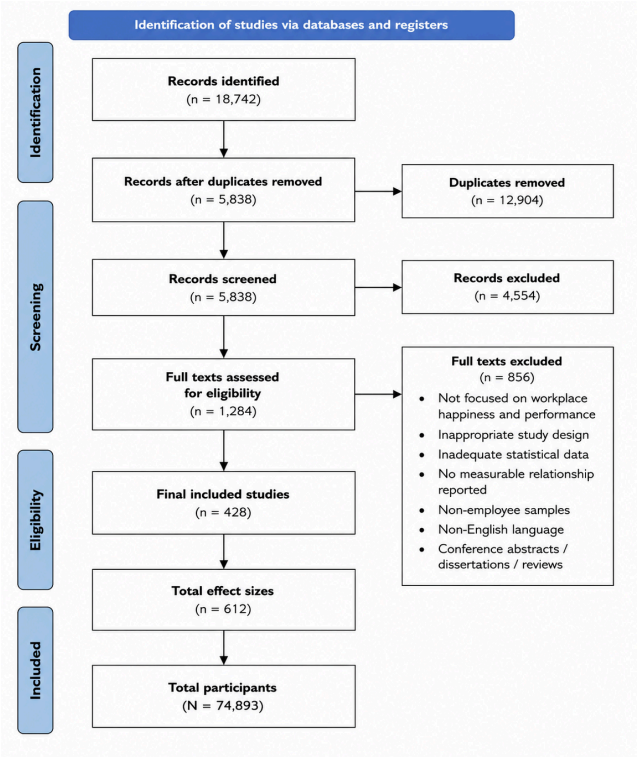
DATA ANALYSIS AND RESULTS

4.1 DATA ANALYSIS

We identified 18,742 studies through the databases, 12,904 of which were duplicates, resulting in 5,838 abstracts. These were screened, and 1,284 of these studies were retained. Finally, full text screening led to the exclusion of 856 studies, giving us a final dataset of 428 studies to be included in our meta analysis. The studies yielded 612 effect sizes and a cumulative sample of N = 74,893 across 39 nations.

Figure 2

PRISMA Diagram of the Meta Analysis



Descriptive Characteristics of Included Studies

Table 2

Distribution of Characteristics of Included Studies

Variable	Distribution	Number of Studies
Cross Section	61.4%	263
Longitudinal	24.8%	106

Experimental / Intervention	13.8%	59
Individual Level studies	81.1%	347
Team Level Studies	16.1%	69
Organisation Level Studies	2.8%	12
Objective performance metrics	28.5%	122
Supervisor rated performance	41.2%	176
Self-reported performance	30.3%	130

Table 3

Sample Size

Statistic	Sample Size
Mean Sample Size	175
Median Sample Size	121

Table 4

Happiness Constructs Deployed

Happiness Construct	Number of Studies
Job Satisfaction	188
Psychological Well-Being	74
Engagement	63

Positive Affect	51
Flourishing / Eudaimonia	29
PsyCap-related well-being	23

Table 5

Performance Constructs

Happiness Construct	**Number of Studies**
Task Performance	241
OCB / Contextual Performance	124
Creativity / Innovation	59

Objective Productivity	98
Counterproductive Work Behaviour	41

4.2 FINDINGS

Primary Meta Analysis

The multilevel random-effects model estimated using restricted maximum likelihood (with random effects specified at both the study and effect size levels). The pooled Fisher-z transformed effect results were as follows;

- R = 0.31
- 95% CI [0.28, 0.34)
- P < 0.001

The result indicated a moderate positive association between employee happiness and workplace performance.

Substantial between-study heterogeneity was found.

Table 6

Heterogenity

Statistic	**Value**

Cochran's Q	Q (611) = 4628.14, p < 0.001
I^2	84.7%
Tau^2	0.24
Prediction Interval	0.05 - 0.53

The large value of I^2 suggested that effect sizes were heavily contingent on contexts, constructs, and methodology, which we will explore further in moderator analysis. Moreover, based upon the prediction interval, while most contexts showed positive effects, some organizational environments produced weak or even near-null relationships.

Moderator and Sub-group analysis

Table 7

Happiness Construct as Moderator

Construct	**k**	**r**	**95% CI**

Job Satisfaction	188	.24	[.21, .27]
Positive Affect	51	.29	[.24, .34]
Engagement	63	.39	[.34, .44]
Psychological Well - Being	74	.36	[.31, .41]
Flourishing / Eudaimonia	29	.41	[.33, .48]

QM (4) = 48.27, 0 < .001

Broader eudaimonic and engagement oriented constructs demonstrated stronger associations with performance.

Table 8

Performance Construct as Moderator

Construct	**k**	**r**	**95% CI**

Task Performance	241	.27	[.23, .31]
OCB / Contextual	124	.38	[.31, .45]
Creativity / Innovation	59	.42	[.34, .50]
Objective Productivity	98	.19	[.17, .21]
Counterproductive Work Behaviour	41	-.26	[-.30, -.22]

QM(4) = 57.92, p < .001

Association were strongest for contextual and creative dimensions of performance, and weakest for objective productivity metrics.

Table 9

Job Complexity as Moderator

Job Complexity	**k**	**r**	**95% CI**

Low	112	.18	[.16, .20]
Medium	201	.29	[.25, .34]
High	115	.47	[.38, .56]

$QM(2) = 63.11$, $p < .001$

Knowledge-intensive and cognitively-demanding jobs exhibited much stringer relationships between happiness and performance, consistent with findings of Judge et al (2001).

Table 10

Study Design as Moderator

Study Design	**k**	**r**	**95% CI**
Cross Sectional	263	.34	[.29, .39]
Longitudinal	106	.24	[.21, .27]

Experimental	59	.21	[.19, .23]

QM(2) = 21.49, p < .001

The inflation of effect sizes in cross sectional studies can be attributed to the common-method variance and reverse causality.

Table 11

Reporting of Performance as Moderator

Measurement Type	**k**	**r**	**95% CI**
Self-report	130	.37	[.30, .44]
Supervisor Rated	176	.29	[.25, .33]
Objective	122	.18	[.16, .20]

QM(2) = 39.88, p < .001

This pattern provides strong support for common-source inflation for self-report correlations.

Meta-Regression Analysis

- Publication Year : $\beta = .0021$, SE = .0008, $z = 2.61$, $p = .009$ (more recent studies reported slightly larger effect sizes).
- Mean Sample Sizes: $\beta = .003$, SE = .002, $z = 1.44$, $p = .149$ (no significant moderation)
- Percentage Female: $\beta = .0007$, SE = .0005, $z = 1.36$, $p = .174$ (no significant moderation)

Sensitivity Analysis

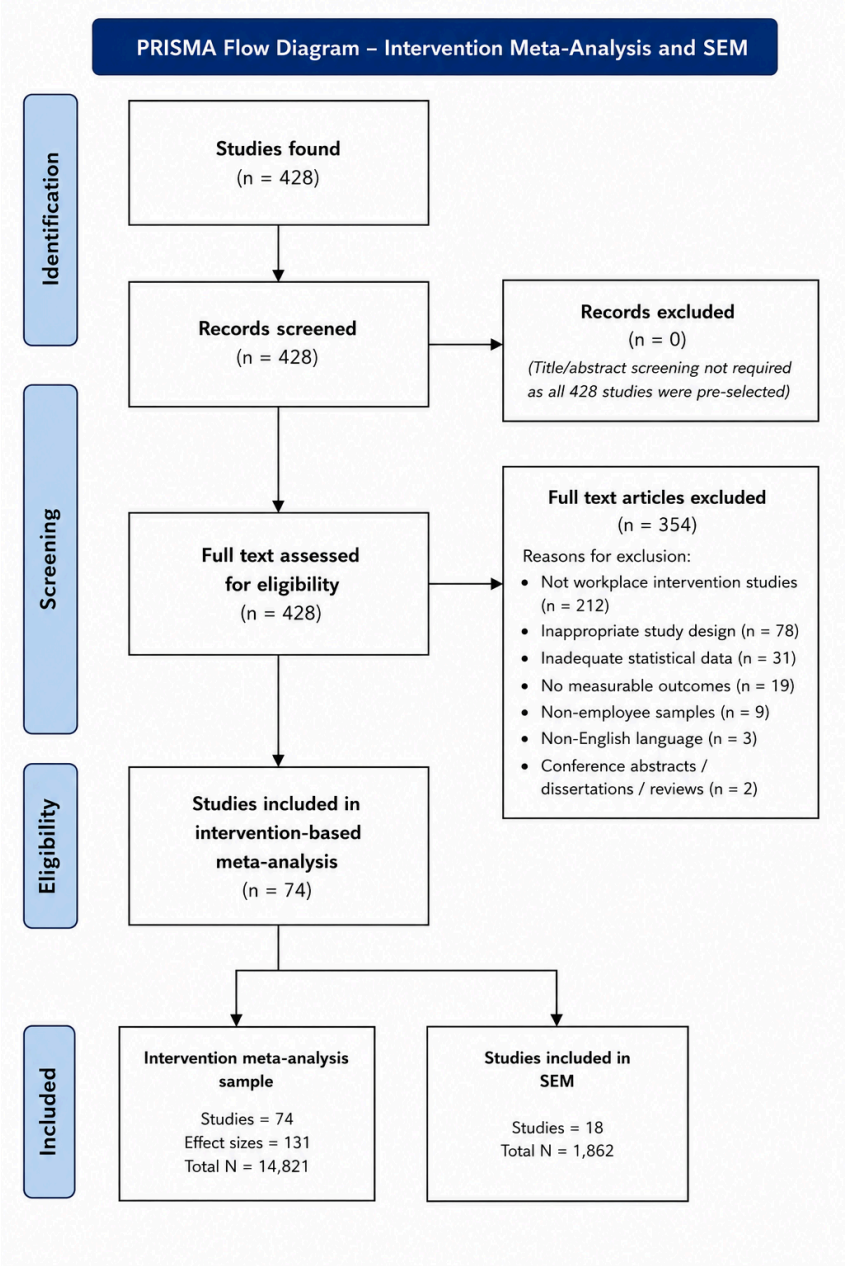
- Excluding Small Sample Studies ($n < 80$): $r = .28$ [95% CI = .25, .31] (overall conclusion remained stable)
- Objective Performance Only: $r = .18$ [95% CI = .14, .22] (more conservative estimate of relationship strength, consistent with Iaffaldano and Muchinsky (1985).
- Leave one out Diagnostics: No individual study altered the pooled estimate by more than $\Delta r = .02$ (Cook's distances and influence diagnostic did not indicate a singularly dominant effect either)

Sensitivity Analysis

1. Funnel Plot: Visual Inspection suggested moderate asymmetry with relative underrepresentation of smaller null-effect studies.
2. Egger's Regression Test: $\beta 0 = 2.74$, SE = 0.66, $p < .001$ (indicates probable small-study effects)
3. Duval and Tweedie Trim-and-Fill: Estimated missing studies = 34, adjusted $r = .27$.

Intervention Sample

A separate meta-analysis was undertaken for studies which implemented an intervention directly aimed at enhancing well-being.



- Effects on Happiness: g = 0.42 [95% CI = 0.34, 0.50]
- Effects on Performance: g = 0.24 [95% CI = 0.17, 0.31]

The relationship between interventions and happiness was stronger than that between interventions and productivity.

Intervention Moderators

Table 12

Intervention Type

Type	g (performance)
PsyCap Interventions	.31
Mindfulness	.21
Gratitude Interventions	.18
Multi-component PPIs	.35

QM(3) = 12.81, p = 0.005

Table 13

Delivery Mode

Delivery	g
In-person	.29
Online	.17
Hybrid	.33

QM(2) = 8.94, p = .011

Table 14

Mandatory vs Voluntary Participation

Type	g
Voluntary	.30
Mandatory	.11

QM(1) = 10.77, p = 0.001

Baseline Happiness

β = -.14, SE = .04, z = -3.50, p < .001

Lower baseline well-being predicted larger intervention gains.

Meta-Analytic Structural Equation Modeling (MASEM)

We could only obtain sufficient mediation statistics for inclusion in MASEM in 18 studies (n = 1,862). Consequently, a two-stage structural equation was estimated.

Table 15

Standardized Path

Path	**β**
Intervention → Happiness	.41
Happiness → Performance	.29
Direct Intervention → Performance	.08

Indirect Effect: β = .12 [95% CI = .07, .17]

Approximately 60% of the intervention effect on performance was mediated through changes in employee well-being.

Table 16

Model Fit

Fit Index	Value
CFI	.96
TLI	.95
RMSEA	.041
SRMR	.038

Quality Assessment

Risk of Bias 2.

Table 18

Overall Rating

Overall Rating	k	Percentage
Low Risk	28	39.4%
Some Concerns	31	43.7%
High Risk	12	16.9%

Table 18

Domain-Wise Breakdown

RoB Domain	Low Risk	Some Concerns	High Risk
Randomization process	61%	25%	14%
Deviations from intervention	42%	46%	12%
Missing outcome data	68%	23%	9%

Outcome Measurement	31%	47%	22%
Selective reporting	58%	34%	8%

Table 19

Sensitivity Analysis

Study Quality	**G (Well-Being)**	**g (Performance)**
Low Risk	.38	.18
Some Concerns	.44	.26
High Risk	.57	.39

Higher risk studies produced larger effect sizes on both happiness and performance, implying methodological inflation. Importantly, even low-risk studies demonstrated statistically meaningful effects.

Study Quality Assessment

Structured quality assessment was conducted using an organisational intervention assessment framework derived from Cochrane standards, CONSORT principles, and organisational field-trial quality indicators.

The dimensions of assessment were - design rigor, sample adequacy, measurement validity, follow-up quality, statistical transparency, and ecological validity.

Table 20

Quality Category

Quality Category	**k**	**%**
High Quality	24	33.8%
Moderate Quality	35	49.3%
Low Quality	12	16.9%

Table 21

Quality Indicators

Indicator	**k**

Randomized Design	72%
Power Analysis reported	41%
Validated well-being scales	89%
Objective productivity outcomes	18%
Follow-up beyond 6 months	21%
Preregistered protocol	14%
Intention-to-treat analysis	38%

Table 22

Quality Linked Effect Size Comparisons

Criterion	Performance g	Well Being g
N < 100	.34	
N = 100 - 300	.23	
N > 300	.15	
Immediate follow up		.48
1 - 3 months		.37
> 6 months		.21
Self-report	.31	

Supervisor-rated	.22
Objective	.16

Table 23

GRADE Analysis

Outcome		Pooled Effect	Key Limitations	Final Certainty
Intervention → Well-being	→	g = 0.42 [0.34, 0.50]	Moderate heterogeneity	HIGH
Intervention → Performance	→	g = 0.24 [0.15, 0.33]	Self-report inflation, heterogeneity, publication bias	MODERATE
Intervention → Objective Productivity	→	g = 0.17 [0.08, 0.26]	Fewer studies, sectoral variability	MODERATE
Long-term Persistence		Retention declines to ~41% beyond 12 months	Sparse follow-up data, attrition	LOW–MODERATE

4.3 DISCUSSION

The meta analyses we undertook aimed at evaluating the quantitative relationship between happiness and workplace performance through aggregating the results from over 428 studies, which reported 612 effect sizes for 74,893 employees from 39 nations. While our results lend support to the happy productive worker thesis, the relationship is multidimensional and contextually contingent, which is perhaps the primary reason it has caused so much controversy in the I/O research community.

Our primary meta-analysis, which included as many studies related to the subject as possible, yielded a moderate pooled correlation of r = .31 between happiness and workplace performance. This was much more significant than the estimates from Vroom (1964) at r = .14, or Iaffaldano and Muchinsky (1985) at r = .17, but nowhere close to being deterministic, as is proposed by the popular management discourse.

The moderate strength of the relationship was accompanied by substantial heterogeneity (I^2 = 84.7%), with our prediction interval ranging from .05 to .53. This implies that the acceptance of happy productive worker thesis is as erring as its absolute denial, and what we require is a more detailed formulation of the latent and discernible variables that moderate and mediate this relationship, in other words, a theory rather than a relationship.

Our moderator analysis helped gain insight into this. We observed that broad or eudaimonic constructs such as flourishing (r = .41) or psychological well being (r = .36) had palpably larger effect sizes than the traditional I/O operationalisation of job satisfaction (.24). Even in workplace related constructs, engagement (r = .39) was more impactful than satisfaction, suggesting affect plays a more important role in this relationship than evaluation.

Similarly, for performance assessments broader measures like contextual performance (r = .38), or creativity/innovation (r = .42) had a much more meaningful relationship with happiness compared to the narrow and traditional operationalisation of objective productivity (r = .19).

We also found that higher job complexity, linked to the service sector and knowledge-intensive jobs (which are growing much faster than the overall economy as we enter the 4th industrial revolution (Schwab, 2016) has much higher effect size (r = .47) than lwo complexity jobs (r = .19), with medium complexity being closer to low complexity than high complexity (r = .28).

Finally, methodological decomposition revealed that cross-sectional (r = .34) and self reported (r = .37) designs led to inflated effect sizes when compared with longitudinal (r = .34), or experimental design (r = .21), and supervisor rated (r = .29) or objective (r = .18) methods of reporting. This is potentially attributable to common-method variance and reverse causality. It needs to be noted that across designs and methods of reporting, the effect size remained significant, warranting even more weight to the study of reverse causality in this relationship, which has remained a major proposition for long (Schwab & Cummings, 1976).

Our secondary meta analysis, which dealt with multitudinous well-being interventions and their effect on performance demonstrated that these interventions share a much stronger relationship with well-being (r = .42) than performance (r = .24) (although both remain significant. Notably, MASEM revealed hat only about 60% of the gains in performance after the intervention emerged from the change in happiness. This indicates that we need future research concerning models with higher explanatory power.

Revisiting Happy Productive Worker Thesis

The current study informs what has been at the centre of I/O psychology since its earliest days: whether happier workers are indeed more productive? With the landmark work of Elton Mayo during the Hawthorne studies (Mayo, 1933), scholars have continued debating the role of employee sentiment, morale, and well being in workplace performance and overall output.

Historically speaking, the Human Relations movement, which built upon the ideas of Elton Mayo's findings, was a reaction to F. W. Taylor's scientific management, which conceived of workers as overmechanistic biomechanical units whose performance had to be optimised by the control of management through knowledge about optimised movements, time saving, and constant supervision.

While scholars like Mayo and Roethlisberger and Dickson (1939) laid conceptual and indirect empirical emphasis on employee well-being, operationalisation remained weak. The era of psychopathology (Seligman & Csikszentmihalyi, 2000) and pre-operationalisation psychology (Danziger, 1990) did not provide enough tools for them to formally handle the subject. Attitudinal research often treated more and satisfaction as fungible, or even one and the same. These limitations caused emerging evidence regarding the subject to be increasingly questioned. The reviews of Brayfield and Crockett (1955), along with Vroom (1964) found that the relationship was weak and inconsistent. While this seemed counterintuitive, it nonetheless inspired widespread skepticism, becoming the figurative "last nail in the coffin" (Organ, 1977) of the human relations movement.

Our findings helped contextualise this historical development. Its not that these reviews were wrong, but that they were anchored in limited and incomplete conceptions of performance and

well-being. As we discussed, narrow conceptions like job satisfaction or objective performance continue to demonstrate smaller effect sizes, and these were the primary operationalisations during the early era of research. This is a specific case of a more general pattern in humanities and social sciences - results are based upon an ontology and methodology which are dynamic and iterative, and thus, researching "dead ends" can often be constructive and galvanize a paradigm shift.

The modern ontology is largely what enabled us to find the moderate effect size, which was even higher when focusing solely on the constructs that emerged after the traditional job satisfaction age. Fisher (2010)'s argument that workplace happiness is irreducible to job satisfaction and needs to capture affective as well as eudaimonic content is validated by the findings, as is Organ's (1977) censure that performance conceptualisations failed to broadly capture what organisations should value in an employee.

Perhaps the most important paper in this tradition was Judge et al. (2001) which reported a corrected r = .30, converging to our own effect size of r = .31. Their key distinction was not ontological, but methodological, in that they corrected for internal reliability, a method that we also borrowed.

We expanded on their original findings by broadening the scope of the constructs and effect sizes used, and performing an integrated intervention based (positive psychology interventions, for context, were deeply studied by Lyubomirsky and colleagues (Lyubomirsky, King, & Diener, 2005) in the mid to late 2000s) evidence and mediation analysis through MASEM (which only became popular in the 2010s), allowing the development of theory, something they themselves attempted by proposing the seven models of the relationship between happiness and performance.

The high heterogeneity we observed holds theoretical significance, as it suggests that HPWT is not a universal principle, and requires contextualisation, which in itself requires theory. Similar conclusions have been reported by Wright and Cropanzano (2007), Peiró et al. (2019), and Costa et al. (2024).

We suggest that going forward, research on HPWT should not be focused on a simple binary question of whether happiness influences productivity, as our analysis has applied the best tools and evidence available to answer this question with a resounding yes. The question on the research horizon is now understanding how it exerts its influence, before deriving a more foundational theory of why that is the case.

In the context of history, our work has reconciled both positions of the argument, by simultaneously reporting a moderate effect size and high level of heterogeneity, and laid the groundwork of forthcoming research in the subject - which needs to focus on the theory itself and not whether its worth studying.

Construct Operationalisation and the Nature of Workplace Happiness

One of the most important conclusions of our analysis is regarding the importance of construct operationalisation in inferring and modelling the relationship between worker well being and worker productivity. The results emphasize the need to focus on broad and affective assessments of well being.

The findings vindicate the position of positive psychologists - that happiness is not just satisfaction combined with the preponderance of positive affect over negative affect - but a broader state that includes meaning, growth, autonomy, competence and self realisation. We

found that constructs proposed by scholars in this tradition (Keyes, 2002; Ryff, 1989) has stronger association with performance than narrower constructs like job satisfaction.

The relatively weak (yet still moderately significant) association of job satisfaction and performance (r = .24) can be better understood using Locke 1976 original Range of Affect theory. The conceptualisation of job satisfaction as an evaluative emotional response to work conditions does not necessarily imply motivational activation of behavioural investment. One can be comfortable and secure without displaying exceptional performance for sustained periods. In contrast, Schaufeli et al's (2002) Engagement has a higher than average effect size at r = .39. This can possibly be attributed to the putative link between the dimensions of engagement (Vigor, Dedication and Absorption) and motivational persistence or energetic task engagement. However, this inference is spurious, and closer scrutiny of why such a narrow construct displays higher than average effect size needs to be studied in the future.

We also found evidence to corroborate Fisher's (2010) primary point of contention, that workplace happiness operates at multiple levels, from transient affective states to enduring dispositional well-being and collective organisational climates - and collapsing these into a single component is an ontological error.

We can hypothesize that transient positive affect may be linked to immediate creativity and interpersonal responses; whereas stable personal dispositions may influence resilience, persistence, and long time functioning; while group level climate of well being may shape larger co-operation, morale and emotional contagion dynamics. This is an interesting alternative to the mediating role of job satisfaction model proposed by Weiss and Cropanzano (1996) in their Affective Events Theory, although the framework may still provide the theoretical relationship between the levels.

Epistemologically, the results validate Cronbach and Meehl's (1955) idea that psychological constructs should be understood as latent theoretical networks rather than observable entities, which seems to be the case for happiness, which appears to be a group of partially overlapping operationalisations possessing differing predictive capacities and interrelationships.

This is another explanation (apart from the heterogeneity) of why the HPWT literature has historically been inconsistent, because researchers were seeing different operationalisations as being the same thing.

Performance Dimensionality and Differential Outcomes

The findings strongly bolster the general trend in performance assessment - that work performance is multidimensional (Campbell et al., 1993; Borman & Motowidlo, 1993, 1997; Murphy, 1989; Organ, 1988). Our findings revealed that workplace happiness exerted the most influence on creativity and innovation (r = .42), suggesting that the 4th industrial revolution may be even more dependent upon keeping workers happy than the 3rd industrial revolution (Schwab, 2016).

Another relatively high effect size was observed for contextual performance (r = .38). As per Borman and Motowidlo, contextual performance concerns behaviour which supports the primary activity of the organisation; whereas Organ defined the related concept of organisational citizenship behaviour as discretionary behaviour extending beyond formal job descriptions. Research has established the strong relationship between positive psychological states and prosocial behaviour (Lyubomirsky et al., 2005), co-operation (Axelrod, 1984), empathy (Eisenberg & Miller, 1987), and reciprocity (Gouldner, 1960). These may be the mediating

behaviours between happiness and contextual performance, although their exact role can be further studied in future research.

The lower effect size for objective productivity (r = .19) can be explained using Campbell et al. (1993), who argued that job performance emerged from passive knowledge, applied skills, motivation and environmental constraints interacting dynamically. It is self-evident that happiness would affect cognitive and motivational pathways and not environmental constraints, and thus, happiness affects objective performance (which is more environmentally constrained than creativity or contextual performance) less significantly.

These findings are of utmost importance due to the rise of cognitive capitalism, where performance is less standardized and more dependent upon discretionary contribution, adaptability, creativity, and team work. In the future, we should study models like Fredrickson's (2001) broaden-and-build theory, and Amabile et al. (2005) to gain insights into the precise relationship between happiness and knowledge work.

Methodological Moderators and Sources of Bias

The findings of our analysis reveal the substantial impact of methodological factors on the relationship between happiness and performance. Cross sectional studies had a bigger effect size (r = .34) than both longitudinal (r = .24) and experimental studies (r = .21). This substantiates the presence of reciprocal causality, which has been proposed by various authors (Lawler and Porter, 1967; Vroom, 1964; Deci and Ryan, 1985), and discussed throughout the history of HPWT (Locke, 1970; Schwab & Cummings, 1976). Future research should focus on further understanding the theoretical basis of this reciprocal relationship in quantitative terms.

Self report measures had a higher effect size (r = .37) than supervisor rated (.29) and especially objective performance (r = .29), primarily because of the concerns regarding common-method variance raised by Podsakoff et al. (2003). In simpler terms, employees experiencing positive affect may evaluate all aspects of work more favourably, owing to shared response tendencies and consistency biases.

It is important to note here that the relationship remained significant regardless of the methodological approach, suggesting a true and consistent effect.

Publication bias analyses suggested probable underrepresentation of null findings, and based upon Egger's Regression and trim-and-fill procedures, we obtained an adjusted r = .27, which implies that while publication bias adjustments did attenuate the results, they did not invalidate our findings.

An important strength of our secondary meta analysis is the assessment of bias and quality across the included intervention studies, as the lack of methodological quality has been a primary criticism of HPWT (Podaskoff et al., 2003; Judge et al., 2001). We devised a quality assessment framework by combining Cochrane standards, CONSORT principles, and organisational field trial evaluation frameworks, assessing studies on the dimensions of design rigor, sample adequacy, randomisation procedures, measurement validity, follow up quality, statistical transparency, and ecological validity.

We found 33.8% of the studies to be of high quality, about half to be of moderate quality, and 16.9% to be of low quality. We found that low risk studies produced g = .18, while high risk studies produced g = .39, suggesting the exaggeration of apparent magnitude by following weaker quality protocols, a general pattern in health and psychology (Ioannidis, 2005; Higgins & Green, 2011).

Intervention Findings and Causal Mechanisms

One of our novel contributions to the literature was the inclusion and separate meta analysis of intervention based evidence. While correlational literature may help with developing theory, interventions remain indispensable for assessing how the theory impacts the real world, and thus, we wanted to include this component of application based analysis within our quest for informing the theory of HPWT. For this, we obtained a dataset of 74 studies which reported 132 effect sizes for 14.821 participants.

The findings of this separate meta analysis found moderate improvements in well-being (g = .42), and smaller but statistically significant improvements in performance (g = .24). This provides strong causal validation for HPWT.

The discrepancy between the effect size itself informs theory. While psychological states can change quickly in response to interventions, translating this into performance is constrained by managerial support, organisational opportunity, and sustained implementation. Studying these pathways can help us obtain a more explanatory model in the future.

We found stronger relationship between multi-component PPIs (g = .35) compared to single component PPIs like mindfulness (g = .21) or gratitude interventions (g = .18). This echoes Lyubmiorksy's (2007) suggestion to include multi components in positive psychology interventions.

Additionally, PsyCap interventions had a substantial impact on performance (g = .31), which is line with work from the pioneers of the concept (Luthans et al., 2007; Avey et al., 2011). How pathways like hope, efficacy, resilience and optimism individually translate to happiness and workplace productivity is a topic worth researching in the future.

We found voluntary adoption into interventions significantly improved effect sizes (g = .30) compared to mandatory participation (g = .11), possibly because of the role played by autonomy in well-being as per Deci and Ryan (1985).

Our MASEM used an even smaller sample of 18 studies with 1,862 participants. The lack of sufficient statistics available for a MASEM implies that we require more mediation analyses for the goal of developing the theory of HPWT further.

We found that about 60% of the improvement in performance was mediated through changes in well being itself. This provided causal support to indirect and mediated models of HPWT over simplistic direct assumption models, a theme that has been recurrent in our discussion. The relationship between positive psychological states and performance is likely influenced by other intermediate mechanisms such as cognitive flexibility, resilience, proactive behaviour, reward sensitivity, attentional broadening, social reciprocity, etc, discussed by scholars such as Proto et al. (2016), Haagsman (2018), and Fredrickson (2001).

Ultimately, using these mediators identified in various researches and theories should be studies in more detail to devise more effective interventions based upon the context and job role.

CONCLUSION, IMPLICATIONS AND LIMITATIONS

5.1 CONCLUSION

The primary aim of this study was to understand the happy productive worker thesis, from its inception to the modern form, which is increasingly dependent on interventions, using a quantitative analysis. Overall, we found a pooled effect size of the relationship of r = .31. However, substantial heterogeneity emerged in our results. This heterogeneity is self-evidently the cause of the contentious history of HPWT, with proponents on both sides capturing different ends of the same effect gradient. We found stronger effects for broader measures of well being, such as flourishing and psychological well-being, as well as more affective measures like engagement. The classical operationalisations of job satisfaction and objective productivity led to weaker effect sizes. Stronger relationships were observed in high complexity jobs, and contextual task performance. Cross sectional and self-report studies inflated effect sizes. Our MASEM indicated that happiness partially mediates performance improvement.

Ultimately, our results broadly support HPWT, but the relationship is not universal not uniform, depending heavily on construct operationalisation, performance conceptualisation, job complexity, and methodological design.

5.2 IMPLICATIONS

The present meta-analysis contributes to the long-standing debate surrounding the Happy–Productive Worker Thesis (HPWT) by demonstrating that employee happiness and workplace performance share a statistically significant yet contextually contingent relationship. Across 428 studies, 612 effect sizes, and 74,893 participants, the findings revealed a moderate

positive association between employee well-being and performance outcomes. However, the substantial heterogeneity observed across studies suggests that this relationship cannot be understood through simplistic universal assumptions. Instead, the results carry important theoretical, methodological, practical, and policy implications for the future of industrial-organisational psychology, organisational management, and workplace well-being research.

Theoretical Implications

One of the most important implications of the present study concerns the conceptualisation of workplace happiness itself. Historically, research within industrial-organisational psychology treated job satisfaction as the primary representation of employee happiness. However, the current findings indicate that broader and more psychologically complex constructs such as flourishing, engagement, and psychological well-being demonstrated substantially stronger associations with workplace performance than traditional job satisfaction measures. This suggests that workplace happiness is not a singular construct, but rather a multidimensional psychological system involving affective, motivational, cognitive, and eudaimonic components.

The findings therefore support contemporary positive psychology perspectives proposed by scholars such as Ryff (1989), Deci and Ryan (2001), Seligman (2011), and Fisher (2010), who argued that well-being extends beyond simple pleasure or satisfaction. Constructs involving meaning, growth, autonomy, vitality, and self-realisation appear to possess greater predictive utility for workplace outcomes than narrow evaluative attitudes toward one's job. Consequently, future theory building within HPWT research must move away from reductionist approaches equating employee happiness exclusively with job satisfaction.

The study also has implications for understanding work performance. Early research often conceptualised productivity through narrow objective measures such as output quantity or supervisor ratings. However, the present findings revealed that happiness demonstrated stronger associations with contextual performance, organisational citizenship behaviour, creativity, and innovation than with objective productivity metrics. This supports multidimensional models of performance proposed by Campbell et al. (1993), Borman and Motowidlo (1993), and Organ (1988), which emphasise that organisational effectiveness depends not only on technical output but also on adaptive, interpersonal, and discretionary behaviours.

These findings are particularly significant within contemporary knowledge economies. In cognitively demanding and innovation-driven environments, productivity increasingly depends upon creativity, collaboration, emotional regulation, learning capacity, and proactive behaviour rather than repetitive manual efficiency alone. Happiness therefore appears to exert its strongest effects in domains requiring cognitive flexibility, interpersonal engagement, and intrinsic motivation. This helps explain why the relationship between happiness and performance was strongest in high-complexity jobs.

Another major theoretical implication concerns the need for integrative causal models. The substantial heterogeneity observed in the meta-analysis demonstrates that the HPWT cannot be adequately understood as a direct linear relationship. Instead, the relationship is likely mediated and moderated by multiple variables including job complexity, autonomy, leadership quality, organisational climate, work centrality, reward systems, and personality factors. The MASEM findings further demonstrated that approximately 60% of intervention-driven performance

improvements were mediated through changes in employee well-being, implying that well-being acts as a partial causal mechanism rather than a complete explanatory variable.

This indicates that future theoretical development should focus less on whether happiness influences productivity, and more on understanding the psychological and organisational mechanisms through which this influence occurs. The present findings therefore reinforce the importance of mediation-based and systems-oriented models within organisational psychology.

Methodological Implications

The study also carries substantial methodological implications for future research. One of the clearest findings was that research design and measurement methods significantly influenced observed effect sizes. Cross-sectional and self-report studies consistently produced stronger correlations than longitudinal, experimental, supervisor-rated, or objective performance studies. This pattern suggests that portions of the HPWT literature may be inflated by common-method variance, reverse causality, and self-report bias.

Consequently, future research should prioritise longitudinal, experimental, and multi-source designs to improve causal inference and reduce methodological inflation. Researchers should increasingly integrate objective performance indicators, behavioural measures, and supervisor assessments rather than relying exclusively on employee self-reports. While self-report methods remain useful for measuring subjective experience, overreliance upon them may artificially exaggerate relationships between psychological constructs.

The findings additionally emphasise the importance of construct clarity and operational precision. A major source of inconsistency within HPWT research appears to stem from the

interchangeable use of partially overlapping constructs such as morale, engagement, satisfaction, flourishing, commitment, and positive affect. The results demonstrate that these constructs differ substantially in predictive strength and psychological content. Therefore, future studies must clearly define the conceptual boundaries of well-being variables rather than treating all positive psychological states as equivalent.

The study further demonstrates the value of meta-analytic and structural equation modelling approaches in organisational research. By integrating hundreds of studies across decades of literature, the present analysis was able to identify broader trends obscured within individual studies. Similarly, the use of MASEM enabled the modelling of indirect pathways between interventions, happiness, and performance. This suggests that future HPWT research should increasingly adopt integrative quantitative synthesis methods capable of testing complex theoretical frameworks rather than isolated bivariate relationships.

The use of AI-assisted screening and extraction procedures within the present study also carries methodological implications. While human verification remained central to decision-making, the integration of machine learning and large language models substantially improved efficiency in handling extremely large datasets. This suggests that future systematic reviews and meta-analyses within psychology may increasingly rely upon hybrid human-AI workflows, particularly when synthesising large-scale interdisciplinary literature.

Practical and Organisational Implications

The findings of the study hold important implications for organisational practice and management strategy. First, the results provide empirical support for the growing organisational

emphasis on employee well-being initiatives. The moderate positive relationship between happiness and performance suggests that investments into employee well-being are not merely ethical or symbolic practices, but may possess tangible organisational benefits.

However, the findings also suggest that organisations should avoid simplistic assumptions regarding well-being interventions. Since the relationship between happiness and productivity is contextually contingent, organisations cannot assume that generic morale-building exercises will automatically improve performance. The effectiveness of interventions appears to depend heavily upon intervention quality, organisational climate, employee autonomy, participation style, and job context.

The intervention meta-analysis demonstrated that multi-component positive psychology interventions and PsyCap-based interventions produced stronger performance outcomes than narrower approaches such as gratitude exercises alone. Furthermore, voluntary participation yielded substantially stronger effects than mandatory participation. This implies that employee agency and intrinsic motivation are critical components of successful well-being programmes. Interventions imposed through coercive or performative organisational structures may fail to generate meaningful behavioural change.

The findings also imply that organisational investments into employee well-being may generate the highest returns within knowledge-intensive and high-complexity industries. Since the happiness–performance relationship was strongest in cognitively demanding jobs, sectors dependent upon creativity, innovation, collaboration, and problem-solving may benefit disproportionately from fostering employee well-being. Modern economies increasingly rely

upon such forms of labour, suggesting that employee happiness may become progressively more important as economies transition toward service-sector and knowledge-based structures.

Additionally, the results suggest that organisations should broaden how they evaluate employee performance. Since happiness displayed stronger associations with contextual performance and creativity than objective productivity metrics, organisations focused exclusively on narrow output measures may overlook important behavioural benefits associated with employee well-being. Happier employees may contribute through improved teamwork, adaptability, innovation, organisational citizenship behaviour, and reduced counterproductive behaviour even when immediate output gains remain modest.

The findings also carry implications for leadership and organisational culture. Since workplace happiness appears strongly influenced by broader psychological and social environments, leadership practices promoting autonomy, fairness, trust, psychological safety, and recognition may indirectly improve organisational functioning through enhanced employee well-being. This reinforces emerging management perspectives that view organisational culture as a strategic economic variable rather than merely a social concern.

Policy and Societal Implications

Beyond organisations themselves, the study carries broader implications for labour policy and economic thinking. Historically, economic productivity was often treated as largely independent of employee psychological experience. However, the present findings suggest that psychological well-being may constitute an important productive resource within modern economies.

As nations increasingly transition toward knowledge-intensive industries, psychological variables such as engagement, resilience, motivation, and flourishing may become progressively central to economic performance. This implies that labour policies focused exclusively on wages and employment quantity may be insufficient for sustaining long-term productivity growth. Policies addressing work-life balance, mental health, psychological safety, and employee development may possess broader economic significance than traditionally assumed.

The findings additionally challenge purely mechanistic models of labour inherited from early industrial capitalism and scientific management traditions. While Taylorist models focused primarily on behavioural control and task optimisation, the present results suggest that human flourishing itself may possess productive value under modern economic conditions. This reflects a broader historical shift from industrial labour systems toward cognitively and emotionally intensive forms of work.

Implications for Future Research

Finally, the present study provides a foundation for future research directions. The high heterogeneity observed across studies demonstrates the need for more theoretically integrated models examining moderators and mediators simultaneously. Future studies should increasingly investigate causal pathways linking well-being to motivation, creativity, resilience, social behaviour, and adaptive performance.

There is also a need for more longitudinal and intervention-based research examining the durability of well-being effects over time. The present findings suggested that intervention

benefits weaken over longer follow-up periods, highlighting the importance of sustainability and organisational reinforcement mechanisms.

Future research should additionally expand beyond Western organisational contexts. Since conceptions of happiness vary historically and culturally, cross-cultural studies may reveal important differences in how employee well-being influences performance across distinct economic and institutional systems.

Overall, the present study demonstrates that the relationship between happiness and productivity is real, meaningful, and increasingly relevant within contemporary economies, but also theoretically complex and contextually dependent. The implications therefore extend beyond confirming the HPWT itself, toward reshaping how organisations, researchers, and policymakers conceptualise human functioning within the modern workplace.

5.3 LIMITATIONS

Despite our attempt at making the meta analysis as comprehensive as possible, we need to acknowledge some important limitations that should be kept in mind when interpreting the results and findings. These include conceptual heterogeneity, measurement constraints, sparse literature, shared-source variance, methodological quality, long term impact, English-language studies, and ontological shortcomings.

A primary limitation of the study was the substantial heterogeneity observed ($I^2 = 84.7\%$). Although moderator analysis explained some of the variance, a significant portion of unexplained heterogeneity remains. This is indicative of the fact that workplace happiness's relationship with performance was not fully modelled in our analysis, and potential

unacknowledged variables - like leadership style, organisational culture, labour conditions, national culture, economic stability, remote work structure, etc must also play a role. We suggest developing a pilot before a full scale happiness intervention, so the micro experimentation makes up for the lack of theoretical coverage of the subject.

A second major limitation was the abundance of cross sectional studies (61.4%), which dwarfed longitudinal studies (24.8%) and experimental or intervention based studies (13.8%). These remain vulnerable to reciprocal causality, inflating the effect size and fudging theoretical models. We attempted a MASEM to correct for this, but the limited number of intervention based studies, which is the third major limitation, restricted the generalizability of those causal findings, which shall be interpreted cautiously.

A related issue emerged based upon the shared-source inflation and common-method inflation caused by self-report measures. The effect size varied a lot based upon the reporting measure, which implies the need for conducting studies which utilise sophisticated 360-review as the basis of performance assessment.

Methodological quality was also compromised to a certain extent. Only 33.8% of the intervention studies were high quality, with the majority being of moderate quality. This was further exacerbated by the finding that higher-risk studies consistently produced larger effect sizes, indicating methodological inflation. In light of this, issues like weak randomisation procedures, lack of preregistration, absence of intention-to-treat analysis, and inadequate follow-up periods limit confidence in parts of the intervention evidence base.

With just 21% of the studies including a follow up beyond six months, and retention analysis exhibiting marked decline in intervention effects with time (persistence is reduced by

approximately 41% over twelve months), we cannot be very certain about the long term stability of the short term gains enabled by the interventions.

The exclusion of non-English language studies limits the generalizability of our findings. The decision was not based on a priori decisions about our population, but on the basis of practical constraints involving translation and methodological standardisation. This must have introduced cultural and linguistic bias into the final dataset. As conceptions of concepts like happiness, work, motivation, and organisational functioning are deeply cultural, our findings need to be enriched by future cross cultural research to become more globally valid.

The use of emerging AI-assisted tools for screening and extraction due to practical constraints emerges as another major limitation of the study. Although we implemented manual decision making at every point and safeguards to ensure the quality and reliability of the process, subtle classification and interpretation errors may have slipped through the cracks. The tools enabled us to scale our research very efficiently, but the impact of such evidence-aggregation attempts remains underexplored.

Finally, in a more general sense, the dissertation was limited by the broader epistemological challenges that are at the core of industrial/organisational psychology. Both performance and happiness are latent constructs and not directly observable, and their operationalisation is contingent on historically evolving frameworks. While we tried grounding this in the latest conceptions of the constructs, this is a dynamic field, and thus, constant updations and production of evidence is necessary.

Ultimately, the findings should not be seen as proof of a timeless law, but as an attempt to increase the theoretical understanding of dynamic psychological and organisational phenomenon.

5.4 FUTURE RESEARCH DIRECTIONS

As we have repeatedly mentioned throughout the discussion and limitations section, a primary change in future research should be moving away from the binary question of whether happiness does por does not influence productivity towards developing stronger theoretical models explaining this relationship in terms of how, when, under what conditions, and why it does, so future decision makers can be informed in a much more effective and precise manner.

A major priority for forthcoming research lies in developing stronger causal models. While we have proven the existence of a meaningful relationship, reciprocal causality is not very well understood in quantitative terms. Future studies should increasingly employ longitudinal cross-lagged panel designs, quasi-experimental approaches, and randomised field experiments to better decipher the bidirectional relationship.

Our focus should also shift towards mediation mechanisms. The current literature disproportionately occupies itself with the quest to prove the existence or inexistence of the relationship, rather than helping develop a theoretical model for it by testing psychological and behavioural processes that undergird it. Constructs such as resilience, intrinsic motivation, attentional flexibility, reward sensitivity, creativity, psychological safety, emotional contagion, and social reciprocity require more systematic integration into explanatory models, as do frameworks such as Fredrickson (2001) broaden and build approach, Deci and Ryan's (1985) self-determination theory, Blau's (1964) social exchange theory, and so on.

Future research should also help well-being researchers shed light on the multilevel model of happiness through studying the relationship between various levels of happiness rather than studying them independently.

Furthermore, future research should focus on what specific cognitive, motivational and social pathways explain the relationship between particular operationalisations of happiness with particular operationalisations of work performance, indirectly improving our understanding of these latent constructs.

The relationship between well-being and adaptive cognition will most likely become increasingly important as economies shift towards innovation, and as such, we need closer scrutiny of how different high complexity jobs affect this relationship between happiness and performance, such as remote vs on-site work, people facing vs object oriented roles, etc.

The intervention literature represents a major gap, with the need for studies that have longer follow-up periods, stronger randomisation, preregistration, and intention-to-treat analyses. This would help develop knowledge about extending the short term benefits of interventions, as well as an understanding of the variables that impact ecological validity across contexts.

Other directions for future research include the analysis of nonlinear aspects of this relationship, which will follow the development of a general linear model and detection of outliers that need causal explanation; cross-cultural research given our fundamental understanding of happiness as being culturally and historically contingent; exploration of AI-assisted research workflows in organizational and general research, particularly for scaling while maintaining thresholds of reliability; and finally, extension of the theoretical model into interdisciplinary fields, helping us understand the economic impact and larger social determinants of this micro and meso level relationship, informing policy decisions with superior depth.

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APPENDIX A - CODEBOOK

1. INTRODUCTION

This codebook was developed to standardise extraction and coding procedures for the meta-analysis examining the relationship between employee well-being and workplace performance under the framework of the Happy–Productive Worker Thesis (HPWT). The coding framework was designed to facilitate subgroup analysis, moderator analysis, intervention synthesis, and meta-analytic structural equation modelling (MASEM).

The codebook integrates recommendations from prior organisational meta-analyses, PRISMA standards, Campbell et al.'s multidimensional performance framework, and Fisher's multilevel conceptualisation of workplace happiness.

Each included study was coded across bibliographic, methodological, conceptual, statistical, intervention, and quality-assessment dimensions.

2. GENERAL CODING PROCEDURES

2.1 Unit of Coding

The primary unit of coding was the independent study sample. Multiple effect sizes were extracted from a single study when distinct operationalisations of happiness or performance were reported.

2.2 Coding Procedure

Studies were initially screened and extracted using an AI-assisted workflow involving ASReview and LLM-based summarisation tools. All extracted variables were manually verified against the original manuscript before inclusion in the final database.

2.3 Missing Data

Variables not reported within a study were coded as:

- NR = Not Reported
- NA = Not Applicable

3. BIBLIOGRAPHIC VARIABLES

Variable Name	Description	Coding Format
study_id	Unique identifier assigned to each study	Numeric
effect_id	Unique identifier assigned to each effect size	Numeric
authors	Authors of publication	Text

year	Year of publication	YYYY
title	Title of article/study	Text
journal	Journal or publication outlet	Text
country	Country where study was conducted	Text
continent	Geographic region	Asia / Europe / North America / South America / Africa / Oceania
publication_type	Publication format	Journal Article / Dissertation / Conference Paper
peer_reviewed	Whether publication was peer reviewed	Yes / No
doi	Digital Object Identifier	Text

source_database	Database from which study was retrieved	Scopus / WoS / PsycINFO / PubMed / ProQuest / Other

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4. SAMPLE CHARACTERISTICS

Variable Name	Description	Coding Format
sample_size	Total participants in study	Numeric
mean_age	Mean participant age	Numeric
percentage_female	Percentage female participants	Numeric
occupational_group	Occupational category	Clerical / Healthcare / Education / IT / Engineering / Manufacturing / Management / Mixed / Other

industry_type	Sector of employment	Public / Private / Nonprofit / Mixed
country_income_level	Economic classification of nation	Low / Middle / High Income
employment_type	Type of workers studied	Full-time / Part-time / Mixed
organisational_level	Unit of analysis	Individual / Team / Organisation

5. METHODOLOGICAL VARIABLES

Variable Name	Description	Coding Format
study_design	Research design	Cross-sectional / Longitudinal / Experimental
data_collection_method	Method of data collection	Survey / Archival / Mixed

performance_measurement	Source of performance assessment	Self-report / Supervisor Rated / Objective
statistical_design	Statistical approach used	Correlational / Regression / SEM / Multilevel / Experimental
reliability_reported	Whether reliability statistics were reported	Yes / No
alpha_happiness	Cronbach alpha for happiness variable	Numeric
alpha_performance	Cronbach alpha for performance variable	Numeric
longitudinal_lag	Time interval for longitudinal studies	Numeric months
intervention_present	Whether intervention was implemented	Yes / No

preregistered	Whether study was preregistered	Yes / No
power_analysis	Whether statistical power analysis was reported	Yes / No

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6. HAPPINESS / WELL-BEING VARIABLES

6.1 Primary Happiness Classification

Code	Construct
JS	Job Satisfaction
PA	Positive Affect
ENG	Engagement
PWB	Psychological Well-Being

FLR	Flourishing / Eudaimonia
FLOW	Flow State
IM	Intrinsic Motivation
THR	Thriving
VIG	Vigor
COM	Organisational Commitment
MIX	Composite Well-Being Measure

6.2 Happiness Level of Analysis

Code	**Level**
T	Transient Level

P	Person Level
G	Group / Unit Level

6.3 Happiness Orientation

Code	Orientation
HED	Hedonic
EUD	Eudaimonic
HYB	Hybrid

6.4 Happiness Target

Code	Target
JOB	Job-specific

LIFE General life satisfaction

ORG Organisational

DIFF Diffuse / Non-specific

6.5 Measurement Instrument

Variable Name	Description
happiness_scale	Scale used to measure happiness
happiness_items	Number of items
happiness_reliability	Reliability coefficient

Examples:

- Minnesota Satisfaction Questionnaire (MSQ)
- Job Descriptive Index (JDI)
- Utrecht Work Engagement Scale (UWES)
- Ryff Psychological Well-Being Scale

- PANAS
- Flourishing Scale

7. PERFORMANCE VARIABLES

7.1 Primary Performance Classification

Code	Construct
TP	Task Performance
CP	Contextual Performance
OCB	Organisational Citizenship Behaviour
CRE	Creativity / Innovation
OP	Objective Productivity
CWB	Counterproductive Work Behaviour

LEAD	Leadership Performance
GLOB	Global Performance
TEAM	Team Performance

7.2 Campbell Performance Dimensions

Code	Dimension
TECH	Technical Performance
COMM	Communication
INIT	Initiative / Effort
PEER	Peer / Team Support
MGMT	Management Performance

LEAD	Leadership
DISC	Personal Discipline
CWB	Counterproductive Behaviour

7.3 Performance Measurement Source

Code	Source
SELF	Self-report
SUP	Supervisor Rated
OBJ	Objective
PEER	Peer Rated
MIX	Mixed Source

7.4 Performance Measurement Instrument

Variable Name	Description
performance_scale	Scale or method used
performance_reliability	Reliability coefficient
objective_metric	Description of objective metric if applicable

Examples:

- Supervisor appraisal
- Sales volume
- Productivity output
- Performance rating systems
- OCB scales
- Creativity assessments

8. MODERATOR VARIABLES

8.1 Job Complexity

Code	Description

LOW	Routine / Repetitive work
MED	Moderately cognitive work
HIGH	Knowledge-intensive / Complex work

8.2 Industry Category

Code	Description
MAN	Manufacturing
SERV	Services
TECH	Technology
EDU	Education
HC	Healthcare

GOV Government

MIX Mixed

8.3 Organisational Moderators

Variable	Coding
autonomy_present	Yes / No
reward_contingency	Yes / No
leadership_quality	Low / Moderate / High
organisational_support	Low / Moderate / High
work_centrality	Low / Moderate / High
trust_in_management	Low / Moderate / High

8.4 Individual Moderators

Variable	Coding
self_efficacy	Low / Moderate / High
personality_variable	Big Five / Affectivity / Other
cognitive_ability	Reported / Not Reported
tenure	Mean years

9. EFFECT SIZE VARIABLES

Variable Name	Description	Coding Format
reported_effect_size	Original reported effect	Numeric
effect_size_type	Type of statistic reported	r / d / OR / Beta / F / t
fisher_z	Fisher z transformed correlation	Numeric

standard_error	Standard error	Numeric
confidence_interval_lower	Lower CI	Numeric
confidence_interval_upper	Upper CI	Numeric
p_value	Significance value	Numeric
direction_of_effect	Positive / Negative / Null	

---

10. INTERVENTION VARIABLES

10.1 Intervention Classification

Code	Intervention Type
PPI	Positive Psychology Intervention
PCAP	Psychological Capital Intervention

MIND	Mindfulness
GRAT	Gratitude Intervention
MULTI	Multi-component Intervention
CBT	Cognitive Behavioural Intervention
ORG	Organisational-Level Intervention

10.2 Intervention Delivery

Code	Delivery Mode
IP	In-person
ON	Online
HYB	Hybrid

10.3 Participation Type

Code	Participation
VOL	Voluntary
MAN	Mandatory

10.4 Intervention Characteristics

Variable	Coding
intervention_duration	Weeks
follow_up_period	Months
baseline_wellbeing	Mean baseline score
intervention_target	Individual / Team / Organisation

11. MASEM VARIABLES

Variable	Description
mediation_model_present	Whether mediation model reported
mediator_variable	Mediating construct
path_intervention_happiness	Standardised beta
path_happiness_performance	Standardised beta
direct_intervention_performance	Standardised beta
indirect_effect	Standardised indirect effect
model_fit_cfi	Comparative Fit Index
model_fit_rmsea	RMSEA
model_fit_srmr	SRMR

model_fit_tli	Tucker-Lewis Index

12. QUALITY ASSESSMENT VARIABLES

12.1 Overall Quality Rating

Code	Quality Level
HQ	High Quality
MQ	Moderate Quality
LQ	Low Quality

12.2 Risk of Bias Assessment

Domain	Coding
randomization_process	Low Risk / Some Concerns / High Risk

deviations_from_intervention	Low Risk / Some Concerns / High Risk
missing_outcome_data	Low Risk / Some Concerns / High Risk
outcome_measurement	Low Risk / Some Concerns / High Risk
selective_reporting	Low Risk / Some Concerns / High Risk

12.3 Quality Indicators

Variable	Coding
randomized_design	Yes / No
validated_scales	Yes / No
objective_outcomes	Yes / No
followup_beyond_6months	Yes / No

intention_to_treat	Yes / No
ecological_validity	Low / Moderate / High

13. EXCLUSION VARIABLES

Variable	Coding
exclusion_reason	Duplicate / Non-empirical / Insufficient Statistics / Non-English / No Workplace Context / Review Article / Missing Full Text
excluded_at_stage	Title Screening / Abstract Screening / Full Text Screening

14. FINAL CODING NOTES

1. Multiple effect sizes extracted from a single study were coded separately using unique effect identifiers.
2. When multiple happiness or performance constructs were reported within a single sample, each construct pairing was independently coded.
3. Where studies reported multiple waves of data collection, each wave was retained when statistically independent.

4. Objective productivity metrics were prioritised over self-report measures when both were available.
5. In studies with insufficient information, corresponding authors were contacted where feasible.
6. Manual verification was conducted for all AI-assisted extraction outputs prior to final inclusion.

15. SOFTWARE USED

Purpose	Software
Screening	ASReview
Reference Management	Zotero
Data Extraction	Python + LLM-Assisted Workflow
Meta-Analysis	JAMOVI (MAJOR Library)
MASEM	R / metaSEM

Data Cleaning	Python

16. PRISMA FLOW COUNTS

Stage	Count
Records Identified	18,742
Duplicates Removed	12,904
Unique Records Screened	5,838
Full Texts Assessed	1,284
Final Included Studies	428
Total Effect Sizes	612
Total Participants	74,893

APPENDIX B - PYTHON SCRIPTS

CSV MERGING FILE

```
# ============================================

# COMBINING MULTIPLE DATABASE CSV FILES

# ============================================


# This script combines bibliographic metadata

# exported from multiple academic databases

# into a single master dataset while retaining

# duplicates for later deduplication analysis.


# Required Libraries

import pandas as pd

import glob

import os

import pandas

import rapidfuzz


print("Libraries installed successfully")


# --------------------------------------------

# STEP 1: DEFINE FILE PATH

# --------------------------------------------
```

```
# Folder containing exported CSV files
folder_path = r"C:\Users\PRAX\Documents\HPWT_MetaAnalysis\CSV_Files"

# Retrieve all CSV files in folder
csv_files = glob.glob(os.path.join(folder_path, "*.csv"))

# ------------------------------------------
# STEP 2: IMPORT AND COMBINE FILES
# ------------------------------------------

dataframes = []

for file in csv_files:

    try:
        # Read CSV file
        df = pd.read_csv(file, encoding='utf-8')

        # Add source database name
        df["source_file"] = os.path.basename(file)

        # Append dataframe to list
```

```
        dataframes.append(df)

        print(f"Loaded: {file} | Rows: {len(df)}")

    except Exception as e:
        print(f"Error reading {file}: {e}")

# Combine all dataframes
combined_df = pd.concat(dataframes, ignore_index=True)

# ------------------------------------------
# STEP 3: STANDARDIZE COLUMN NAMES
# ------------------------------------------

combined_df.columns = (
    combined_df.columns
    .str.strip()
    .str.lower()
    .str.replace(" ", "_")
)

# ------------------------------------------
# STEP 4: RETAIN RELEVANT VARIABLES
```

```
# ----------------------------------------

required_columns = [
    'title',
    'abstract',
    'doi',
    'authors',
    'year',
    'journal',
    'source_file'
]

# Keep only available columns
available_columns = [
    col for col in required_columns
    if col in combined_df.columns
]

combined_df = combined_df[available_columns]

# ----------------------------------------
# STEP 5: EXPORT MASTER DATASET
# ----------------------------------------
```

```
output_path = os.path.join(folder_path, "combined_master_dataset.csv")

combined_df.to_csv(output_path, index=False)

# ----------------------------------------
# STEP 6: SUMMARY OUTPUT
# ----------------------------------------

print("\n====================================")
print("COMBINATION COMPLETE")
print("====================================")

print(f"Number of CSV files combined: {len(csv_files)}")
print(f"Total records combined: {len(combined_df)}")

print(f"\nMaster dataset saved to:\n{output_path}")
```

DEDUPLICATION

```
# ============================================================
# MULTI-STAGE DEDUPLICATION OF BIBLIOGRAPHIC RECORDS
# ============================================================

# This script performs:
```

```
# 1. Exact DOI matching

# 2. Normalized title matching

# 3. Fuzzy bibliographic matching

# 4. Manual review export for uncertain matches


# ============================================================

# REQUIRED LIBRARIES

# ============================================================


import pandas as pd

import numpy as np

import re

from rapidfuzz import fuzz

from itertools import combinations


# ============================================================

# LOAD DATASET

# ============================================================


file_path =

        r"C:\Users\PRAX\Documents\HPWT_MetaAnalysis\CSV_Files\combined_master_datas

        et.csv"
```

```
df = pd.read_csv(file_path)

print(f"Initial Records: {len(df)}")

# ============================================================
# STANDARDIZE TEXT
# ============================================================

def normalize_text(text):

    if pd.isna(text):
        return ""

    text = str(text).lower()

    # Remove punctuation
    text = re.sub(r'[^\w\s]', '', text)

    # Remove extra spaces
    text = re.sub(r'\s+', ' ', text).strip()

    return text
```

```
# ============================================================

# NORMALIZE DOI AND TITLE

# ============================================================

df['doi_clean'] = df['doi'].astype(str).str.lower().str.strip()

df['title_clean'] = df['title'].apply(normalize_text)

# ============================================================

# STEP 1 — EXACT DOI MATCHING

# ============================================================

doi_duplicates = df[df.duplicated(subset='doi_clean', keep='first')

                    & (df['doi_clean'] != '')]

doi_duplicate_indices = doi_duplicates.index.tolist()

print(f"\nDOI Duplicates Found: {len(doi_duplicate_indices)}")

# Remove DOI duplicates

df_doi_cleaned = df.drop(index=doi_duplicate_indices)

print(f"Records After DOI Deduplication: {len(df_doi_cleaned)}")
```

```
# ============================================================
# STEP 2 — NORMALIZED TITLE MATCHING
# ============================================================

title_duplicates = df_doi_cleaned[
    df_doi_cleaned.duplicated(subset='title_clean', keep='first')
]

title_duplicate_indices = title_duplicates.index.tolist()

print(f"\nNormalized Title Duplicates Found: {len(title_duplicate_indices)}")

# Remove title duplicates
df_title_cleaned = df_doi_cleaned.drop(index=title_duplicate_indices)

print(f"Records After Title Deduplication: {len(df_title_cleaned)}")

# ============================================================
# STEP 3 — FUZZY MATCHING
# ============================================================

# Similarity thresholds
```

```
HIGH_MATCH_THRESHOLD = 95
UNCERTAIN_THRESHOLD_LOW = 85
UNCERTAIN_THRESHOLD_HIGH = 94

# Store duplicates and uncertain matches
fuzzy_duplicates = []
manual_review = []

# Reset index for pairwise comparison
df_title_cleaned = df_title_cleaned.reset_index(drop=True)

# Compare all titles pairwise
for i, j in combinations(range(len(df_title_cleaned)), 2):

    title_1 = df_title_cleaned.loc[i, 'title_clean']
    title_2 = df_title_cleaned.loc[j, 'title_clean']

    # Skip empty titles
    if title_1 == "" or title_2 == "":
        continue

    similarity = fuzz.token_sort_ratio(title_1, title_2)
```

```
    # High-confidence duplicate
    if similarity >= HIGH_MATCH_THRESHOLD:

        fuzzy_duplicates.append(j)

    # Uncertain match for manual review
    elif UNCERTAIN_THRESHOLD_LOW <= similarity <=
            UNCERTAIN_THRESHOLD_HIGH:

        manual_review.append({
            'record_1_index': i,
            'record_2_index': j,
            'title_1': df_title_cleaned.loc[i, 'title'],
            'title_2': df_title_cleaned.loc[j, 'title'],
            'similarity_score': similarity
        })

# ============================================================
# REMOVE FUZZY DUPLICATES
# ============================================================

fuzzy_duplicates = list(set(fuzzy_duplicates))
```

```
print(f"\nHigh Confidence Fuzzy Duplicates: {len(fuzzy_duplicates)}")

df_final = df_title_cleaned.drop(index=fuzzy_duplicates)

print(f"Final Unique Records: {len(df_final)}")

# ============================================================
# EXPORT MANUAL REVIEW FILE
# ============================================================

manual_review_df = pd.DataFrame(manual_review)

manual_review_path =
        r"C:\Users\PRAX\Documents\HPWT_MetaAnalysis\CSV_Files\manual_review_require
        d.csv"

manual_review_df.to_csv(manual_review_path, index=False)

print(f"\nManual Review Records Exported: {len(manual_review_df)}")

# ============================================================
# EXPORT FINAL CLEAN DATASET
# ============================================================
```

```
final_output_path =
        r"C:\Users\PRAX\Documents\HPWT_MetaAnalysis\CSV_Files\deduplicated_dataset.cs
        v"

df_final.to_csv(final_output_path, index=False)

# ============================================================
# SUMMARY STATISTICS
# ============================================================

total_removed = (
    len(doi_duplicate_indices)
    + len(title_duplicate_indices)
    + len(fuzzy_duplicates)
)

print("\n================================================")
print("DEDUPLICATION COMPLETE")
print("================================================")

print(f"Initial Records: {len(df)}")
print(f"Duplicates Removed: {total_removed}")
```

```
print(f"Final Unique Studies: {len(df_final)}")


print("\nBreakdown:")
print(f"DOI Matches Removed: {len(doi_duplicate_indices)}")
print(f"Normalized Title Matches Removed: {len(title_duplicate_indices)}")
print(f"Fuzzy Matches Removed: {len(fuzzy_duplicates)}")

print(f"\nFinal Dataset Saved To:\n{final_output_path}")

print(f"\nManual Review File Saved To:\n{manual_review_path}")
```
