The Comprehensive Meta-Analyses of the Nomological Network of Psychological Capital (PsyCap)

Abstract

This paper presents the most rigorous meta-analysis undertaken to date of empirical literature examining antecedents and outcomes related to psychological capital (PsyCap), and moderators of these relationships. We investigated seven leadership styles as antecedents of PsyCap (authentic, ethical, servant, empowering, transactional, transformational, and abusive leadership), five outcomes (burnout, turnover intentions, work engagement, performance, and satisfaction), and the impact of four moderators (country of sample origin, cultural characteristics, industry type, and research design). Our analysis of PsyCap research (2007-2020) examined 244 studies (254 independent samples and over 96000 participants), which is over twice as large as previous PsyCap meta-analyses. To optimise the quality and reliability of findings, we corrected for artefacts and included heterogeneity, sensitivity, and publication bias analyses. Our results provide several new findings beyond previous PsyCap meta-analyses. We found that empowering, servant, transformational, and transactional leadership were all positively associated with PsyCap, with empowering and transformational leadership being the strongest antecedents of PsyCap and abusive and transactional leadership being the weakest. The findings demonstrated PsyCap was positively associated with work engagement, and negatively associated with burnout. Country of sample origin moderated all the relationships, except for servant leadership. Additionally, cultural characteristics (e.g., power distance, masculinity, long-term orientation, and uncertainty avoidance) moderated several conceptual relationships. Study design was also found to moderate the PsyCap - work engagement relationship. Collectively, these findings offer new and extended insights into the antecedents, outcomes, and moderators related to PsyCap, beyond previous meta-analyses. The theoretical and practical implications of these new findings are also discussed.

Keywords: meta-analysis; psychological capital; PsyCap; leadership; employee outcomes

Introduction

Psychological capital (PsyCap) reflects an individual's state of positive development and is characterised by hope, efficacy, resilience, and optimism (Luthans, Youssef, & Avolio, 2007). Research over the past 15 years has demonstrated that PsyCap is a meaningful resource that can promote desirable employee outcomes (e.g., job satisfaction, organizational commitment, and employee creativity) and buffer against negative employee outcomes (e.g., turnover intentions and cynicism) (Avey, Reichard, Luthans, & Mhatre, 2011; Fontes & Dello Russo, 2020; Huang & Luthans, 2015). These relationships have now also been established in a small number of meta-analyses studies (e.g., Avey, Reichard, et al., 2011; Kong, Tsai, Tsai, Huang, & de la Cruz, 2018; Wu & Nguyen, 2019). However, we argue that these meta-analyses have been underdeveloped in terms of both scope and methodology, which has led to a restricted understanding regarding the antecedents of PsyCap, and the factors that may moderate the relationships between PsyCap and its antecedents and outcomes. We further argue that the flaws with the design of recent meta-analyses studies (Kong et al., 2018; Wu & Nguyen, 2019) might limit the reliability of the produced results and the future implications. Additionally, the 'progress reports' on the state of theoretical and empirical knowledge about PsyCap over time provided by these studies both highlight and reinforce the need to ensure that such efforts keep pace with the explosive growth of PsyCap literature. For example, a simple keyword search for "psychological capital" conducted in May 2022 in the Scopus database found that between 2007 and 2018 (the cut-off data collection point for Wu and Nguyen (2019)), 717 PsyCap studies had been published. In the 2 years between that study and December 2020 (the cut-off data collection point for this study), 461 new studies were published, increasing the volume of PsyCap literature by 64%. Furthermore, the significant recent increase in empirical research about PsyCap provides a valuable opportunity to both extend the insights into the antecedents, outcomes related to PsyCap, and moderators of these

relationships provided by previous meta-analyses, and to also overcome the limitations of their methodological approaches. In doing so, we expect to provide a more fine-grained understanding of PsyCap, which can help inform organisational practices to maximise the benefits of PsyCap for enhanced employee performance and functioning.

Limitations of Previous PsyCap Meta-Analyses

A small number of PsyCap meta-analyses have been conducted in recent years (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019) [1]. These studies have aimed to generate a greater understanding of PsyCap and the factors that influence its emergence, and the relationship with important work-related outcomes. However, these meta-analyses have been notably limited in terms of both scope and methodology. For example, despite previous studies showing leadership to be a significant antecedent of PsyCap (e.g., Avey, 2014; Bouckenooghe, Zafar, & Raja, 2014), extant PsyCap meta-analyses have rarely gone beyond investigating authentic leadership (see e.g., Banks, McCauley, Gardner, & Guler, 2016; Hoch, Bommer, Dulebohn, & Wu, 2018; Kong et al., 2018). Thus, other styles of leadership, such as empowering, transformational, and transactional leadership, have yet to be fully investigated in meta-analysis research. Moreover, the strength of these leadership styles in predicting PsyCap has not been compared in previous PsyCap meta-analysis studies. As such, it is currently unknown which leadership styles are the strongest predictors of PsyCap. Overall, the current PsyCap meta-analyses do not draw a comprehensive picture of the relationship between leadership and PsyCap, and do not compare the strength of different leadership styles in predicting PsyCap. This is an important point as it has implications for both future research and practice.

[1] It is acknowledged that another meta-analysis of PsyCap has been recently published (Lupșa, Vîrga, Maricuțoiu, & Rusu, 2020). However, this study examined the effectiveness of PsyCap *intervention* programs, rather than the relationships between PsyCap and antecedent and outcome variables. Therefore, discussing this paper is out of the scope of the current study.

Furthermore, the investigation of moderators of the relationships between PsyCap and other variables has also been limited in meta-analysis research. Two previous meta-analysis studies (Avey, Reichard, et al., 2011; Wu & Nguyen, 2019) have investigated moderation effects in the relationship between PsyCap and employee outcomes. However, neither investigated potential moderation effects of the relationships between PsyCap and antecedent variables, nor did they investigate moderation effects in the relationship between PsyCap and negative employee outcomes (e.g., burnout). Similarly, Avey, Reichard, et al. (2011) only investigated the moderation effects of sample origin and industry type in the relationship between PsyCap and a combined group of positive outcomes (e.g., well-being, commitment, and satisfaction). Thus, the results of this study cannot explain the conditional effect for each individual relationship between PsyCap and the outcome variables and provide a simplistic investigation of the moderators by combining the positive outcomes. We also suggest the US/non-US dichotomy (Avey, Reichard, et al., 2011) represents a simplistic approach for investigating the potential influence sample origin may have on PsyCap relationships and does not provide a detailed analysis. Collectively, we argue that these identified omissions and shortcomings across previous PsyCap meta-analyses limit current understandings of the factors and boundary conditions of the relationships between PsyCap and antecedent and outcome variables. Thus, there is still much yet to be discovered in terms of the moderators of PsyCap relationships.

Besides, it is important to acknowledge that previous PsyCap meta-analyses (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019) have incurred consequential methodological issues, which undermines the reliability of the findings reported. For instance, failure to correct for the artefacts, particularly in meta-analysis studies that use correlation, can result in misleading estimates of effect sizes (Schmidt & Hunter, 2015). Additionally, the omission of heterogeneity analyses, sensitivity analyses, and publication bias analysis can also

adversely influence the findings of meta-analysis studies (Cleophas & Zwinderman, 2017). For example, when sensitivity analyses (e.g., outlier analysis) are not conducted, the influence of the results from low-quality individual studies on the overall meta-analysis is unknown. This can lead to an over-estimation in reported findings stemming from the meta-analysis. Therefore, it is important to investigate how results from lower quality studies may influence the meta-analysis summary effect size (see Bown & Sutton, 2010; Cleophas & Zwinderman, 2017). Furthermore, it is well established that studies that have obtained significant results, or strong effect sizes, are more likely to be published in comparison to studies that have not obtained significant results or obtained weak effect sizes (Card, 2012; Schmidt & Hunter, 2015). In this situation, the published studies will not be representative of all studies (see Borenstein, Hedges, Higgins, & Rothstein, 2009). To help remedy this, publication bias analysis can be conducted to enhance the representativeness of the meta-analysis. However, this important methodological consideration has not been included in any of the PsyCap meta-analysis studies to date. Overall, in reviewing PsyCap meta-analyses conducted to date, it is evident that these important methodological steps have not been routinely undertaken, especially for the most recent studies (Kong et al., 2018; Wu & Nguyen, 2019). All in all, these methodological and study design flaws undermine the findings of these studies and suggest that their results need to be interpreted with caution.

The Current Study

This study aims to extend previous meta-analyses by undertaking a series of 13 meta-analyses to identify significant antecedents and outcomes related to PsyCap, along with the factors that moderate these relationships. In doing so, this study responds to calls for more in-depth investigations of antecedents and moderators related to PsyCap (e.g., Luthans & Youssef-Morgan, 2017; Luthans, Youssef, & Avolio, 2015; Newman, Ucbasaran, Zhu, & Hirst, 2014) in several ways. First, it will provide an extended scope by including antecedent

(e.g., empowering, transformational, and transactionalleadership) and outcome (burnout and work engagement) variables pertinent to PsyCap that have not been examined in prior meta-analyses. In addition, it will provide the first meta-analytic comparison of the strength of leadership styles in predicting employee PsyCap. As such, this study will provide a comprehensive framework of the relationship between PsyCap and leadership and help determine the effectiveness of various leadership styles in predicting employee PsyCap through strong research syntheses.

Second, this study will extend previous investigations of the moderating effects of sample origin and industry type (Avey, Reichard, et al., 2011), by investigating these effects on relationships with individual outcome variables rather than grouped outcomes. This will also enable the first meta-analytical investigation of moderating effects in the relationships between PsyCap and both positive and negative outcome variables. Moreover, this study will go beyond using a simple US/non-US dichotomy to examine the influence of sample origin. Instead, we will code studies for each country and draw on Hofstede's six-dimensional model of national culture (Hofstede, Hofstede, & Minkov, 2010) to determine how different cultural dimensions may influence the relationships between PsyCap and its outcomes and antecedents. This is a novel application of the sample origin and national culture in a PsyCap meta-analysis study and will provide a more elaborate understanding of the role of context and culture in the nomological network of PsyCap. As such, this study will explore the moderation effects of sample origin, culture, and industry type in the relationships between PsyCap and both antecedent and outcome variables. Importantly, our study will aim to provide a more methodologically rigorous meta-analysis of PsyCap by undertaking moderation analyses (subgroup analysis and meta-regression) for each of the individual investigated relationships and by employing corrected effect sizes, sensitivity analysis (outlier analysis), and publication bias analysis.

By conducting a more comprehensive and methodological rigorous meta-analysis of PsyCap, the findings from this study will provide a deeper understanding regarding the relationship between PsyCap and antecedent and outcome variables, as well as the moderator variables of these relationships. Moreover, from a practical perspective, the findings from this study will provide important insights about the situations in which, and for whom, PsyCap has the greatest impact, which in turn can enable organisations to maximise the benefits of PsyCap.

The theoretical framework of PsyCap and research questions development

Antecedents of PsyCap

In more recent years, PsyCap research has moved away from solely investigating direct relationships between PsyCap and outcomes to investigate factors that foster PsyCap (e.g., antecedents). Currently, one of the most frequently studied antecedents of PsyCap is leadership including, empowering (Park, Kim, Yoon, & Joo, 2017), transformational (Gooty, Gavin, Johnson, Frazier, & Snow, 2009), authentic (Amunkete & Rothmann, 2015; Avey, 2014; Hystad, Bartone, & Eid, 2014; Malik & Dhar, 2017; Rego, Sousa, Marques, & Cunha, 2012; Woolley, Caza, & Levy, 2011), servant (Bouzari & Karatepe, 2017; Karatepe & Talebzadeh, 2016), and ethical leadership (Avey, 2014; Bouckenooghe et al., 2014). Findings from these studies have demonstrated that these leadership styles have a significant, positive influence on employee PsyCap. Other research has also demonstrated the significant and negative impact of abusive leadership on employee PsyCap (Agarwal, 2019; Agarwal & Avey, 2020; Ahmad, Athar, Azam, Hamstra, & Hanif, 2018; Lee & Wu, 2016).

It has been argued that leaders can bring positivity to the organisation by engaging and expressing behaviours that are either intrinsically positive, or lead to positive outcomes (Cunha, Rego, Simpson, & Clegg, 2020). This is argued to be most evident in relation to positive forms of leadership such as ethical, empowering, authentic, transformational, and servant leadership (see e.g., Adams, Meyers, & Sekaja, 2020; Cunha et al., 2020; Marques, 2020; Stander &

Coxen, 2017). However, it is also suggested that behaviours that typify transactional leadership, which is not considered as a positive leadership style per se, can still lead to positive employee outcomes (Cunha et al., 2020). For example, Gardner, Avolio, Luthans, May, and Walumbwa (2005, p. 345) purported that authentic leaders "draw from the positive psychological states that accompany optimal self-esteem and psychological well-being, such as confidence, optimism, hope, and resilience, to model and promote the development of these states in others". Drawing on this line of argument, we suggest that intrinsically positive leadership styles, including authentic, ethical, empowering, transformation, and servant leadership, can positively predict employee PsyCap. Conversely, we posit that negative styles of leadership, such as abusive leadership, are likely to erode positive psychological states, such as PsyCap in employees. Importantly, investigation of the relationship between various leadership styles and PsyCap will enable the determination of those leadership styles with the strongest (and weakest) association with PsyCap. Therefore, the following research questions are proposed:

Research Question 1: Is authentic leadership positively associated with employee PsyCap?

Research Question 2: Is ethical leadership positively associated with employee PsyCap?

Research Question 3: Is transformational leadership positively associated with employee PsyCap?

Research Question 4: Is transactional leadership positively associated with employee PsyCap?

Research Question 5: Is servant leadership positively associated with employee PsyCap?

Research Question 6: Is empowering leadership positively associated with employee PsyCap?

Research Question 7: Is abusive leadership negatively associated with employee PsyCap?

Research question 8: Which leadership styles have the strongest and weakest impact on employee PsyCap?

Outcomes of PsyCap

Research over the past two decades has consistently demonstrated that PsyCap is a significant predictor of a range of desirable outcomes, including job performance, organisational citizenship behaviours, and organisational commitment (Nolzen, 2018). Research has also shown that PsyCap negatively influences undesirable outcomes, including cynicism (Wang, Chang, Fu, & Wang, 2012), turnover intentions, and burnout (Amunkete & Rothmann, 2015; Manzano-García & Ayala, 2017).

Conservation of resources theory (Hobfoll, 1989) is the predominant theoretical framework cited to explain the relationship between PsyCap and outcome variables (Alessandri, Consiglio, Luthans, & Borgogni, 2018; Karatepe & Karadas, 2015; Newman, Nielsen, Smyth, Hirst, & Kennedy, 2018). According to the COR theory, individuals strive to keep, preserve, and build resources. Resources have been defined as "those objects, personal characteristics, conditions, or energies that are valued by individual or that serve as a means for attainment of these objects, personal characteristics, conditions, or energies" (Hobfoll, 1989, p. 516). COR theory differentiates between two mechanisms designed to conserve resources: (1) the seeking of new resources which will aid energetic activation towards the pursuit of goals (resource gain orientation); and (2) the propensity to prevent resource loss, and thus retain a sufficient buffer of resources (resource loss orientation; Hobfoll, 1989). Moreover, COR theory proposes the notion of resource caravans (Hobfoll, 2011; Hobfoll, Halbesleben, Neveu, & Westman, 2018), whereby psychological resources travel together and interact synergistically, as is purported with the components of PsyCap – hope, efficacy, resilience, and optimism (Luthans & Youssef-Morgan, 2017).

Previous studies have demonstrated that gaining personal resources, such as PsyCap, leads to positive employee outcomes, including job satisfaction, work engagement, and employee performance (Amunkete & Rothmann, 2015; Mazzetti, Guglielmi, Chiesa, & Mariani, 2016; Tüzün, Çetin, & Basim, 2018). Additionally, gaining resources has been found to buffer against negative outcomes. For example, PsyCap has been shown to negatively predict turnover intentions, burnout (Amunkete & Rothmann, 2015; Manzano-García & Ayala, 2017), stress (Avey, Luthans, & Jensen, 2009; Siu, Cheung, & Lui, 2015), and job stress (Abbas & Raja, 2015).

Therefore, drawing on the COR theoretical framework, it is argued that gaining PsyCap as a resource caravan can help develop positive outcomes, including job satisfaction, employee performance, and work engagement, and buffer against negative outcomes, such as turnover intentions and burnout. As such, the following research questions are investigated:

Research Question 10: Is PsyCap positively associated with job performance?

Research Question 11: Is PsyCap positively associated with work engagement?

Research Question 12: Is PsyCap positively associated with job satisfaction?

Research Question 13: Is PsyCap negatively associated with turnover intentions?

Research Question 14: Is PsyCap negatively associated with burnout?

Moderators of the relationship between PsyCap and outcome variables

As discussed earlier, previous PsyCap meta-analysis studies (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019) have been limited in their examination of potential moderators in the relationships between PsyCap and antecedent and outcome variables. Therefore, to build upon previous meta-analyses (e.g., Avey, Reichard, et al., 2011), this study will examine the role of sample origin, culture, and industry type as potential

moderators of the individual relationships between PsyCap and both antecedent and outcome variables.

Correlations reported across previous studies suggest that industry type may have a differential bearing on the relationship between leadership and PsyCap. For example, Schuckert, Kim, Paek, and Lee (2018) found a correlation of 0.706 between authentic leadership and PsyCap in a sample of employees working in the service industry. In contrast, Hystad et al. (2014) reported a notably lower correlation of 0.24 between authentic leadership and PsyCap among a sample of employees within the manufacturing industry. Similar correlational variations are noted in the relationship between leadership and PsyCap across studies in relation to sample origin. For example, Corner (2015) reported a correlation of 0.712 between authentic leadership and PsyCap in a sample from the US. In comparison, Yun and Kang (2018) reported a much lower correlation of 0.27 for the same relationship among a sample from South Korea.

Recent research also suggests that the moderation effects of sample origin and industry type on the relationships between PsyCap and outcome variables may be stronger than previously reported. For example, Idris and Manganaro (2017) reported a correlation between PsyCap and job satisfaction of .039 in a study with a sample of employees from Saudi Arabia. In contrast, Kim, Kim, Newman, Ferris, and Perrewé (2019) reported a correlation of .67 between PsyCap and job satisfaction in a study with a sample of employees from the USA. Similar disparities are reported in regard to the relationship between PsyCap and turnover intentions when industry type is considered. For example, Munyaka, Boshoff, Pietersen, and Snelgar (2017) reported a correlation of -.35 between PsyCap and turnover intentions in a sample of manufacturing employees. However, Kim et al. (2017) reported a correlation of -.72 between PsyCap and turnover intentions in research with a sample of hospitality employees.

These heterogeneous findings suggest that variables such as sample origin and industry type play an important moderating role in the relationship between PsyCap and individual antecedent and outcome variables. Therefore, it is important to investigate the potential moderators for each *individual* outcome and antecedent variables, rather than as combined groups of variables, as moderators may influence each relationship. Further, we go beyond the US/non-US dichotomy, used in Avey, Reichard, et al. (2011) to code studies for each country. To comprehensively account for contextual differences in different countries, we also investigate the moderating role of Hofstede's six-dimensional model (Hofstede et al., 2010) of national culture. This includes examining the influence cultural dimensions such as power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, and indulgence have on the relationships between PsyCap and its outcomes and antecedents. Given that the moderating effects of sample origin and industry type have not been investigated previously in relation to individual outcomes and antecedents, we propose the following research questions:

Research Question 15: Do industry type, sample origin, and cultural dimensions moderate the relationship between leadership styles (i.e., authentic, ethical, transactional, transformational, servant empowering, and abusive leadership) and PsyCap?

Research Question 16: Do industry type, sample origin, and cultural dimensions moderate the relationship between PsyCap and employee outcomes of employee performance, work engagement, job satisfaction, turnover intentions, and burnout?

Method

Literature search

An initial search was conducted in May 2018, and to ensure that all the studies were identified and assessed for inclusion in this study, an updated search was conducted in February

2021. The aim of the search was to identify relevant published and unpublished studies that were undertaken between 2007 (when the first empirical study on PsyCap was published) and the end of 2020. Relevant databases were searched, including Scopus, Web of Science, PsycINFO, ProQuest, Ovid Medline, CINAHL, and EBSCO (Business Source Ultimate). The initial search in May 2018 included the search terms of "psychological capital", PsyCap, "authentic leadership", burnout, engagement, performance, "job satisfaction", turnover intentions, intention to quit, and intention to leave, as the keywords individually. Then, the results of the search for "psychological capital" and PsyCap were combined with the operator "OR". The same procedure was followed for other variables. The final search strategy then combined these two results with the operator "AND".

Inclusion and exclusion criteria

To be included, studies were required to be written in English, and be quantitative and empirical in nature. They needed to have used either the 12 or 24 item versions of the PsyCap questionnaire (Avey, Avolio, & Luthans, 2011; Luthans et al., 2007) to measure PsyCap. Studies that employed single measures for variables (e.g., job satisfaction) were removed as single-item measures have been shown to have poor validity and reliability (McIver & Carmines, 1981). Additionally, only studies that investigated PsyCap in relation to workplace outcomes were included.

An initial database search in May 2018 identified a total of 1260 published studies. Reviewing abstracts excluded 1106 studies, and the remaining 154 studies (including eight conference papers) were further analysed for their inclusion in the meta-analysis. To control for the possibility of publication bias, the literature search was extended to also include unpublished studies. The first strategy to identify unpublished studies was to search for relevant theses in the ProQuest database, which yielded 1906 results. Using this method, 26 potential

unpublished theses were identified. An email was also sent via the Academy of Management (AOM) ListServ (Organisational Behavior Division List) to 5380 researchers and academics requesting relevant unpublished PsyCap studies. From this, two additional studies were received (one unpublished thesis and one in-press journal article). One further in-press study was identified via the journal indexing databases. Thus, in total, 29 unpublished studies were identified for potential inclusion in the meta-analysis.

In the next step, the full papers/theses for the 183 identified studies (154 published studies and 29 unpublished studies) were assessed against inclusion/exclusion criteria. Three studies were removed as they did not use the 12 or 24 item measures of PsyCap (Madrid, Diaz, Leka, Leiva, & Barros, 2017; Nguyen & Nguyen, 2012; Van Steenbergen, van der Ven, Peeters, & Taris, 2017), and three studies were removed due to using a single-item measure (Cassidy, McLaughlin, & McDowell, 2014; Cenciotti, Alessandri, & Borgogni, 2017; Hite, 2015). One study was removed as it employed a student rather than a workplace sample (Gooty et al., 2009), and four studies were removed due to measuring similar but different constructs from the focus of this study (e.g., measuring career satisfaction) (Ganotice, Yeung, Beguina, & Villarosa, 2016; Guo, Xiyuan, & Qin, 2012; Polatci & Akdogan, 2014; Zhang, Li, Ma, Hu, & Jiang, 2014). One further study was also removed due to inconsistent reporting of the correlation coefficients for the relationship between PsyCap and burnout (Malekitabar, Riahi, & Malekitabar, 2017). Finally, 16 theses were removed due to not having access to the full-text and a further 12 studies were excluded as these studies did not provide the results of the correlation coefficients, despite follow up email requests to the corresponding authors of these studies. Therefore, the total number of included studies in the meta-analysis from this phase of the literature search was 143 studies (151 samples, N = 56608).

A similar procedure was used in February 2021 to identify relevant literature published between May 2018 until the end of December 2020 regarding the abovementioned variables

(i.e., authentic leadership, job satisfaction, job performance, work engagement, burnout, and turnover intentions). To expand the scope regarding the antecedents of PsyCap, the search terms of "psychological capital", PsyCap, "ethical leadership", "transactional leadership", "transformational leadership", "servant leadership", "abusive leadership", "abusive supervision" were also utilised. The aim was to identify studies (published from 2007 until the end of December 2020) that have investigated the relationship between PsyCap and leadership styles beyond only authentic leadership. The same procedure for study inclusion was used as described earlier. The search for published studies in February 2021 yielded 1600 published studies. An additional 183 studies were identified as potential studies to be included in the meta-analysis. After a closer examination, further studies were removed due to using a measure other than 12-items or 24-items PCQ to measure PsyCap (45 studies), using other levels of analysis beyond individual level (e.g., team PsyCap) (4 studies), not using an employee sample (6 studies), and not providing correlation for the identified relationships (30 studies). Therefore, 98 usable published studies were identified to be included beyond those identified in the first search.

In terms of the unpublished studies, the results of the search in ProQuest yielded 9635 results, of which 30 potential theses were identified. However, all 30 theses were removed due to not having access to them (29 theses) and not providing the correlation coefficient for the identified studies (1 thesis). Only one new thesis was added to the database at this stage, which was the unpublished Ph.D. thesis of one of the authors of this paper (the thesis has not been indexed in the ProQuest yet). Furthermore, seven potential conference papers were identified via searching in the journal indexing databases. Among these, five studies were removed due to using a measure other than 12-items or 24-items PCQ to measure PsyCap (2 studies) and not providing correlation for the identified relationships (3 studies). Therefore, a total of two

conference papers were added to the analysis. Overall, in the second stage of literature research, 101 new studies (103 independent samples, N=39908) were added to the database.

Therefore, as shown in Figure 1, the total number of published and unpublished studies included in the meta-analysis was 244 studies (254 independent samples, N = 96416). A comparison of the scope of this meta-analysis compared with previous PsyCap meta-analyses (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019) has been provided in the online supplementary material document, which demonstrates the comprehensiveness of the meta-analysis reported in this paper compared to the extant PsyCap meta-analyses.

INSERT FIGURE 1 ABOUT HERE

Coding procedure

For each sample, coded sample size, sample origin, industry type, effect size, and reliability scales (Cronbach's Alpha) were extracted for the variables of interest. In this study, the correlation coefficient was used as a measure of effect size since this study is interested in the relationships between PsyCap and other variables.

Studies were also coded according to whether they had reported the correlation and reliability scales for PsyCap as an aggregate or had reported each of the four dimensions of PsyCap. In this case, when the correlation was reported individually for the different dimensions of PsyCap, the composite correlation was calculated according to methods outlined in Schmidt and Hunter (2015). Additionally, when a study reported separate reliability scores (Cronbach's Alpha) for the different dimensions of a construct, the average score was calculated. If a study did not report exact reliability scale data (Cronbach's Alpha), nor provide this information on request, the average score of the reliability scale from the available studies in the dataset was calculated and entered (see e.g., Kirca, Jayachandran, & Bearden, 2005; Mackay, Allen, & Landis, 2017). Coding of the studies was conducted in June and August

2018, as well as February 2021 to ensure coding reliability. Any inconsistency in coding was discussed and resolved within the research team.

Meta-analysis procedure

This meta-analysis combined the methodologies outlined in Hunter and Schmidt (2004) and Borenstein et al. (2009), which acknowledge artefact corrections and provide similar formulas to correct the effect sizes. As such, this meta-analysis corrected the effect sizes with regard to the internal reliability (Cronbach's alpha) for all variables. Moreover, effect sizes were weighted by sample size within random-effects models. The summary effect sizes were then calculated using the Comprehensive Meta-Analysis software program (CMA) version 3.

Tests of heterogeneity were used to assess the degree of variability or inconsistency in study outcome magnitudes. Heterogeneity tests are important to assess the extent to which observed dispersion among the findings of different studies is real dispersion, rather than dispersion arising from within-study error (Borenstein et al., 2009). Three measures were used to assess the heterogeneity: Cochran's Q statistic, I^2, and Tau^2. Where significant/substantial heterogeneity is identified, either through a significant Q, an I^2-value > 75%, or large Tau^2, it is suggested that potential moderators of effect size be investigated (Borenstein et al., 2009; Higgins, Thompson, Deeks, & Altman, 2003). In this meta-analysis study, when heterogeneity tests were significant, the potential moderation effects of sample origin and industry type were investigated using the mixed-effects analysis option in the CMA for subgroup analyses (see Borenstein et al., 2009) as these moderators are categorical variables. Moreover, the moderating role of culture was investigated using meta-regression.

For moderation analyses, sample origin and industry type were coded using categories; names of each country, from which the samples were obtained, were coded for sample origin; and service and manufacturing for industry type. In addition, for the cultural dimensions,

numerical values for each dimension and each country were obtained from open access data via Hofstede Insight website (https://www.hofstede-insights.com/).

In the next step, sensitivity analysis was conducted via outlier analysis (Borenstein et al., 2009). Studies located in the 5% percent of both ends of the spectrum (regarding the strength of the effect sizes) were omitted, and then the result of the new analysis was compared with the original analysis (see Huber, 1980; Tukey, 1960). The main reason for conducting outlier analysis is that extreme effect sizes can affect the summary effect sizes, which can then influence the robustness and validity of the meta-analysis results (Viechtbauer & Cheung, 2010).

Finally, publication bias was tested using funnel plots in conjunction with Duval and Tweedie's Trim and Fill method (Duval & Tweedie, 2000). The first step in the Trim and Fill method is to identify and remove (or *trim*) the studies that have caused funnel plot asymmetry. Then, the true centre of the funnel plot is estimated. At the next step, the removed studies are replaced and their missing counterparts around the centre are added (or *filled*). In the last step, the number of missing studies that may be a result of publication bias is estimated and a new summary effect size is calculated with the filled studies included in the meta-analysis (Duval & Tweedie, 2000). By conducting the publication bias analysis using this method, a form of sensitivity analysis is also implemented (Duval, 2005).

Analysis and results

The results yielded by the meta-analysis in relation to the proposed research questions are described below. As such, Tables 1 and 2 depict the results of the random-effects model meta-analysis, heterogeneity test, and some components of the moderation analyses for the identified relationships (Due to the high volume of analyses and outputs, the complete moderation analysis results can be found in the supplementary material document). Forest plots

of the investigated relationships, funnel plots of the publication bias analyses have also been provided in the supplementary material document.

INSERT TABLE 1 ABOUT HERE

INSERT TABLE 2 ABOUT HERE

Antecedents of PsyCap

According to Table 1, the summary correlations for leadership styles (i.e., authentic, ethical, transformational, transactional, servant, empowering, and abusive) and employee PsyCap were found to be significant and positive (for positive leaderships styles) and negative for abusive leadership. These results provided meaningful insight for RQs 1-9. Results of the subgroup analyses confirmed that the differences in summary correlations for all leadership styles and PsyCap are statistically significant; $Q(6)=133.33$, $p<.001$. Accordingly, it was found that empowering and transformational leadership styles have the strongest correlation with PsyCap, while the correlations between transactional and abusive leadership and PsyCap were the smallest in magnitude. Furthermore, the results of the meta-regression analyses suggested that the differences between empowering leadership and abusive/transactional leadership, as well as transformational leadership and abusive/ transactional leadership remained statistically significant (Table 3 and 4). This further supports the role of empowering and transformational leadership as the strongest antecedents of PsyCap and abusive and transactional leadership as the weakest antecedents of PsyCap.

INSERT TABLE 3 ABOUT HERE

INSERT TABLE 4 ABOUT HERE

The significant Cochran's Q and high I^2 showed evidence of significant heterogeneity in the relationship between the leadership styles (except for transactional leadership) and PsyCap, and therefore, moderation analyses were conducted (RQ15). The results of the

subgroup analyses did not show a significant moderation effect for industry type. Moderation analysis was not conducted for the effect of industry type on the relationships between ethical, servant, and empowering leadership and PsyCap, due to insufficient study numbers. However, the results of the subgroup analyses showed a significant moderation effect of sample origin in the relationships between PsyCap and the leadership styles, except for servant leadership (Authentic Leadership, $Q(14)=210.38$, $p<.001$; Ethical leadership, $Q(5)=11.85$, $p=.037$; Transformational Leadership, $Q(5)=161.89$, $p<.001$; Empowering Leadership, $Q(2)=14.80$, $p=.001$; and Abusive Leadership, $Q(2)=26.51$, $p<.001$). For example, for the relationship between authentic leadership and PsyCap, the summary effect sizes for studies conducted in Iran and Portugal were the strongest, while for Canada, Namibia, and Norway were the weakest. For the relationship between ethical leadership and PsyCap, the summary effect sizes for studies in Jordan and Pakistan were the largest, and for the USA was the lowest. For the relationship between transformational leadership and PsyCap, the strongest effect size was from South Korea, and the smallest summary effect size was from the Chinese samples. For the relationship between empowering leadership and PsyCap, the effect size from the US sample was the strongest, and for the sample from China was the smallest. Finally, for the relationship between abusive leadership and PsyCap, the summary effect sizes from samples in Pakistan were the largest, and those from India were the lowest. The results clearly show the diversity of the effect sizes among countries (Detailed information can be found in the supplementary materials).

In terms of the cultural analysis, using meta-regression, power distance and masculinity were found to moderate the relationship between transformational leadership and PsyCap (power distance: $R^2=.42$, $p=.015$; masculinity: $R^2=.41$, $p=.009$). Overall, the analyses showed that as power distance increases, the strength of the positive relationship between transformational leadership and PsyCap decreases. Similarly, the analyses showed that, overall,

as masculinity increases, the strength of the positive relationship between transformational leadership and PsyCap decreases. Additionally, long-term orientation demonstrated to moderate the relationship between servant leadership and PsyCap (R^2=.46, p=.014). The results suggested that as long-term orientation increases, the positive relationship between servant leadership and PsyCap becomes stronger. Finally, the results indicated that uncertainty avoidance moderates the relationship between abusive leadership and PsyCap (R^2=.64, p=.002). The results suggested that as uncertainty avoidance increases, the strength of the negative relationship between abusive leadership and PsyCap becomes stronger. No moderation effect was found for either individualism or indulgence in the relationship between PsyCap and leadership styles (Further information about the moderation analysis can be found in the supplementary material document).

Outlier analysis. Using the 5% rule, the lowest and highest effect sizes were removed for each of the identified relationships (see Huber, 1980; Tukey, 1960). The adjusted summary effect sizes (Authentic Leadership, .487, 95% CI [.442, .528]; Ethical Leadership, .405, 95% CI [.347, .461]; Transformational Leadership, .520, 95% CI [.371, .642]; Servant Leadership, .496, 95% CI [.465, .526]; Abusive Leadership, -.349, 95% CI [-.507, -.169]), were not meaningfully different to the original values suggesting outliers are not strongly impacting the result of the meta-analyses. Outlier analysis was not conducted for the relationships between transactional and empowering leadership and PsyCap as there were only three studies for each of the relationships.

Publication bias. As seen in Table 1, potential unpublished studies were only suggested for two of the relationships (i.e., authentic and servant leadership and PsyCap). However, for authentic leadership, the summary effect size estimate following Duval and Tweedie's trim-and-fill method was negligibly higher (+.019) than the initial summary effect sizes, with only three potential unpublished studies suggested. Similarly, for servant leadership, the difference

was negligible (-.025), with only one potential unpublished study suggested. Therefore, publication bias does not seem to be substantially impacting the results.

Outcomes of PsyCap

The summary effect sizes for the relationship between PsyCap and outcome variables of (self-reported and supervisor-reported) job performance, work engagement, job satisfaction, turnover intentions, and burnout have been depicted in Table 2, which provide meaningful insight for RQs 10-14. The results show that PsyCap has a significant positive relationship with job performance, work engagement, and job satisfaction and a significant negative relationship with turnover intentions and burnout. In addition, the magnitudes of all the identified relationships were above medium in strength (see Cohen, 1977), with the relationship between PsyCap and work engagement to be found the strongest. In terms of the heterogeneity, the significant Cochran's Q and high I^2 in all relationships suggested considerable heterogeneity; thus, moderation analyses were conducted (RQ16). The results of the subgroup analysis suggested that sample origin significantly moderated all the relationships (Self-reported performance, $Q(12)=236.96$, $p<.001$; supervisor-reported Performance, $Q(11)=171.94$, $p<.001$; Work Engagement, $Q(21)=266.50$, $p<.001$; Job Satisfaction, $Q(21)=3559.41$, $p<.001$; Turnover Intentions, $Q(13)=111.03$, $p<.001$; and Burnout, $Q(13)=224.96$, $p<.001$). for example, for the relationship between PsyCap and Self-reported performance, the largest effect size was from a Taiwanese sample, and the smallest summary effect size was from Romania. Similarly, for the relationship between PsyCap and Self-reported performance, the largest effect size was from Taiwan, but the smallest effect size was from China. For PsyCap – work engagement relationship, the summary effect size from Indian samples was the strongest, while the summary effect size from North Cyprus samples was the weakest. For PsyCap – job satisfaction relationship, the summary effect size for a sample from Ghana was the strongest, and the summary effect size for a sample from Saudi Arabia was the weakest. For the

relationship between PsyCap and turnover intentions, the largest summary effect size was from Romanian samples, and the smallest effect size was from North Cyprus. Finally, for the relationship between PsyCap and burnout, the summary effect size from the US samples was the strongest, and the effect size for a sample from Iran was the weakest (Further information about the moderation analysis can be found in the supplementary material document).

Moreover, industry type was found to significantly moderate the relationship between PsyCap and self-reported performance, $Q(1)=8.09$, $p=.004$, with the relationship stronger in the manufacturing industry sample than the service industry. Besides, results of the meta-regression analyses for cultural analysis demonstrated that masculinity moderates the positive relationship between PsyCap and self-reported job performance ($R^2=.05$, $p=.048$) and the negative relationship between PsyCap and turnover intentions ($R^2=.10$, $p=.045$). The results suggested that as the level of masculinity increases, the strength of the positive relationship between PsyCap and self-reported performance decreases. It was also found that as the level of masculinity increases, the strength of the negative relationship between PsyCap and turnover intentions decreases. In addition, uncertainty avoidance was found to moderate the negative relationship between PsyCap and turnover intentions ($R^2=.15$, $p=.012$), in which as the level of uncertainty avoidance increases, the negative relationship becomes stronger. Finally, for the relationship between PsyCap and job satisfaction, although none of the six cultural dimensions were identified to be a significant moderator, the total regression model (comprising the six factors) was statistically significant ($p=.037$) with $R^2=.21$.

Outlier analysis. For each identified relationship, 5% of effect sizes from both ends were removed and the adjusted summary effect sizes were calculated. The results showed that the adjusted summary effect sizes were not meaningfully different from the original summary effect sizes (Self-reported Performance, .564, 95% CI [.509, .614]; Supervisor-reported Performance, .389, 95% CI [.314, .458]; Work Engagement, .682, 95% CI [.655, .708]; Job

Satisfaction, .631, 95% CI [.596, .664]; Turnover Intentions, -.357, 95% CI [-.402, -.310]; and Burnout, -.508, 95% CI [-.557, -.456]). Thus, outliers do not appear to be meaningfully affecting the effect sizes.

Publication bias. Using Duval and Tweedie's trim-and-fill method (Table 2), no potential unpublished studies were suggested for the relationships between PsyCap, turnover intentions, and burnout. Moreover, for the relationship between PsyCap and self-reported job performance, only three unpublished studies were suggested, and the adjusted summary effect size was found to be negligibly higher than the original value (+.032). In addition, Outliers might be responsible for the difference in the calculated effect sizes in the relationship between PsyCap, supervisor-reported job performance, work engagement, and job satisfaction. After removing the outliers from the analysis as identified in the outlier analysis, using the Duval and Tweedie's trim-and-fill method, the summary effect size estimates were only negligibly different from the original summary effect sizes (-.004 for supervisor-reported performance, -.015 for work engagement, and -.026 for job satisfaction) with few potential unpublished studies suggested (3 suggested unpublished studies for supervisor-reported performance, 6 suggested unpublished studies for work engagement, and 6 suggested unpublished studies for job satisfaction). Therefore, publication bias does not seem to substantially impact the results.

The potential role of study design

As "cross-sectional studies of attitude-behavior relationships are vulnerable to the inflation of correlations by common method variance" (Lindell & Whitney, 2001, p. 114), it is important to investigate the probability that the nature of study designs has inflated effect size results, especially as most of the studies included in this meta-analyses had cross-sectional designs. However, no PsyCap meta-analysis study has investigated it to date. As such, moderation analysis was conducted to compare whether there are any differences between the effect sizes reported in the cross-sectional studies compared to longitudinal studies (Table 5).

Due to the insufficient number of longitudinal studies, we were only able to conduct the subgroup analysis for the relationships between PsyCap and the employee outcomes of work engagement, job satisfaction, and supervisor-reported job performance. The results of the moderation analysis were only significant for the relationship between PsyCap and work engagement, showing that the association was stronger among cross-sectional studies compared to longitudinal studies, $Q(1)=10.43$, $p=.001$. However, both effects were still large, and thus while it is plausible that study design has inflated correlations, this does not clearly affect the interpretation of the effect. The results of the moderation analyses were not significant for Supervisor-reported Performance, $Q(1)=.80$, $p=.371$ or Job Satisfaction, $Q(1)=1.25$, $p=.264$).

INSERT TABLE 5 ABOUT HERE

Discussion

This study undertook a comprehensive and methodologically rigorous meta-analysis to generate a more in-depth understanding of the relationship between PsyCap, and its outcomes and antecedents, as well as the moderators of these relationships. Drawing on 254 samples from different countries and cultural contexts derived from multiple indexing databases, this study represents the largest PsyCap meta-analysis dataset conducted to date as it includes more than double the samples included in previous PsyCap meta-analyses (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019). Table 6 provides a snapshot of the comparison between the current study and the previous PsyCap meta-analyses. It clearly demonstrates how our study has gone above and beyond the previous ones. This adds more weight to the findings of our study and provides much stronger support for the results of the investigated relationships. In addition, as the table shows the overlap between these meta-analyses is limited. In particular, only the relationship between PsyCap and job satisfaction has been investigated across all

PsyCap meta-analysis studies. Having said that, the results of our study provided much stronger support for this relationship (i.e., $r = .683$) compared to .54 (Avey et al., 2011), .533 (Kong et al., 2018), and .511 (Wu & Nguyen, 2019), which are quite similar in magnitude.

INSERT TABLE 6 ABOUT HERE

Overall, the findings showed that the correlations between PsyCap and antecedent (e.g., transformational and empowering leadership) and outcome (e.g., job satisfaction and work engagement) variables were significant and of strong correlational magnitude (i.e., $r > |.50|$ for a strong relationship). Thus, PsyCap is an important psychological resource as it appears to foster desirable employee outcomes (e.g., job performance, work engagement, and job satisfaction) and buffer against undesirable employee outcomes (e.g., turnover intentions and burnout). In addition, empowering and transformational leadership were found to have the strongest link with PsyCap, while transactional and abusive leadership were identified as having the weakest association. These findings offer further evidence that leadership styles (and particularly positive leadership styles) are important antecedents of PsyCap. To explore heterogeneity and to investigate the moderation effects of sample origin and industry type for each of the relationships, a series of subgroup analyses were conducted. The results from these analyses showed that the correlation between PsyCap and employee self-reported performance is higher in samples of employees working in the manufacturing industry than those working in the service industry. Furthermore, we found that sample origin moderated the relationship between PsyCap and all variables, except servant and transactional leadership. These findings significantly expand previous PsyCap meta-analyses (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019), which did not investigate the moderating role of sample origin and industry type in the relationship between PsyCap and each of the individual antecedent and outcome variables. As discussed previously, to move beyond a simple US/non-US

categorisation and to provide a better understanding of the interplay between culture and PsyCap, we implemented meta-regression to analyse the influence of cultural dimensions on PsyCap relationships. Our findings provided a substantial addition to the literature and demonstrated that the cultural dimensions of power distance, masculinity, long-term orientation, and uncertainty avoidance might be the cultural dimensions that can impact the relationship between PsyCap and antecedent and outcome variables. The reasons for this are as yet unconsidered in the research literature, and further substantive research is needed. However, at current, we suggest that PsyCap and its relationships need to be interpreted cautiously and with consideration of the context of sample origin and cultural dimensions.

This study has provided further insights into the nomological network of PsyCap by extending beyond the previous PsyCap meta-analysis studies (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019) in several ways. First, it included four leadership styles that have been overlooked in previous PsyCap meta-analyses (i.e., empowering, transformational, transactional, and servant leadership). It also investigated and compared the strengths of leadership styles in predicting PsyCap. Similarly, two additional relationships, which have not been investigated in previous PsyCap meta-analyses, were analysed; the relationship between PsyCap and both work engagement and burnout. Second, a larger and more diverse database was utilised in this study compared to previous PsyCap meta-analyses. This resulted in a significantly larger total sample size than those used in previous studies, including far more non-US samples (209 non-US samples in this meta-analysis, compared to seven in Avey, Reichard, et al., 2011). This has enabled the examination of the moderating influence of sample origin in the relationship between PsyCap and each of the variables. Furthermore, the comprehensive moderation analysis of sample origin was conducted by coding each country and their related cultural profile, which was then accompanied by subgroup and meta-regression analyses. This level of analysis has not been conducted in any

PsyCap meta-analysis to date. Consequently, the results of this meta-analysis have produced a finer-grained understanding regarding the interplay between PsyCap and cultural context on work-related outcomes and thereby responded to calls to extend research regarding the cross-cultural validity of PsyCap (see Luthans & Youssef-Morgan, 2017).

Finally, this meta-analysis has employed more robust and comprehensive methodologies beyond those used in previous PsyCap meta-analyses. These include comprehensive search techniques using numerous indexing databases, which led to a larger database; correcting for artefacts; and conducting moderation, outlier, and publication bias analyses. Using these methodologies has helped garner results and effect sizes that provide a more accurate insight into the true nature of the investigated relationships, compared to those generated in previous PsyCap meta-analyses (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019).

Theoretical and practical implications

From a theoretical perspective, this study has responded to calls in the literature for a more in-depth understanding of the antecedents of PsyCap (see Luthans & Youssef-Morgan, 2017; Newman et al., 2014) by investigating the relationship between authentic, ethical, transformational, transactional, servant, empowering, and abusive leadership and PsyCap. It has been argued that there is now ample evidence affirming PsyCap as a positive construct with useful predictive validity and that what is needed now is a greater understanding of the systems and structures within persons and organisational life that predict PsyCap itself (Avey, 2014). This study has also extended findings from previous PsyCap meta-analyses (Kong et al., 2018; Wu & Nguyen, 2019) by demonstrating that authentic, ethical, and abusive leadership styles are significant predictors of employee PsyCap. Furthermore, by investigating leadership styles that have not been included in previous meta-analyses (i.e., empowering, transformational, transactional, and servant leadership), this study has provided a deeper understanding regarding

the relationship between various leadership styles and employee PsyCap. Importantly, this meta-analysis compared the strength of various leadership styles in predicting PsyCap to provide insights into which leadership styles are the strongest antecedents of PsyCap.

In relation to outcomes of PsyCap, this study has confirmed findings reported in previous meta-analyses (Avey, Reichard, et al., 2011; Kong et al., 2018; Wu & Nguyen, 2019) by demonstrating positive relationships with job performance and job satisfaction and a negative association with turnover intentions. However, as the current study has undertaken a more robust meta-analysis methodology and included a much larger number of studies than previous meta-analyses, it is argued these findings can be interpreted with greater confidence. Furthermore, this study has provided new meta-analytical insights into the relationships between PsyCap and burnout and work engagement. Specifically, it was found that PsyCap has a strong, positive relationship with work engagement and a strong, negative relationship with job burnout.

This study also represents the first PsyCap meta-analysis to investigate moderators of the relationship between PsyCap and undesirable employee outcomes, as well as the relationship between PsyCap and its antecedents. By examining the moderating effects of sample origin and industry type, this study has responded to several recent calls for research investigating moderators of PsyCap relationships (e.g., Luthans & Youssef-Morgan, 2017; Luthans et al., 2015; Newman et al., 2014). Identifying moderators is argued to be the "key issue for theory development and testing as well as practical applications of a theory" (Aguinis, Gottfredson, & Wright, 2011, p. 1033). Thus, identifying significant moderators of PsyCap relationships is important for developing a greater understanding of the conditions which influence the effects of PsyCap. In particular, the moderation analyses in this study highlight the importance of sample origin and culture in relation to PsyCap and suggest that PsyCap may operate differently across various cultural settings. For example, PsyCap might have a stronger

impact on employee performance in countries with lower levels of masculinity (e.g., Portugal and South Korea). As the role of culture has not been investigated to this extent in previous PsyCap meta-analyses, this study makes an important contribution in responding to calls for greater investigation into potential cultural differences in relation to PsyCap (Luthans & Youssef-Morgan, 2017).

In addition, this was the first PsyCap meta-analysis to investigate the moderating role of study design on the reported findings. The results showed that study design impacted the strength of the relationships, whereby the relationship between PsyCap and work engagement was found to be stronger among cross-sectional studies compared to longitudinal studies. It is likely that this has occurred because the analysed cross-sectional studies might incur common method variance (Lindell & Whitney, 2001), though it needs to be indicated that the correlations for both longitudinal and cross-sectional studies were large, and thus the interpretation of the results is similar. That said, this finding demonstrates the importance of conducting more longitudinal studies in future research.

This study also makes several important practical contributions. For example, the findings of this meta-analysis affirm PsyCap as a useful positive construct that has a significant impact on employee outcomes that are important for organisations, and employees alike, including job satisfaction, job performance, turnover intentions, and burnout. This, in turn, can inform organisational practices in terms of fostering resources such as PsyCap, via training interventions (e.g., PCI; Luthans, Avey, Avolio, Norman, & Combs, 2006), to not only enhance individual employee PsyCap, but also foster other desirable employee outcomes (e.g., job performance and job satisfaction) and hinder a wide range of undesirable employee outcomes (e.g., turnover intentions and burnout).

Our findings provide robust evidence for significant associations between positive leadership styles (e.g., ethical and servant leadership) and PsyCap, as well as the negative relationship between abusive leadership and PsyCap. These findings suggest that organisations could enhance and sustain employee PsyCap by investing in positive leadership development and training. For example, previous research has found that authentic leadership can be developed among leaders through training and coaching programs (Baron, 2016; Fusco, 2018). Our findings also indicate empowering leadership and transformational leadership have the strongest associations with employee PsyCap. Thus, it is suggested that organisations looking to maximise the benefits of employee PsyCap focus on attracting and cultivating these leadership styles within their leaders.

The findings from this study also revealed that to understand the relationship between PsyCap and antecedent and outcome variables, sample origin, and cultural contexts need to be taken into account. In regard to antecedents of PsyCap, the results suggest that transformational leadership might have a stronger influence on employee PsyCap in countries with lower levels of power distance (e.g., Pakistan) and masculinity (e.g., South Korea). In contrast, the impact of servant leadership on employee PsyCap might be stronger in the countries with higher levels of long-term orientation (e.g., Taiwan), while abusive leadership might have a stronger negative impact on PsyCap in countries with higher levels of uncertainty avoidance (e.g., Pakistan).

In regard to outcome variables, our findings demonstrated that PsyCap might be a stronger predictor of employee self-reported performance in countries with lower levels of masculinity (e.g., Portugal). Moreover, it was found that the strength of the relationship between PsyCap and turnover intentions might be lower in countries with higher levels of masculinity (e.g., USA and Australia). However, the strength of this relationship was found to be stronger in the countries with higher levels of uncertainty avoidance (e.g., Romania and

Turkey). Finally, the relationship between PsyCap and job satisfaction was found to be more complex than the other identified relationships. The findings suggested that this relationship may be impacted by a multifactorial combination of variable as indicated by a total regression model comprising the six factors being statistically significant. Overall, these represent new findings, as this is the first comprehensive meta-analytical investigation of culture and country as moderators of the relationship between PsyCap and antecedent and outcome variables. These findings provide contextual understanding about which (and how) cultural dimensions can impact the relationship between PsyCap and antecedent/outcome variables. These insights help identify in which countries PsyCap might have a stronger impact on the investigated employee outcomes. They also uncover under which circumstances and for which countries, a specific leadership style might be more effective in fostering employee PsyCap. Overall, the results of this study demonstrate the cultural differences in relation to PsyCap and PsyCap relationships.

In addition, the results suggested that PsyCap may operate differently across various industry settings. For example, the results showed that the positive relationship between PsyCap and performance is stronger in the manufacturing industry in comparison to the service industry. This finding suggests that PsyCap development (e.g., PsyCap Intervention; Luthans et al., 2006) may be particularly important in industries such as manufacturing. However, this needs to be interpreted with some caution, given that there were few studies with manufacturing samples included in the analysis.

Limitations and future research directions

As with any research, this study has some limitations which should be acknowledged. First, in this study, only PsyCap studies conducted at the individual level of analysis were included in the analysis. However, it is important to recognise that in recent years, research has also begun to explore PsyCap at the team level (e.g., Dawkins, Martin, Scott, Sanderson, &

Schüz, 2018; Heled, Somech, & Waters, 2016). Accordingly, there remains an opportunity for future research to commence investigation across this emerging body of collective PsyCap (e.g., via meta-analysis or systematic review). This avenue of research would enable the development of a more in-depth understanding of the factors that influence collective PsyCap and its relationship with its outcome and antecedent variables.

Moreover, the majority of the included studies had cross-sectional survey-based study designs. Therefore, the causality of the identified relationships cannot be inferred (Van der Stede, 2014). As such, conducting future longitudinal studies is necessary to be able to investigate causality between PsyCap and theorised antecedent and outcome variables. This would also enable future PsyCap meta-analyses to examine the causation and directionality of the identified relationships across PsyCap studies with greater certainty. Furthermore, results of the moderation analysis suggested that cross-sectional studies might yield inflated effect sizes, which suggests the need for more reliable results using longitudinal study designs.

Besides, it is important to acknowledge that this meta-analysis has only included studies that have been written in the English language. However, with the emergence of PsyCap research in many more countries, the PCQ-12 and -24 (Avey, Avolio, et al., 2011; Luthans et al., 2007) have been translated and validated in other languages, including Spanish, Portuguese, and Italian (Alessandri, Borgogni, Consiglio, & Mitidieri, 2015; Antunes, Caetano, & Cunha, 2017; León-Pérez, Antino, & León-Rubio, 2017). Therefore, there is an opportunity for future meta-analyses to include PsyCap studies published in languages other than English so to reflect a more global understanding of PsyCap.

Lastly, in considering the relationship between negative leadership styles and PsyCap, it is conceded that recent reviews and meta-analyses of PsyCap (Newman et al., 2014; Nolzen, 2018; Wu & Nguyen, 2019), including the current study, have only focused on abusive

leadership. This suggests a paucity of knowledge regarding how other negative leadership styles (e.g., exploitative, toxic, despotic, and narcissistic leadership), beyond abusive leadership, influence employee PsyCap, and it is clear that further original empirical research in this area is required. This is important as the findings of previous studies suggest that negative leadership styles predict different employee psychological outcomes. For example, exploitative, despotic, and laissez-faire leadership styles have been found to lead to higher levels of psychological distress, and lower levels of psychological well-being, and affective organisational commitment, respectively (Buch, Martinsen, & Kuvaas, 2015; Majeed & Fatima, 2020; Raja, Haq, De Clercq, & Azeem, 2020). These findings highlight the importance of investigating different forms of negative leadership styles, beyond only abusive leadership, as potential unique antecedent variables of PsyCap.

Conclusion

PsyCap research has grown rapidly over the past 15 years, with much of this research focused on the relationship between PsyCap and work-related outcomes. This paper reported findings of a comprehensive meta-analytic study of PsyCap that has extended beyond previous PsyCap meta-analyses, in terms of both methodology and scope. The meta-analysis study aimed to investigate significant antecedents and outcomes related to PsyCap, along with the factors that moderate these relationships. The findings of this study demonstrated strong evidence for the importance of employee PsyCap in positively predicting desirable employee outcomes (job performance, work engagement, job satisfaction) and overcoming undesirable employee outcomes (turnover intentions and burnout). The findings also showed the importance of positive leadership styles (i.e., ethical, empowering, authentic, transformational, and servant leadership) in enhancing employee PsyCap with the empowering and transformational leadership to have the strongest relationship with PsyCap. Furthermore,

moderation analyses provided meaningful insight for the impact of sample origin, culture, and industry type on the relationship between PsyCap and both antecedent and outcome variables. In addition, the findings demonstrated that study design significantly moderated the relationship between PsyCap and work engagement. Overall, the results of this meta-analysis have extended finding from previous PsyCap meta-analyses and provide a greater understanding of the factors that influence PsyCap and its relationships with leadership styles and work-related outcomes.

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Figure 1

Flow chart of included/excluded studies in May 2018 and February 2021

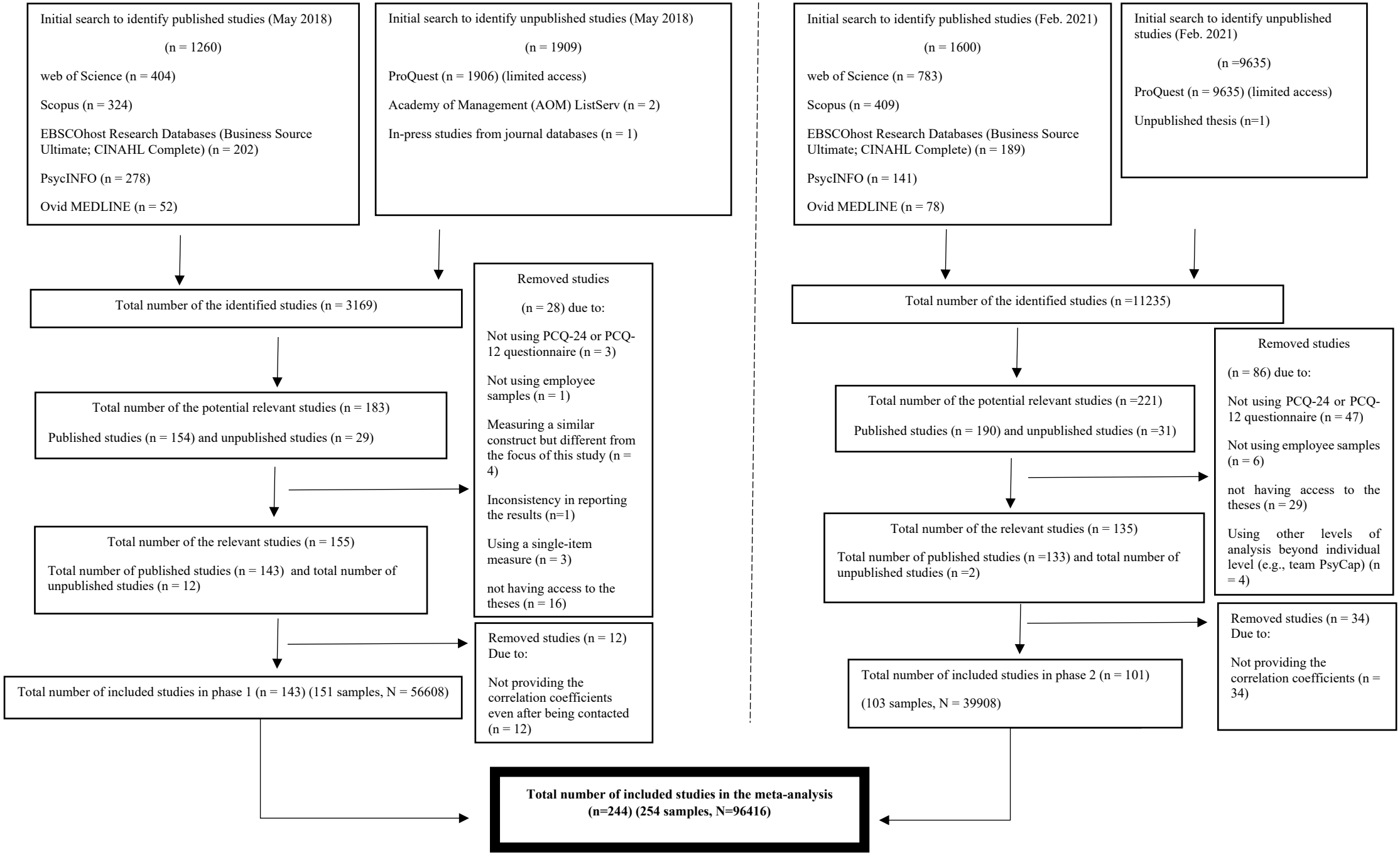

Table 1

Results of the random-effects model meta-analysis, heterogeneity test, and moderation analysis for the relationships between Leadership styles and PsyCap

Analysis	Summary effect						Heterogeneity of effects					
	Effect	*k*	95% CI [LL, UL]	*p*	Trim	Trim & Fill Adjusted	*Q*	df	*p*	I^2	T^2	*Tau*
					Authentic Leadership – PsyCap							
Analysis	*.499*	*34*	[.449, .545]	*<.001*	3	.518	*486.42*	33	<.01	*93.22*	*.03*	*.18*
Moderation – Industry type												
Manufacturing	*.412*	*2*	[.187, .595]	.001								
Service	*.514*	*21*	[.442, .579]	<.001								
					Ethical Leadership – PsyCap							
Analysis	*.421*	*7*	[.333, .501]	*<.001*	0	.421	*51.716*	6	*<.01*	*88.40*	*.02*	*.13*
					Transformational Leadership – PsyCap							
Analysis	*.557*	*9*	[.388, .690]	*<.001*	0	.557	*360.26*	8	*<.01*	*97.78*	*.11*	*.33*
Moderation – Industry type												
Manufacturing	*.428*	*1*	[.355, .496]	*<.001*								
Service	*.605*	*4*	[.384, .760]	*<.001*								
					Transactional Leadership – PsyCap							
Analysis	*.240*	*3*	[.192, .288]	*<.001*	0	.240	*1.712*	2	*.425*	*0*	*0*	*0*
					Servant Leadership – PsyCap							
Analysis	*.462*	*6*	[.389, .529]	*<.001*	1	.437	*26.05*	5	*<.01*	*80.80*	*.01*	*.10*
					Empowering Leadership – PsyCap							
Analysis	*.563*	*3*	[.442, .663]	*<.001*	0	.563	*14.80*	2	*.001*	*86.49*	*.02*	*.13*
					Abusive Leadership – PsyCap							
Analysis	*-.349*	*6*	[-.507, -.169]	*<.001*	0	-.349	*170.15*	5	*<.01*	*97.06*	*.06*	*.24*
Moderation – Industry type												
Manufacturing	*-.386*	*1*	[-.470, -.295]	*<.001*								
Service	*-.547*	*2*	[-.785, -.169]	*0.007*								

Note: k = number of studies, 95%CI = 95% confidence interval, LL = Lower limit of 95% CI, UL = Upper limit of 95% CI, Trim = studies trimmed in Trim & Fill analysis, Q = Cochran's Q, T^2 = Tau squared, Trim = suggested unpublished studies using Duval & Tweedie Trim & Fill analysis for publication bias.

Table 2

Results of the random-effects model meta-analysis, heterogeneity test, and moderation analysis for the relationships between PsyCap and outcome variables

Analysis	Summary effect						Heterogeneity of effects					
	Effect	*k*	95% CI [LL, UL]	*p*	Trim	Trim & Fill Adjusted	*Q*	df	*p*	I^2	T^2	*Tau*
					PsyCap – Self-Reported Job Performance							
Analysis	.571	28	[.503, .632]	<.001	3	.603	570.194	27	<.01	95.27	.06	.25
Manufacturing	.751	2	[.703, .793]	*<.001*								
Service	*.580*	11	[.441, 0.693]	*<.001*								
					PsyCap – Supervisor-Reported Job Performance							
Analysis	.425	27	[.310, .527]	<.001	8 (3)	.515(.421)	968.25	26	<.01	97.32	.12	.35
Manufacturing	.427	2	[.201, .610]	<.001								
Service	.448	14	[.234, .620]	<.001								
					PsyCap – Work Engagement							
Analysis	.712	85	[.658, .759]	<.001	32 (6)	.793 (.697)	6027.45	84	<.01	98.61	.22	.47
Manufacturing	.706	4	[.518, .829]	<.001								
Service	.716	52	[.639, .779]	<.001								
					PsyCap – Job Satisfaction							
Analysis	.683	55	[.588, .759]	<.001	23 (6)	.791 (.657)	7160.79	54	<.01	99.25	.36	.60
Manufacturing	.514	5	[.265, .698]	<.001								
Service	.711	30	[.490, .736]	<.001								
PsyCap – Turnover Intentions												
Analysis	-.359	42	[-.428, -.287]	<.001	0	-.359	973.37	41	<.01	95.79	.07	.26
Manufacturing	-.372	2	[-.449, -.291]	<.001								
Service	-.367	26	[-.466, -.259]	<.001								
					PsyCap – Burnout							
Analysis	-.551	54	[-.644, -.442]	<.001	0	-.551	6442.15	53	<.01	99.18	.29	.54
Manufacturing	-.266	5	[-.535, .052]	.100								
Service	-.595	44	[-.695, -.472]	<.001								

Note: k = number of studies, 95%CI = 95% confidence interval, LL = Lower limit of 95% CI, UL = Upper limit of 95% CI, Trim = studies trimmed in Trim & Fill analysis, Q = Cochran's Q, T^2 = Tau squared, Trim = suggested unpublished studies using Duval & Tweedie Trim & Fill analysis for publication bias. Wherever necessary, the results of the publication bias analysis after removing the outliers have been reported in parentheses.

Table 3

Results of the meta-regression for leadership styles as predictors and PsyCap as outcome (Empowering Leadership as the reference group)

	Coefficient	*Standard Error*	z	*p*
Intercept	*0.64*	*0.12*	5.40	*<.001*
Abusive Leadership	*-1.00*	*0.14*	-6.94	<.001
Authentic Leadership	*-0.09*	*0.12*	-0.73	*.465*
Ethical Leadership	*-0.19*	*0.14*	-1.31	*.190*
Servant Leadership	*-0.15*	*0.15*	-1.03	*.302*
Transactional Leadership	*-0.39*	*0.17*	-2.34	.019
Transformational Leadership	*-0.01*	*0.14*	-0.08	*.937*

Table 4

Results of the meta-regression for leadership styles as predictors and PsyCap as outcome (Transformational Leadership as the reference group)

	Coefficient	*Standard Error*	z	*p*
Intercept	*0.63*	*0.07*	9.21	*<.001*
Abusive Leadership	*-0.99*	*0.11*	-9.23	*<.001*
Authentic Leadership	*-0.8*	*0.08*	-1.03	*.301*
Empowering Leadership	*0.01*	*0.14*	0.08	*.937*
Ethical Leadership	*-0.17*	*0.10*	-1.69	*.091*
Servant Leadership	*-0.14*	*0.11*	-1.28	*.199*
Transactional Leadership	*-0.38*	*0.14*	-2.80	*.005*

Table 5

Results of the moderation analysis for the identified relationships

Analysis	*Effect*	*k*	95% CI [LL, UL]	*p*
PsyCap – Supervisor-Reported Job Performance				
Cross-sectional	*.447*	*21*	[.312, .563]	<.001
Longitudinal	*.341*	*6*	[.132, .522]	*.002*
PsyCap – Work Engagement				
Cross-sectional	*.718*	*78*	[.661, .768]	<.001
Longitudinal	*.610*	*7*	[.583, .636]	<.001
PsyCap – Job Satisfaction				
Cross-sectional	*.673*	*50*	[.569, .756]	<.001
Longitudinal	*.764*	*5*	[.617, .859]	<.001

Table 6

A Summary Comparison of Previous PsyCap Meta-Analyses and the Current Study

	Avey et al. (2011)	Kong et al. (2018)	Wu and Nguyen (2019)	Current Meta-Analysis
Total number of included studies	45	77	105	244
Included number of unpublished studies	N/R (The exact number has not been provided)	N/A	N/A	15
Number of independent samples	51	N/R	N/R	254
Total sample size	12567	N/R	N/R	96416
Independent samples for AL	N/A	5	13	34
Independent samples for ETL	N/A	N/A	3	7
Independent samples TRFL	N/A	N/A	N/A	9
Independent samples for TRAL	N/A	N/A	N/A	3
Independent samples for SL	N/A	N/A	N/A	6
Independent samples for EMPL	N/A	N/A	N/A	3
Independent samples for ABL	N/A	N/A	5	6
Independent samples for JS	10	16	14	55
Independent samples for SEP	6	N/R	N/A	28
Independent samples for SUP	15	N/R	N/A	27
Independent samples for TI	5	N/A	N/A	42
Independent samples for burnout	N/A	N/A	N/A	54
Independent samples for WE	N/A	N/A	N/A	85
Samples from the USA	26	N/R	N/R	38
Samples from outside of the USA	7	N/R	N/R	209
Working adult sample	23	N/R	N/R	254
Samples in the service industry	10	N/R	N/R	154
Samples in the manufacturing industry	4	N/R	N/R	19

Notes: N/A = not assessed, N/R = not reported, AL = Authentic Leadership, ETL = Ethical Leadership, TRFL = Transformational Leadership, TRAL = Transactional Leadership, SL = Servant Leadership, EMPL = Empowering Leadership, ABL = Abusive Leadership, JS = Job satisfaction, SEP = Self-reported Performance, SUP = Supervisor-reported Performance, TI = Turnover Intentions, WE = Work Engagement.