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LITERATURE REVIEW

The applications of neuro-linguistic programming in organizational settings: A systematic review of psychological outcomes

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Neuro-linguistic programming (NLP) is an approach to communication and personal development focusing on how individuals organize their thinking, feelings, and language. While a growing number of academic articles highlight the application of NLP in organizational settings, a systematic review synthesizing and evaluating the quality of this evidence has not been conducted to date. The aim of this article was to follow the preferred reporting items for systematic reviews and meta-analysis (PRISMA) guidelines and conduct a systematic review of empirical studies evaluating the application of NLP in organizational settings. Targeted outcomes included self-esteem, trustworthiness, organizational commitment, and occupational stress. Academic research databases used to identify articles included ProQuest, PsycINFO, Science Direct, Google Scholar, and a specific NLP database. The literature search yielded 952 titles from which seven studies met all of the inclusion criteria. Findings indicate that NLP can be effective for improving a wide range of work-related psychological outcomes including self-esteem and occupational stress. However, there were concerns regarding methodological rigor. In general, the benefits of NLP were both overpromised and undersupported. Implications for future NLP application and research, with a focus on the relevance to current issues in the field of human resource (HR) development, are discussed.

KEYWORDS

coaching, human resource management, organizational performance, training/training and development, workplace stress

1 | INTRODUCTION

While there is debate concerning a precise definition of neuro-linguistic programming (NLP) (Grimley, 2016; O'Connor & McDermott, 2001; Sturt et al., 2012), NLP researchers usually regard it to be a methodology to model human

experience and communication (Bandler & Grinder, 1979). NLP focuses on determining how outstanding results are achieved in both the personal development and psychotherapy domains, and uses these insights to foster continuous improvements in human functioning (O'Connor & McDermott, 2001). NLP has its origins in observations that Richard Bandler made about specific linguistic structures used by the psychotherapists Fritz Perls, Virginia Satir, and Milton Erickson, to increase the effects of positive suggestions on patients (Bandler & Grinder, 1979). A key assumption of NLP is that there are common linguistic patterns, which were used by these successful psychotherapists, to elicit successful outcomes during therapy (Bandler & Grinder, 1979).

NLP has been used to treat a variety of clinical symptoms including depression, anxiety, and stress (Simpson & Dryden, 2011; Stipancic, Renner, Schütz, & Dond, 2010), and has been used in a wide range of fields worldwide including management, business, education, and sports (Karunaratne, 2010; Tosey, Mathison, & Michelli, 2005; Zastrow, Dotson, & Koch, 1987). In the UK alone, over 100,000 individuals have attended NLP training courses (Tosey & Mathison, 2009). Between 2006 and 2009, 326 National Health Service (NHS) trusts and strategic authorities spent more than £800,000 on NLP-related training that included delivering the program to more than 700 NHS employees (Sturt et al., 2012). In Japan, the NLP Connection organization has certified 1,725 practitioners, 1,321 master practitioners, 373 trainer associates, and 40 trainers (C. Hall, personal communication, March 15, 2016).

NLP is also used as a coaching method in organizational settings, including by (for example) organizations such as the BBC, Metronet Rail, AstraZeneca, British Telecom, and Burton Foods. Anecdotal reports indicate that within these organizations, NLP led to improvements in work engagement, work motivation, and job performance (Abrams, 2004; Human Resource Management International Digest, 2010; The Association for NLP, n.d.). One of the key applications of NLP techniques in organizational settings relates to effective goal setting and strategies to maximize goal attainment (McDermott & Jago, 2006). While goal-setting methods used in organizations tend to be cognitively oriented (e.g., the SMART goal), NLP's unique approach to goal setting, such as the well-formed outcome (O'Connor & McDermott, 2001), invariably makes use of the five-sensory domains as well as include body movement exercises as a means of helping people envisage how a successfully implemented goal might impact various aspects of their life (e.g., the Disney strategy; Dilts, 1995). These unique NLP features are understood to improve goal ownership and motivation, as well as foster more adaptive psychological strategies relating to goal attainment (Kotera & Sheffield, 2017).

NLP has also been used by organizations across the remits of self-management, presentation, negotiation, interviewing, team building, leadership, and self-appraisal (Grimley, 2016; O'Connor & McDermott, 2001; Tosey & Mathison, 2009). For example, feedback seeking (i.e., asking for feedback from colleagues to identify areas of improvement; Anseel, Lievens, & Schollaert, 2009) corresponds to an NLP presupposition (i.e., the guiding principle that practitioners act upon; O'Connor & McDermott, 2001) that "the meaning of communication is the response you get" (O'Connor & McDermott, 2013, p. 35). Similarly, reflection refers to the NLP's *strategy* that involves closely analyzing one's subjective experience in a certain work-related context (O'Connor & McDermott, 2001). These philosophical approaches and specific skills of NLP, which aim at translating structured learning into applied skills by facilitating informal learning, are critical for human resource development (HRD), as many organizations still heavily orientate their staff development around formal learning (Kock & Ellström, 2011). Furthermore, a translational approach—comprising translation of knowledge from science into the development of new models, and translation of research into practice (Woolf, 2008)—is achievable in, and aligned with the values of NLP, because NLP is established on communication models (e.g., adaptation of the TOTE: Test, Operation, Test, and Exit; Miller, Galanter, & Pribram, 1960) geared toward implementing evidence-informed personal and professional development strategies.

Despite its popularity in healthcare and organizational settings, the science of NLP has been criticized for being underdeveloped (Pensieri, 2013; Sturt et al., 2012; Thompson, Courtney, & Dickson, 2002). These criticisms not only relate to a poor level of communication between scholars and practitioners that is observed elsewhere within the field of HRD (Brown & Latham, 2018), but also to issues concerning the methodological quality of NLP research. For example, a systematic review that investigated the effects of ten healthcare-setting NLP studies concluded that the quality of the research was weak and that key reporting items were absent (Sturt et al., 2012). Another NLP literature

review highlighted issues relating to researchers' understanding of NLP and whether empirical studies were assessing NLP interventions or individual NLP skills delivered in isolation from the guiding NLP framework (Pensieri, 2013). This is deemed to be a key methodological limitation because many NLP skills need to be delivered as part of a complete NLP teaching framework (Dilts, 1983; Robbins, 1995; Witkowski, 2010). Furthermore, a meta-analysis focussing on NLP-based psychotherapy (Zaharia, Reiner, & Schutz, 2015) concluded that more large-scale randomized controlled trials (i.e., a means of reducing selection bias by randomly assigning participants to either an intervention or control condition; see Jadad & Enkin, 2007) are required to endorse NLP. These methodological concerns were further substantiated by a focus group of 15 NLP experts who claimed that there is (a) a poor quality of empirical evidence and academic rigor, (b) a lack of standardized definitions, (c) ambiguity in the training curriculum, (d) an undefined professional practice code (in some cases leading to NLP being associated with incompetent practice), and (e) a commercial agenda (Grimley, 2016).

Notwithstanding concerns over the methodological quality of NLP studies and the aforementioned interest into the applications of NLP in organizational settings, a systematic review evaluating the quality of this evidence in organizational settings has not been undertaken. Given that NLP applications within HRD contexts were first implemented more than two decades ago (Tosey & Mathison, 2009), rigorously evaluating the outcomes and methodological quality (Zaharia et al., 2015) would be useful to researchers and organizations.

2 | METHODS

According to the HRD hierarchy of evidence (Kepes, Bennett, & McDaniel, 2014) that has been adapted from evidenced-based medicine (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000) where practitioners and scholars are arguably more integrated (Gubbins & Rousseau, 2015), a systematic review is recommended as the optimum means of evaluating an evidence-base as a precursor to practice implementation (Gubbins & Rousseau, 2015; Rojon, McDowall, & Saunders, 2011). Within the field of HRD, systematic reviews that focus on practicality and utility aim to make findings accessible, palatable, relevant, and useful (Denyer & Tranfield, 2009; Tranfield, Denyer, & Smart, 2003). Consequently, the present article aimed to follow the aforementioned recommendations for synthesizing HRD-related evidence, as well as the *preferred reporting items for systematic review and meta-analysis* (PRISMA; Moher, Liberati, Tetzlaff, Altman,, & The PRISMA Group, 2009) guidelines, to systematically review the literature and evaluate the quality of evidence relating to the applications of NLP in the workplace. Additionally, Klassen, Jadad, and Moher's (1998) framework—focussing on question, criteria, missing articles, quality of the studies, assessment, and results—was used to help structure and maintain the validity of the systematic review. The extended version of the population, intervention, control, and outcomes (PICO) format (Boland, Cherry, & Dickson, 2013) was used to identify the research question (Table 1). The PICO format is a strategy to formulate a researchable question by breaking the question into four components to help identify relevant information (Sackett, Richardson, Rosenburg, & Haynes, 1997). The extended version of PICO was used instead of CIMO (Context, Intervention, Mechanism, and Outcome; Denyer & Tranfield, 2009) because NLP originated in clinical practice and is often used in one-on-one settings in workplace contexts.

The primary research questions were (a) how effective is NLP in helping to improve work-related psychological outcomes? and (b) what quantity and quality of evidence is there?

2.1 | Literature search

Following Callahan's (2010) recommendations, the literature search focussed on criteria of where, when, who, how, what, and why. A comprehensive literature search was undertaken using the following electronic research databases following consultation with a subject librarian (Rojon et al., 2011): ProQuest, PsycINFO, Science Direct, and Google Scholar via EBSCO. A dedicated NLP database (Hücker, 1995) was also searched. The search was conducted for

articles published before the October 31, 2017 (searched in December 2017). The search terms "NLP," "neurolinguistic program#ing," "neuro-linguistic program#ing" and "neuro linguistic program#ing" were combined using the "OR" Boolean operator (n = 2,567). Searches including "natural language process*" and "non#linear program#ing" were then excluded (n = 1,231). Among the remaining articles, those that had "work*," "occupation*," "profession*," "staff," "job," "employee*," "management," "business," and "organi?ation*" in the title or abstract were retrieved (n = 952). This is consistent with the approach followed by other systematic reviews concerning psychological interventions in the workplace (e.g., Ravalier, Wegrzynek, & Lawton, 2016). The first author conducted the search and then the search results were reviewed by a second author. NLP associations, research groups, and social network forums were also contacted to identify any additional research articles. Manual reference searches (Rojon et al., 2011) on previous systematic reviews on NLP (i.e., that were not directly focussed on the organizational setting; Pensieri, 2013; Sturt et al., 2012; Zaharia et al., 2015) were likewise undertaken.

2.2 | Selection of studies and outcomes

To be eligible for further analysis, studies had to (a) be published in a peer-reviewed academic journal using English language, (b) report an empirical intervention study (utilizing preintervention and postintervention measures of dependent variables) and/or qualitative research study (using an appropriately implemented qualitative analytical technique) of an NLP intervention, and (c) involve individuals working in full-time or part-time roles. Articles were excluded from further analysis if they (a) were not interventions (e.g., articles that only introduced skills or concepts, or discussed theories or models), (b) employed a single-participant design (i.e., case studies), and (c) did not assess work-related psychological outcomes or work-related performance outcomes (see Table 1 for full details of the eligibility criteria).

2.3 | Outcome measures

"Work-related psychological outcomes" were defined by reviewing articles published in human resources journals, defined by the *Scimago Journal & Country Rank* (including the *Human Resource Development Quarterly and Journal of Occupational and Organizational Psychology*) during the past 5 years (this time period was selected to ensure that the outcomes were aligned with current directions in HRD research and practice). Eligible work-related psychological outcomes were determined by identifying the following key words in the article titles: engagement, stress, distress,

TABLE 1 Extended population, intervention, control, and outcomes (PICO) for this review

	How effective is NLP in helping to improve work-related psychological outcomes? What quantity and quality of evidence is there?	
Review questions	**Inclusion criteria**	**Exclusion criteria**
Population	Workers in an organization (i.e., employees >18 years old)	<18 years and nonwork samples
Intervention	An NLP-based intervention	Non-NLP intervention
Comparator	Any comparator including no intervention	
Outcomes	Work-related psychological outcomes,[a] work performance outcomes	Other outcomes
Study design	Empirical and/or qualitative intervention study	Single case studies, reviews, discussion articles, and articles introducing theories/concepts/models/applications
Other	Published in a peer-reviewed academic journal in English	

[a] engagement, stress, distress, well-being, security, safety, satisfaction, burnout, resilience, efficacy, caring, trust, mindfulness, creativity, hope, and emotional intelligence.

well-being, security, safety, satisfaction, burnout, resilience, efficacy, caring, trust, mindfulness, creativity, hope, and emotional intelligence.

2.4 | Data extraction and synthesis

The first author compressively reviewed all of the search results and studies were short listed for possible inclusion if the title of the article indicated that the study fell within the scope of the review. Given the first author has first-hand experience of using NLP, the entire selection process was reviewed by a coauthor to mitigate against any potential bias. Following this initial selection process, full texts of short-listed articles were independently assessed by all authors involved in the selection process. A discussion was then held among the authors to determine if a given study met each of the eligibility criteria. Forward and backward reference searches of relevant articles revealed no additional studies.

Details of the included studies were arranged using an extended version of the data extraction template developed by Sturt et al. (2012). This covered the following key information: publication details (authors, year, and country), study design and setting, participant characteristics, details of demographic data, intervention details, intervention facilitator, outcome measures, and study findings (see Table 2).

2.5 | Quality scoring: Assessing the risk of bias

The quality of the included studies was assessed using the Newcastle-Ottawa Scale (NOS), as it is an established means of assessing the risk of bias in nonrandomized trials (Wells et al., 2000). The NOS employs a star system, rating the quality of studies from 0 to 9 stars (high risk: 0–3, medium risk: 4–6, low risk: 7–9). NOS assesses the following three domains: (a) representativeness of study group selection (maximum of four stars), (b) comparability of groups (maximum of two stars), and (c) ascertainment of either the exposure or outcome of interest (maximum of three stars). Because NOS was originally developed for medical research, some adjustments were made in the current study that concerned organization-based research: (a) the word "exposure" was changed to "intervention," (b) the fourth scale item was changed from "Demonstration that outcome of interest was not present at start of study" to "Demonstration that *the measured outcome was assessed before the intervention*" (because work-related psychological outcomes often exist before the intervention, for example, stress), and (c) in respect of the first item in the outcome assessment section, a star was awarded if the outcome was assessed using a validated psychometric scale (i.e., as opposed to medical records). The Critical Appraisal Skills Program (CASP) checklist (Public Health Resource Unit, 2013) was used to appraise the quality of qualitative studies (high risk: 0–4, medium risk: 5–8, and low risk: 9–12). These assessments were conducted by two coauthors independently (YK & DS; kappa = 0.96), who discussed any disagreements.

3 | RESULTS

3.1 | Search results

The initial comprehensive literature search yielded a total of 952 articles. Expert consultation (e.g., with The Association for NLP), enquiries in social media forums, and manual searches of previous NLP reviews did not yield any additional articles. A total of 96 articles were identified as being potentially relevant to this study. A subsequent review of titles and abstracts identified that 18 articles warranted a full-text review based on the predetermined inclusion and/or exclusion criteria outlined in Table 1. A total of seven studies met all of the eligibility criteria. Figure 1 shows the PRISMA flow diagram for the article selection process (Table 3).

TABLE 2 Details of included studies

Author, year, and country	Study design, and setting	Population and participants	NLP intervention details	Assessed outcomes and measures	Results
Duncan, Konefal, & Spechler, 1990, Netherlands	Quantitative. One-group pre-post. Training facility	54 adults participating as either an NLP practitioner or a master practitioner training	21-day residential training rapport, language, anchoring, communication, calibration, modality, goal setting, phobia, sorting pattern, behavior change, and timeline	Self-actualization measured by the personal orientation inventory	Significant increase in 9 out of 12 subscales ($d \geq 0.6$)
Konefal, Duncan, & Reese, 1992, US	Quantitative. One-group pre-post. Training facility	47 adult workers including physicians, therapists, counselors, college professors, teachers, and business managers	21-day residential training, the same contents as above apart from an addition of shifting perceptual positions	Trait anxiety and locus of control measured by the trait-anxiety scale of the state–trait anxiety inventory, and the multiple health locus of control	Trait anxiety decreased significantly. Scores on the internal subscale of locus of control increased significantly ($d \geq 0.6$)
Ashok & Santhakumar, 2002, India	Quantitative. Nonrandomized controlled pre-post study. Workplace	Three different groups of 49 workers (18 masons, 14 bar benders, 17 plumbers)	NLP as mind training to develop kaizen	Kaizen behaviors	NLP groups showed more kaizen and creative kaizen behaviors per individual
Rao & Kulkarni, 2010, India	Quantitative. Nonrandomized controlled pre-post study. Workplace	36 adult workers in counseling for occupational stress (18 in NLP group, 18 in regular counseling group)	1:1 NLP-based counseling using NLP stress mitigation process including relaxation, rapport building, anchoring	Fear of punctuality and responsibility	NLP group showed more reduction in fear of punctuality and responsibility
Thompson, Courtney, Dickson, 2002, UK	Quantitative. One-group pre-post. Workplace	67 hospitality workers (26 executive managers, 41 staff)	five training sessions about leadership, management, sales, and customer care training. Two half-day follow-up training at 6 weeks and 6 months	Self-esteem, self-efficacy, adaptive selling, organizational commitment, social desirability	Except for self-efficacy, the other measures showed increases over the start of course measure
HemmatiMaslakpak, Farhadi, & Fereidoni, 2016, Iran	Quantitative. Non-randomized controlled pre-post study. Workplace	60 nurses in critical care, allocated to intervention or control group	NLP training (such as goal setting, time management, assertiveness skills, representational system, neurological levels). 3-hr 18 sessions over 6 months	Occupational stress measured by the expanding nurse stress scale	Intervention group showed significant decrease in stress while control group remained unchanged
Tsimtsiou, Stavropoulou, Papastefanou, & Lionis, 2017, Greece	Qualitative. Interviews after the training. Used thematic analysis	14 dermatologists	Communication training including NLP (60 min eight sessions)	Clients' and their own training satisfaction	Increase in clients' satisfaction and their own job satisfaction. Highly satisfied with the training

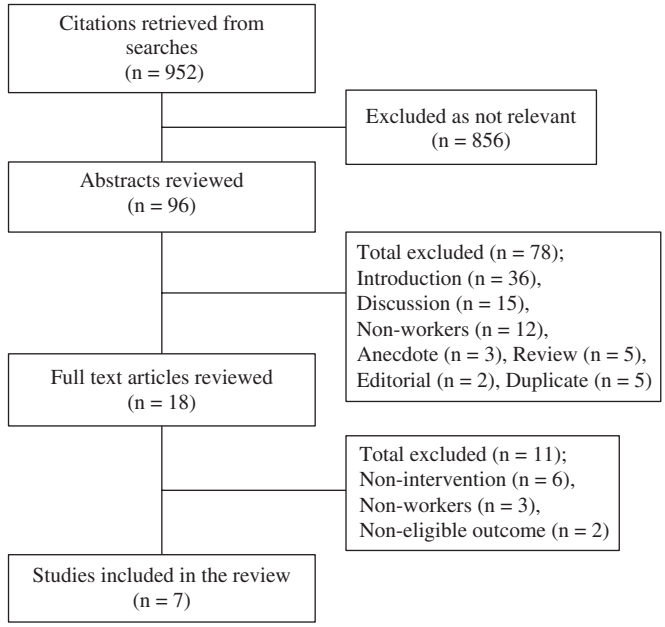

FIGURE 1 PRISMA flow diagram of the article selection process

TABLE 3 Reasons for excluding the full-text-reviewed articles

Author(s), year	Reason for excluding
Loomis & Cohen, 1984	Nonintervention
Nancarrow & Penn, 1998	Nonintervention
Skinner & Stephens, 2003	Noneligible outcome
Wood, 2006	Nonintervention
Mainwaring & Skinner, 2009	Nonintervention
Bin Ahmad, 2010	Nonworkers
Knight, 2012	Nonintervention
Neudecker, Esch, Schaefers, & Valussi, 2014	Noneligible outcome
Cassidy-Rice, 2014	Nonintervention
Mikačič, 2015	Nonworkers
Hollander & Malinowski, 2016	Nonworkers

3.2 | Characteristics of included studies

Six studies were quantitative (Ashok & Santhakumar, 2002; Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Rao & Kulkarni, 2010; Sahebalzamani, 2014; Thompson, Courtney & Dickson, 2002) and one was qualitative (Tsimtsiou et al., 2017). In the quantitative analyses, three studies used a nonrandomized controlled design (Ashok & Santhakumar, 2002; HemmatiMaslakpak et al., 2016; Rao & Kulkarni, 2010), and the other three studies used a within-subject pre-post design (Duncan et al., 1990; Konefal et al., 1992; Thompson et al., 2002). None of the quantitative studies used a randomized controlled trial design. The qualitative study used thematic analysis (Tsimtsiou et al., 2017). Three studies were conducted in Europe (Duncan et al., 1990; Thompson et al., 2002; Tsimtsiou et al., 2017), three studies were conducted in Asia (Ashok & Santhakumar, 2002; HemmatiMaslakpak et al., 2016; Rao & Kulkarni, 2010), and one study was conducted in the USA (Konefal et al., 1992).

Targeted work-related psychological outcomes included (a) self-actualization (Duncan et al., 1990), (b) anxiety (Konefal et al., 1992), (c) kaizen (i.e., continuous improvement on efficiency and quality) behavior (Ashok &

Santhakumar, 2002), (d) fear of punctuality and responsibility (Rao & Kulkarni, 2010), (e) self-esteem, self-efficacy, adaptive selling, and organizational commitment (Thompson et al., 2002), (f) occupational stress (HemmatiMaslakpak et al., 2016), and (g) training satisfaction (Tsimtsiou et al., 2017). One quantitative study conducted follow-up assessments at 6 weeks and 6 months post-training (Thompson et al., 2002). Employees in the seven eligible studies worked in civil engineering, hospitality, education, and health fields (Ashok & Santhakumar, 2002; Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Konefal et al., 1992; Thompson et al., 2002; Tsimtsiou et al., 2017; Rao & Kulkarni, 2010). Five studies provided detailed participant data including age, educational background, marital status, and religion (Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Konefal et al., 1992; Thompson et al., 2002; Tsimtsiou et al., 2017). The remaining two studies provided little or no participant demographic data (Ashok & Santhakumar, 2002; Rao & Kulkarni, 2010). A total of 29% of all participants were male and 71% were female (i.e., based on the assumption that nursing participants in Iran were all female, as Iran bars males from working in this role; Sadeghi, 2012). The age range of participants was from 20 to 50 years and older (Duncan et al., 1990; Konefal et al., 1992). Five of the studies were conducted in the past 10 years.

3.3 | Interventions

All of the studies employed NLP training (Table 1). The duration of the intervention ranged from 21 days (Duncan et al., 1990; Konefal et al., 1992) to 6 months (HemmatiMaslakpak et al., 2016). Tsimtsiou et al. (2017) provided a series of eight 1-h training sessions, Thompson et al. (2002) provided seven sessions over 6 months, and HemmatiMaslakpak et al. (2016)) provided 18 three-hour sessions over 6 months. One study employed licensed counselors and psychotherapists (Konefal et al., 1992), one study was supervised by two NLP trainers (Duncan et al., 1990), and the other five studies either provided no information about the intervention facilitator or did not provide details of the facilitator's level of experience (Ashok & Santhakumar, 2002; HemmatiMaslakpak et al., 2016; Rao & Kulkarni, 2010; Thompson et al., 2002; Tsimtsiou et al., 2017). Specific NLP skills used were related to stress reduction (Duncan et al., 1990; Konefal et al., 1992; Rao & Kulkarni, 2010), communication (Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Konefal et al., 1992; Thompson et al., 2002; Tsimtsiou et al., 2017), and goal setting (Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Konefal et al., 1992). Ashok and Santhakumar (2002) did not report the contents of the intervention. In the three studies focussing on stress or anxiety reduction (Duncan et al., 1990; Konefal et al., 1992; Rao & Kulkarni, 2010), NLP *anchoring*—that involves triggering a desired affective state (e.g., relaxation) by applying a specific stimulus (e.g., a touch on the shoulder, certain words, or a certain picture; O'Connor & McDermott, 2001)—was used. Among the studies focussing on NLP skills for communication (Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Konefal et al., 1992; Thompson et al., 2002; Tsimtsiou et al., 2017), representational systems were often introduced and these involved analyzing others' dominant sense (visual, auditory, kinaesthetic, olfactory, or gustatory) as a means of fostering better communication (Bandler & Grinder, 1979). Finally, none of the studies focussing on goal setting (Duncan et al., 1990; HemmatiMaslakpak et al., 2016; Konefal et al., 1992) described the details of their goal-setting skills.

3.4 | Outcomes

Based on the comparison tests, NLP training was found to (a) significantly decrease occupational stress (HemmatiMaslakpak et al., 2016) and mental health problems such as trait anxiety (Konefal et al., 1992), and (b) significantly increase the internal locus of control (Konefal et al., 1992), time competence, innerdirectedness, self-actualization, existentiality, spontaneity, self-regard, self-acceptance, and capacity for intimate contact (Duncan et al., 1990). The effect sizes of all of the interventions were large ($d \geq 0.6$); however, two studies that used t-tests (Duncan et al., 1990; Konefal et al., 1992) did not report whether the data satisfied the assumption of normality. The other study (HemmatiMaslakpak et al., 2016) used a Mann–Whitney *U* test, as the data were not normally distributed. Changes in all other outcome measures were assessed by comparing mean scores and on this basis, it was

reported that NLP training improved participants' levels of (a) kaizen behavior (Ashok & Santhakumar, 2002), (b) self-esteem, adaptive selling, and organizational commitment (Thompson et al., 2002), and (c) stress (Rao & Kulkarni, 2010). In the qualitative study, NLP communication training was reported as enhancing dermatologists' job satisfaction (Tsimtsiou et al., 2017). Increases in self-esteem (Duncan et al., 1990; Thompson et al., 2002) and decreases in stress (HemmatiMaslakpak et al., 2016; Rao & Kulkarni, 2010) were reported by more than one study. No study examined the organizational psychological constructs of mindfulness, work engagement, or resilience, which have been the focus of recent HRD organizational studies.

3.5 | Risk of bias

In the nonrandomized controlled studies, the risk of bias was deemed to be high for two studies (Ashok & Santhakumar, 2002; Rao & Kulkarni, 2010) and medium for one study (HemmatiMaslakpak et al., 2016). None of these three studies commented on the representativeness of the cohort or conducted follow-up assessments. In the within-subject pre-post studies, the risk of bias was high in two studies (Duncan et al., 1990; Konefal et al., 1992) and medium in one study (Thompson et al., 2002). None of these three within-subject studies considered the representativeness of the cohort (Duncan et al., 1990; Konefal et al., 1992; Thompson et al., 2002) and two did not conduct follow-up assessments (Duncan et al., 1990; Konefal et al., 1992). In the qualitative study, the risk of bias was medium (Tsimtsiou et al., 2017). The qualitative study employed convenience sampling and did not report biases due to the researcher-participant relationship. Moreover, there appeared to be no mention of ethical approval. See Tables 4 and 5 for a detailed assessment of the risk of bias for the quantitative studies and qualitative study, respectively.

4 | DISCUSSION

The present systematic review followed the PRISMA guidelines and evaluated the quality of evidence relating to studies assessing the applications of NLP in the workplace. A total of seven studies (six quantitative and one qualitative), comprising 190 participants, met all of the eligibility criteria for in-depth review and assessment. While findings indicate that NLP can be effective for improving work-related psychological outcomes including self-esteem and occupational stress, both the quantity and quality of evidence were weak.

4.1 | Contribution of this study

This study is the first systematic review to assess the utility of NLP in organizational settings, which in addition to clinical settings, are reported to be a key field where NLP is currently applied (Tosey & Mathison, 2009). The seven articles reviewed reported that a variety of NLP skills (e.g., timeline, goal-setting, and visualization) were successfully employed to improve a wide range of organizational psychological constructs (e.g., occupational stress, well-being, and self-esteem). Notwithstanding the fact that the included studies did not all assess the same psychological outcomes (i.e., meaning that findings were not necessarily replicated across studies), findings from this systematic review are largely consistent with other reports (e.g., Karunaratne, 2010), indicating there may be unique advantages of NLP for employees.

Although NLP elicited benefits across a broad range of outcomes, the diverse NLP skills used in the included studies indicate a need for future research to examine each skill individually, as well as a need for NLP researchers to be clear about the specific NLP skills employed in their interventions. Indeed, although some studies provided a good level of detail in this respect, greater clarity is required in terms of the specific NLP skills that induce positive outcomes (Bandler & Grinder, 1979). Consequently, we recommend that NLP researchers ensure their reporting provides sufficient information and transparency (American Educational Research Association, 2006) as a means of improving the credibility and methodological rigor of NLP research. Onwuegbuzie and Corrigan (2014) highlight the

TABLE 4 Assessment of risk of bias for quantitative research

	Selection				Comparability	Outcome			
Bias category Author, year	Representativeness of exposed cohort	Selection of nonexposed cohort	Ascertainment of intervention	Demonstrate outcome assessed before intervention	Comparability of cohorts on basis of design (*) or analysis (*)	Assessment of outcome	Follow-up long enough	Adequacy of follow-up	Number of stars (0–9)
Nonrandomized controlled study									
Ashok & Santhakumar, 2002							NA	NA	0
Rao & Kulkarni, 2010	*		*			*	NA	NA	3
HemmatiMaslakpak et al., 2016	*	*	*		*	*	NA	NA	5
Within-subject pre-post study									
Duncan et al., 1990	NA	*	*		NA	*	NA	NA	3
Konefal et al., 1992	NA	*	*		NA	*	NA	NA	3
Thompson et al., 2002	NA	*	*		NA		*	*	4

following five factors that contribute to methodologically robust research: (a) comprehensive, (b) systematic, (c) evaluative, (d) defensible, and (e) transparent. By satisfying these five factors, NLP research will more closely adhere to research protocols and reporting guidelines that have been advocated within the wider HRD field (Nimon, 2011).

None of the included studies directly explored mechanisms of action that, for NLP in particular, may be more suitably investigated using a research approach aiming to elucidate experiential processes (i.e., rather than conventional intervention or efficacy studies per se) (Kudliskis, 2013). Nevertheless, the close analysis of subjective experience in NLP—using sub-modalities and strategies (O'Connor & McDermott, 2001)—is likely to play an important mechanistic role. While modalities refer to our five senses (visual, auditory, kinaesthetic, olfactory, and gustatory), submodalities are subcategories of modalities rereferring to the qualities of our five sensory information. For example, as opposed to merely identifying and labeling an image that an employee observes when they feel anxious, submodalities enable them to explore the details of the image (e.g., size, brightness, and color tone) that affect our emotional responses. For example, an employee with a fear of delivering a presentation may have submodalities of a large and bright image of a bored and/or judgmental audience, which creates the sensation of being scared, while a confident presenter may have a different set of submodalities. In NLP terms, strategies are a sequence of internal and external experiences that create a certain outcome, often described using submodalities (Dilts & Delozier, 2000). NLP practitioners can explore an employee's strategy relating to (for example) fear of presentation by identifying and depicting their experience in detail (i.e., how they create the experience of fear of presentation). In this instance, the NLP practitioner might guide employees to remember the face and voice tone of a colleague or audience member that prompted fearful feelings. The employee would then be guided to reflect upon how they could employ positive emotional strategies in this situation. This reflective comparative analysis helps the employee to identify the key components of experiences that trigger negative affective responses.

The close analysis of subjective experience in NLP is applicable to the HRD field because reflecting on subjective experience as a form of performance enhancement and informal learning, is a crucial component for creating meaningful changes in a workplace (Kock & Ellström, 2011). However, the importance of such reflective techniques is often underestimated (Eraut, 2004), which can thus compromise the effects of employee training interventions (Froehlich, Segers, & Van den Bossche, 2014).

In terms of other direct implications for HRD practice and research, NLP skills can also be useful for modeling excellent results such as those identified in a literature review that identified the psychological capital (PsyCap) of four positive psychological constructs that account for positive organizational behaviors and attitudes, namely (a) hope, (b) efficacy, (c) resilience, and (d) optimism (HERO; Luthans, 2012). The development guidelines of PsyCap, which include goal setting, identifying obstacles, and how to overcome them, reflect the key principles underlying NLP techniques such as the *well-formed outcome* and the *Disney strategy* (Dilts, 1995; Kotera & Sheffield, 2017). The Disney strategy, modeled from how Walt Disney realized his dreams, guides employees to access cognitive and physiological styles of a dreamer, realist, and critique (Dilts, 1995). Among career-focused university students, this strategy enhanced their self-efficacy, and their interviews implied relevance to the other PsyCap constructs (Kotera & Sheffield, 2017). Future HRD research using controlled study designs is thus warranted to assess the effects of such NLP techniques on workers' PsyCap (controlled designs are emphasized because they would maximize methodological rigor and therefore reduce "Pollyannaish fluff" [Luthans, 2012, p. 4] that has been highlighted as an issue within the field of organizational positive psychology [Luthans, 2012]).

4.2 | Limitations

There are several factors that may limit the findings of this systematic review. In particular, unpublished studies or studies not published in English language were excluded, meaning that there may be additional relevant evidence pertaining to the applications of NLP in organizational settings. Furthermore, given that the first author is a certified NLP trainer, bias may have been introduced when rating the methodological quality of the eligible studies. However, independent assessment of bias by another researcher, who is not an NLP practitioner, should help to mitigate this potential limiting factor. The Hawthorne effect (i.e., awareness of being observed affects the outcome rather than the intervention) may have been present in the three pre-post design studies (Duncan et al., 1990; Konefal et al., 1992; Thompson et al., 2002). Moreover, while some studies (e.g., Duncan et al., 1990; Thompson et al., 2002) measured many outcomes, they failed to address the multiple comparisons problem. This too could exaggerate the effects of the intervention. Finally, there were only seven studies included in this review and five of them reported no or little information about the intervention facilitator. Therefore, it is difficult to draw reliable conclusions regarding the extent to which the facilitator's experience may have influenced outcomes.

4.3 | Implications for research

Findings from this review indicate that NLP may have a role in improving work-related psychological outcomes, and that further—more methodologically robust—research is warranted to investigate these effects further. Further research is also required to investigate the effects of NLP on work-related psychological outcomes that were not assessed in the studies included in this review. For example, many workers report experiencing shame in respect of mental health problems and may thus be reticent to fully engage in mental health interventions. Therefore, other organizational psychological constructs that can predict the variance of mental health problems (e.g., intrinsic work motivation) may be more effective for some workers, as it would not stimulate their mental health shame (Kotera, Adhikari, & Van Gordon, 2018).

Among the NLP skills used in the included studies, skills that helped employees to have a vision for the future seemed particularly useful (HemmatiMaslakpak et al., 2016; Hollander & Malinowski, 2016; Thompson et al., 2002). Using the Disney strategy, Kotera and Sheffield (2017) reported that creating a clear vision for the future was

TABLE 5 Assessment of risk of bias for qualitative research

Quantitative studies	Clear statement of aims	Appropriate methodology	Appropriate research design	Appropriate recruitment	Data collection addressed research issues	Researcher-participant relationship considered	Ethical issues considered	Rigorous data analysis	Clear statement of findings	How valuable is the research? (0–3)	Score (0–12)
Tsimtsiou et al., 2017	Y	Y	Y	CT	Y	CT	CT	CT	Y	1	6

CT: cannot tell; N: no; NA: not applicable; Y: yes.

particularly useful to participants' professional career planning. Given that workers are often preoccupied and overwhelmed with the tasks they have to perform, NLP skills aimed at formulating a clear and attractive future goal can help provide a sense of purpose in life (Kotera et al., 2018). Additionally, NLP skills that focus on developing a clear and attractive future could be useful in other fields such as clinical settings where NLP has been found to reduce anxiety and stress (Bin Ahmad, 2010; Konefal et al., 1992). A good example is the NLP "as if" frame, that can be used to help patients reconstruct future aspirations (e.g., using questions such as "what would you want to do if you could get out of the hospital now?") (Dilts, 1999).

Of the 96 articles that were deemed to be potentially relevant for this systematic review, 80% were excluded due to being theoretical articles. This may highlight the market-driven nature of NLP (Grimley, 2016), which in terms of its effectiveness, has relied more on anecdotal evidence rather than empirical enquiry per se. Furthermore, the methodological quality of the seven eligible articles was relatively weak. Indeed, the quality assessment showed that most of the included studies suffered from selection bias and did not include a follow-up assessment. Furthermore, clarification on what specific NLP skills (e.g., their functions and procedures) were used, and by whom (e.g., the facilitator's proficiency in NLP), was often missing. Information relating to participants (e.g., their representativeness and how they were recruited) was also often unclear. These design issues have clear implications for future research, which should be addressed to overcome credibility concerns relating to the methodological quality of NLP research. More experimental studies with control groups are also needed to more fully determine the benefits of NLP (Luthans, 2012).

4.4 | Conclusion

The seven selected articles in the current systematic review indicate that NLP can be used to improve a wide range of organizational psychological constructs including work-related self-esteem and work-related stress. NLP employs a multicomponent approach (Dilts, 1983) and may have a broad range of applications in HRD settings (Froehlich et al., 2014). This is consistent with reviews of other workplace coaching approaches, which

discuss how improvements in cognitive or skill-based outcomes can lead to a greater effectiveness across a range of work scenarios (Jones, Woods, & Guillaume, 2016).

However, in line with previous reviews of NLP in healthcare settings (Pensieri, 2013; Sturt et al., 2012), findings from this systematic review demonstrate that more methodologically rigorous research is needed to evaluate the effectiveness of NLP for workers. More specifically, to draw reliable inferences as to the effectiveness of NLP within the wider context of HRD workplace interventions, there is a need for controlled experimental designs featuring follow-up assessments. Specific details relating to the intervention and participants also need to be clearly reported. Thus, in light of the poor quantity and quality of research, the present authors advocate that claims relating to the effectiveness of NLP in the workplace be interpreted with caution.

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