

Linking Interprofessional Work to Outcomes for Employees: A Meta-Analysis

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Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

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Abstract

The aim of this meta-analysis was to examine the relationship between interprofessional work and variables that are related to employee well-being in the health and social care sector, and to examine the influence of different moderators on the relevant mean effect sizes. A systematic literature search in the PsychInfo, Embase, Medline, and the Cumulative Index to Nursing and Allied Health Literature databases was conducted to identify relevant articles. A total of 45 articles that reported results for 53 independent samples were included in the meta-analysis. A random effects model was used to estimate the mean effect sizes (correlations). Most employees were nurses working in hospitals. Interprofessional work characterized by teamwork, collaboration, or cooperation; was negatively and mildly associated with job stress, burnout, and turnover intention (range mean $r = -.13$ to $-.22$); and positively and moderately associated with autonomy, engagement, job satisfaction, and perceived service quality (range mean $r = .33$ to $.46$). The results of this meta-analysis suggest that interprofessional work is linked to important outcomes for employees working in the health and social care sector.

Keywords: collaboration, teamwork, health and social care, burnout, meta-analysis

Linking Interprofessional Work to Outcomes for Employees: A Meta-Analysis

Providing good quality health and social care often requires the combined effort of multiple professionals. The importance of interprofessional work has been emphasized in international government policies (Reeves, Lewin, Espin, & Zwarenstein, 2010b), and a number of interventions have been developed to improve interprofessional working relationships at the pre- and post-licensed level (Martin, Ummenhofer, Manser, & Spirig, 2010; Reeves, Perrier, Goldman, Freeth, & Zwarenstein, 2013; Suter et al., 2012). Although systematic reviews of these interventions have proved inconclusive, preliminary findings suggest a positive impact on health outcomes for patients (Martin, et al., 2010; Reeves, et al., 2013), employees, and organizations (Suter, et al., 2012).

The term interprofessional work is used in the present study to refer to teamwork, collaboration, and cooperation. This was done to capture the separate but related concepts included in interprofessional work. In particular, the concepts of teamwork and collaboration share many key dimensions such as a common understanding of goals; mutual trust and respect; and value of each other's contributions, perspectives, knowledge, and competences (D'Amour, Ferrada-Videla, Rodriguez, & Beaulieu, 2005; Reeves, et al., 2010b). It may, therefore, help to view interprofessional work as a continuum from cooperation, to collaboration, to teamwork; where teamwork describes close working relationships between team members, collaboration characterizes less intense work relationships while working towards a common goal, and cooperation is characterized by having fewer meetings, discussions, and less communication than the others (Reeves, Lewin, Espin, & Zwarenstein, 2010a). In other words, teamwork requires both collaboration and coordination between team members, while collaboration requires coordination.

Interprofessional working relationships can be seen as a job resource for those who take part in the care and support of clients and patients. A useful and established model that

describes the relationship between job resources and job demands, worker well-being (burnout and engagement), and organizational outcomes, is the Job Demands-Resources (JD-R) model (Bakker & Demerouti, 2016; Schaufeli & Taris, 2014). Job demands include different job stressors that are related with burnout, while job resources are related to better engagement, support goal-achievement in work, stimulate learning, and buffer the negative effects of job demands. Identifying job resources like interprofessional work, therefore, has implications related to the training of professionals as well as to how health and social services should be organized in order to lead to better outcomes for employees and clients.

According to the JD-R model, burnout and engagement serve as mediators for a variety of individual and organizational outcomes. Studies have documented that burnout is related to absenteeism, turnover intention, organizational commitment, and job performance (Alarcon, 2011; Swider & Zimmerman, 2010), and to reduced employee health (Demerouti & Bakker, 2011). Engagement has shown a positive relationship with organizational outcomes such as productivity, profitability, and customer satisfaction, and alternatively has a negative relationship with turnover and safety incidents (Harter, Schmidt, & Hayes, 2002).

A total of three meta-analyses that used the JD-R model have been completed, and the most frequently studied job resources seem to be autonomy in the workplace and social support (Crawford, LePine, & Rich, 2010; Halbesleben, 2010; Nahrgang, Morgeson, & Hofmann, 2011). Collaboration, teamwork, and cooperation have not been studied as job resources in any of the aforementioned meta-analyses and were not listed as job resources in an overview of job demands and resources provided by Schaufeli and Taris (2014).

The JD-R model can be used to predict different organizational outcomes such as job safety (Nahrgang, et al., 2011). Other examples of organizational outcomes include commitment, performance, health, and turnover intention (Halbesleben, 2010). The current

meta-analysis will focus on job satisfaction, turnover intention, and perceived service quality as they are key variables in organizational research, and of particular interest for the health and social care sector. Job satisfaction has been found to mitigate turnover among nurses in a review (Lu, Barriball, Zhang, & While, 2012), and among child welfare workers in a meta-analysis (Kim & Kao, 2014). In a systematic review, Lu et al. (2012) examined factors that were related to job satisfaction in order to handle the continuous challenges of the health care sector to recruit and retain nurses in the job (Lartey, Cummings, & Profetto-McGrath, 2014). Kim and Kao (2014) examined predictors for turnover intention, such as job satisfaction, in a meta-analysis of studies in child welfare services because of the detrimental impact turnover can have on children and their families who receive support. One review showed that high turnover rates are also related to costs for organizations due to productivity losses and a reduction in service quality for patients in hospitals (Hayes et al., 2012). In meta-analyses, job satisfaction has been linked to performance (Judge, Thoresen, Bono, & Patton, 2001), to improved organizational commitment (Lu, et al., 2012), and to customer satisfaction and productivity (Blegen, 1993; Harter, et al., 2002).

To our knowledge, there is only one previously conducted meta-analysis that examined the relationship between nurse-physician collaboration and job satisfaction, which found a positive and moderately strong relationship (mean $r = .37$; Zangaro & Soeken, 2007). Their results were, however, based on a small sample of six studies. Furthermore, a review of interventions to promote retention among nurses identified two studies that conducted team oriented interventions and both reported positive effects (Lartey, et al., 2014).

The aim of this meta-analysis is to summarize and integrate empirical research findings that examined the relationship between interprofessional work (i.e., collaboration, teamwork, and cooperation) and outcomes that are important for employees in the health and social care sector. We decided to focus on health and social care professionals because these

professionals must often actively work together to provide for the overall care of individuals. Many countries (e.g., Norway, Sweden, and Finland) are promoting integration of services by co-locating health, mental health, and welfare professionals in order to improve quality of care. Health care professionals, such as nurses, physicians, or psychologists focus on providing, promoting, or restoring overall health, while social service professionals, such as social workers, and child protection workers focus on improving the welfare of citizens (World Health Organization, 2004).

Figure 1 illustrates the expected links between interprofessional work and the variables examined in the current study. The unidirectional arrows from job demands and resources to worker well-being and to organizational outcomes represent the theoretical relationship of the variables according to the JD-R model. We were not interested in testing the mediating role of burnout and engagement but merely in the relationship of interprofessional work with job stress, autonomy, burnout, engagement, job satisfaction, turnover intention, and perceived service quality as assessed by employees.

A meta-analysis is a method to aggregate key findings of quantitative studies and to estimate mean effect sizes for various outcomes. In addition, it is possible to examine the influence of moderator variables if the variation in effect sizes between studies is significant (Lipsey & Wilson, 2001).

----Insert Figure 1 about here----

Method

Literature Search

A systematic literature search in the databases PsychInfo, Embase, and Medline was conducted in March 2016 to find empirical articles that studied the relationship between interprofessional work and outcome variables among professionals of health and social care

services. The Cumulative Index to Nursing and Allied Health Literature (CINAHL) database was searched for articles in June 2017.

The search was adapted to the databases and included three steps: In step one we searched for health and social care professionals such as social workers, child protection workers, nurses, physicians, midwife, counseling or clinical psychologists. In step two, we searched using the terms collaboration, teamwork, cooperation, interdisciplinary-, or multidisciplinary treatment approach. In step three, we searched for outcome measures such as burnout, engagement, job satisfaction, working conditions, job characteristics, or organizational characteristics. The search yielded 7775 articles.

Relevant reviews and meta-analyses found during the literature search and in the Cochrane library were searched for articles. This led to the inclusion of five more articles. Screening the reference lists of the included studies and the publication list of two known researchers in the field led to eight more articles, and five papers were found during the literature search. Thus, the search resulted in a total of 7793 articles.

Inclusion Criteria

Articles were included if they were (a) written in English or German, (b) reported the relationship between different types of interprofessional work (including collaboration, team work, cooperation) (c) between health or social care professionals or institutions, (d) and specified outcome variables (e) with statistics that could be used in the meta-analysis calculations. Studies were excluded if they focused on the social aspects between employees (e.g., social support by colleagues or group cohesion) rather than on how employees work together. All studies meeting the search criteria prior to March 2016 in PsychInfo, Embase, and Medline and prior to June 2017 in CINAHL were examined. Of the 7793 articles found in the literature search, 45 studies were included in the meta-analysis (Figure 2).

----Insert Figure 2 here----

Outcome Variables

The articles were coded based on the following information: name of the first author, year of publication, country where the study was conducted, response rate, sample size, profession (e.g., nurse, social worker), type of institution (e.g., hospital, school, community mental health services), percentage of women, mean age (years), overall work experience (years), and percentage of full-time workers. Some studies did not report variables like age in mean number of years but the number of participants in different age ranges; in these cases, an approximate mean age was calculated. Overall work experience was based on variables like (total) years of nursing experience, years of service, years of experience in health care occupation, hospital tenure, or mean tenure.

Job stress. Job stress refers to “the amount of stress ... [workers] perceive in relationship to their jobs” (Shader, Broome, Broome, West, & Nash, 2001, p. 213), and is typically experienced when the demands such as workload or time pressure exceed the available individual resources and available social support (Frankenhaeuser, 1991). Articles that reported results for multiple variables that fit the label job stress were combined before they were entered in the meta-analysis.

Autonomy. Autonomy at the workplace has been defined as “the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out” (Hackman & Oldham, 1976, p. 258). In one case, the variable was called “milieu of respect and autonomy” (Lee, Dai, & McCreary, 2015, p. 524), in another “job control” (Heponiemi, Aalto, Puttonen, Vanska, & Elovainio, 2014, p. 797), and one article reported multiple scales and the “overall” category was used (Karanikola et al., 2014, p. 474).

Burnout. Burnout is a psychological syndrome that is characterized by a high level of emotional exhaustion and depersonalization and a low level of professional accomplishment. People feel emotionally tired and drained, distance themselves cognitively and emotionally from work, and develop feelings of incompetence and reduced productivity (Maslach, Schaufeli, & Leiter, 2001). Emotional exhaustion, depersonalization, and personal accomplishment were most often assessed with the Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996). In one case the Oldenburg Burnout Inventory was used and job valuation was coded as personal accomplishment and disengagement as depersonalization (Cheng, Bartram, Karimi, & Leggat, 2013). For one article, the correlations between interprofessional work and emotional exhaustion and between interprofessional work and depersonalization was set to .00 because only significant results were reported (Baumgardt, Mook, Rossler, & Kawohl, 2015).

Engagement. Engagement is a psychological state that consists of three components: dedication, vigor, and absorption. Engagement is characterized by a high energy level, enthusiasm, the willingness to put effort into work, and the ability to focus and fully concentrate on work (Schaufeli, 2013). Engagement was assessed with the Utrecht Work Engagement Scale (Schaufeli & Bakker, 2003). One article reported correlations for two of the three scales and the results were combined and coded as Engagement.

Job satisfaction. Job satisfaction has been defined as a “pleasurable emotional state resulting from the appraisal of one’s job as achieving or facilitating the achievement of one’s job values” (Locke, 1969, p. 316). Most of the time this variable was called job- or work satisfaction.

Turnover intention. This variable includes items or scales that assess the employees’ intention to leave the organization, not the profession. Two articles reported results for the

relationship between interprofessional work and intention to stay. The sign of the correlation coefficients were reverse coded.

Perceived service quality. The variable perceived service quality is a subjective measure of provider perceptions. The label was used for variables that assessed quality of care or service ratings from employees. Articles that reported correlations between different factors or scales of perceived service quality were combined (Begat, Ellefsen, & Severinsson, 2005; Larrabee et al., 2004).

Moderator Variables

Moderator variables are categorical or continuous variables that may influence the mean effect sizes and explain a part of the between-study variance. In the current study, categorical moderator variables included country where the study was conducted (USA versus non-USA), institution (hospital versus non-hospital), profession (nurse versus non-nurse), and assessment of interprofessional work. The included studies used different constructs for assessing interprofessional work. The constructs were coded as cooperation, collaboration, or teamwork based on the description of the scale or wording of items used in the articles. Studies that included only nurses asked about their satisfaction or experiences of teamwork or collaboration both with other nurses, but also with other professionals at their hospital. Because many articles reported information regarding the working relationship between nurses and physicians, an additional category, called nurse-physician collaboration, was made to distinguish these articles from the rest. Articles that reported correlations between different factors or scales of interprofessional work between different professionals and an outcome variable were combined and the mean correlations were used in the analyses in order to ensure independent effect sizes in the meta-analysis. Scales that measured interprofessional work with the management or a superior were not coded as we were only interested in work

among staff. The continuous moderators were publication year, percentage of women, mean age, overall work experience, and percentage of employees in full-time position.

Coding Procedure and Inter-rater Reliability

The first author coded all studies and consulted with the other authors. The second author coded 10 of the 45 studies (22%) to assess inter-rater reliability. Cohen's kappa was 1.00 for country where study was conducted, .62 for institution, .82 for profession, and .84 for assessment of interprofessional work. The intra-class correlation coefficient (ICC) was .99 for publication year, 1.00 for percentage of women, mean age, and employees in full-time position, .82 for overall work experience, and .89 for response rate. The ICC for the sample size and the correlation coefficients between interprofessional work and job satisfaction, autonomy, turnover intention, and emotional exhaustion were 1.00. The ICC for the correlation coefficients between interprofessional work and perceived service quality was .99. Disagreement was resolved by discussions and consensus.

Statistical Analyses

SPSS version 23 was used to calculate the descriptive statistics, and the software Comprehensive Meta-analysis (CMA) version 3 for the meta-analysis calculations (Borenstein, Hedges, Higgins, & Rothstein, 2007). The analyses were based on the Fisher's z-scores that CMA computes based on the entered correlation coefficients. The summary effects of Fisher's z were then back transformed to the summary correlation unit by the software (Borenstein, Hedges, Higgins, & Rothstein, 2009). Effect sizes were classified as small (.10), moderate (.30), and large (.50) based on Cohen's guidelines (Cohen, 1988). Because we assumed that there would be real differences between the studies (e.g., how interprofessional work was assessed), a random effects model was chosen to estimate the mean effect sizes and the corresponding confidence intervals (Borenstein, et al., 2009).

A fixed effect model was used to calculate the homogeneity test (Q ; Borenstein, et al., 2009). A significant Q indicates that there are real differences between studies that can be explained by moderator variables (Hedges & Olkin, 1985). The I^2 index is the proportion of true variance that is not due to sampling error (Borenstein, Higgins, Hedges, & Rothstein, 2017). Mixed-effects analyses were used for moderator analyses with categorical variables. A significant total between Q -value (Q_B) indicates true differences in the effect sizes between the subgroups (Borenstein, et al., 2009). Meta-regression analyses were used for continuous moderators using a random effects model with full maximum likelihood estimation and Knapp-Hartung adjustment, which is recommended for analyses with small sample sizes (Hartung, Knapp, & Sinha, 2008). Outlier and influence diagnostics were based on the studentized residuals, Cook's distance, and visual inspection of the scatterplot (Viechtbauer & Cheung, 2010).

Sensitivity analyses were conducted using the one study removed method to examine the impact of individual studies on the overall mean effect size for each outcome (Borenstein, et al., 2009). Duval and Tweedie's trim and fill sensitivity analysis was used to estimate the number of missing studies and the impact that they would likely have on the effect size and confidence interval for each outcome (Duval, 2006).

Results

Study Characteristics

The 45 included articles reported results for 53 independent samples. Articles were published between 1990 and 2016 ($M = 2007$; $SD = 6.22$). Most samples were from the USA ($K = 18$) followed by Canada, Australia, and England ($K = 4$, respectively), Norway and Italy ($K = 3$, respectively), and by Germany, Finland, and Switzerland ($K = 2$, respectively). The total sample size was 42354. Most samples were from hospitals ($K = 42$), seven samples came from institutions such as schools, clinics, doctor's practice, child welfare services, and

other services in the community. Four studies examined employees that worked at multiple sites, including at least one hospital. Nurses were most frequently studied ($K = 39$), followed by non-nurse samples consisting of professions like social worker, physicians, and different mental health professionals ($K = 7$) and mixed samples that included nurses ($K = 7$). About 82% of the participants were female ($K = 35$, $SD = 17.05$), with a mean age of 39.27 years ($K = 43$, $SD = 5.53$), and an overall work experience of 13.62 years ($K = 32$, $SD = 5.01$). About 74% of the employees were full-time workers ($K = 19$, $SD = 16.74$). Interprofessional work was most frequently assessed as nurse-physician collaboration ($K = 21$) followed by teamwork ($K = 14$), collaboration ($K = 12$), and cooperation ($K = 4$). The mean response rate was 61% ($K = 49$, $SD = 19.61$). Table 1 presents the study characteristics for all included studies in the meta-analysis.

----Insert Table 1 here----

Pooled Effect Sizes

Table 2 presents the mean effect sizes for interprofessional work with the different outcome variables. All mean correlations between interprofessional work and the outcomes were significant. The highest mean correlations were found between interprofessional work and perceived service quality (mean $r = .46$), and between interprofessional work and autonomy (mean $r = .38$). The homogeneity test was significant for all analyses, except for personal accomplishment, indicating the need for moderator analyses.

----Insert Table 2 here-----

Moderator Analyses

Moderator analyses were conducted for outcome variables with significant heterogeneity.

Categorical variables. Moderator analyses were calculated for categorical variables with at least three studies included per subgroup (Table 3). Out of the 17 analyses, five were significant. Assessment of the type of interprofessional work was a significant moderator for the correlations with emotional exhaustion ($Q_B = 15.72, p < .001$), depersonalization ($Q_B = 17.83, p < .001$), and turnover intention ($Q_B = 9.43, p = .002$), respectively. Teamwork showed higher negative mean correlations than nurse-physician collaboration in the three significant moderator analyses. Other types of interprofessional work (i.e., collaboration and cooperation) were not included due to the limited number of studies. Furthermore, the mean effect size for interprofessional work and perceived service quality was higher for studies from the USA compared to studies from other countries ($Q_B = 5.95, p = .015$), and for employees working at hospitals compared to employees working at other institutions ($Q_B = 9.23, p = .002$).

----Insert Table 3 here----

Continuous variables. Meta-regression analyses were conducted for continuous moderator variables with at least four studies. Out of the 38 analyses that were carried out, four were significant and the results are reported in the following section. Two moderators, publication year and overall work experience, did not predict any effect sizes.

The mean age of the employees was significantly associated with the mean effect size for interprofessional work and turnover intention ($K = 10, b_1 = -0.02, t = -2.72, p < .05, R^2$ analog = .60), and the relationship got stronger when one study with a large Cook's distance (Lee, et al., 2015) was excluded from the analysis ($K = 9, b_1 = -0.03, t = -4.92, p < .01, R^2$ analog = 1.00). There was a positive relationship between the percentage of women in a sample and the correlation between interprofessional work and engagement ($K = 5, b_1 = 0.03, t = 5.13, p < .05, R^2$ analog = 1.00). Mean age moderated the correlation between

interprofessional work and job stress ($K = 11$, $b_1 = -0.04$, $t = -2.83$, $p > .05$, R^2 analog = .56).

The mean effect size for interprofessional work and autonomy was significantly moderated by the percentage of full-time workers in the sample ($K = 4$, $b_1 = -0.01$, $t = -6.60$, $p < .05$, R^2 analog = 1.00). Although there was one study with a large Cook's distance (Roulin, Mayor, & Bangerter, 2014), the analysis could not be conducted without it because of the small number of studies that reported percentage of full-time workers.

Sensitivity Analyses

The results of the one-study-removed sensitivity analyses, which estimates a mean effect size excluding one study at a time, indicated that the findings were relatively stable for the different outcomes. The biggest change in the mean effect sizes were found for the correlations between interprofessional work and engagement and interprofessional work and perceived service quality (mean $r = .33$ and $.46$, respectively). The range of the estimated mean r varied between $.29$ to $.38$ and between $.39$ to $.48$, respectively, dependent upon which study was excluded from the analysis.

The trim and fill method estimated missing studies for seven of the nine outcomes. The effect sizes for interprofessional work and autonomy, depersonalization, and engagement were missing one study each, interprofessional work and emotional exhaustion and personal accomplishment two, and the effect sizes for interprofessional work and intention to leave were missing three studies. The effect size for interprofessional work and job satisfaction were missing four studies. The changes in the adjusted point estimates and corresponding confidence intervals were generally small compared to the observed estimates and did not alter the conclusions (Sutton, 2006; Sutton, Duval, Tweedie, Abrams, & Jones, 2000). As an example, the adjusted effect size for interprofessional work and job satisfaction was $r = .39$ (95% CI [.33, .45]) compared to the observed statistics of mean $r = .36$ (95% CI [.30, .42]).

Discussion

The aim of this meta-analysis was to examine the relationship between interprofessional work, that is, teamwork, collaboration, and cooperation, of employees in the health and social care sector and different variables that are related to the Job Demands-Resources (JD-R) model. Another aim was to explain some of the variation between studies through the use of moderator analyses. The literature search led to 45 articles with a total of 53 independent samples that were included in the meta-analysis.

Most included articles studied nurses working in hospitals. There were only seven samples that did not include nurses. Other health and social care professionals such as physicians and psychologists or social workers and child protection workers were rarely studied. This might be because those professions are less likely to work in groups like nurses in a hospital unit. It may also be that professionals working in other services in the municipality, like doctor's practices or family's houses, are more difficult to recruit. However, as those professions often depend or complement each other in their work, examining how they experience interprofessional work might be important in order to improve our overall understanding of the role they play as a job resource and in treatment outcomes. Therefore, more research about the importance of interprofessional work for other professions than nurses, working in other settings than hospitals, is clearly needed.

Primary outcomes

Overall, the direction and strength of the relationship between interprofessional work and the outcome variables was in accordance with the JD-R model. In general, the mean correlations between interprofessional work and positive personal outcomes were stronger than between interprofessional work and negative outcomes. Interprofessional work was negatively and mildly associated with job stress, burnout, and turnover intention, and positively, moderately strong with autonomy, engagement, perceived service quality, and job

satisfaction. The strongest relationship was found between interprofessional work and how the employees evaluated the quality of the service they provided.

Interprofessional work appears to have a two-sided significance, as it seems to be important for both patients or clients of health care services as well as for the professionals that deliver those services. Job resources are “physical, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands at the associated physiological and psychological costs ; (c) stimulate personal growth and development” (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001, p. 501). The current meta-analysis suggests that interprofessional work is linked to important individual and organizational outcomes for professionals. As we stated in the introduction, cooperation, collaboration, or teamwork have not explicitly been identified as job resources (Schaufeli & Taris, 2014). It would have therefore been ideal to examine the impact of these concepts individually on the study outcomes, however, we could not run these as separate analyses due to the small number of studies related to some concepts. As a result, we chose to rely on the concept of interprofessional work, with the understanding that these results are open to further refinement in the future. That said, the measures assess aspects of the same construct, that is, how professionals evaluate their work relationship with other professionals in order to fulfill work-related tasks. The findings from this study suggest that interprofessional work should be recognized as a job resource. These results support efforts to increase cooperation, collaboration, and teamwork by training health care professionals and ensuring that there is time and systems in place that promote collaborative work, though it remains to be seen which of these are most important for improving outcomes.

The second strongest correlation was found between interprofessional work and autonomy. Rafferty, Ball, and Aiken (2001) explained the strong association between teamwork and autonomy as a synergistic effect between the two variables. It could be that

people with a higher degree of freedom to make decisions and shape their daily work consult with, and receive advice from, colleagues more often. It could also be that employees that work autonomously benefit more from interprofessional work and that they try to establish good working relationships in order to exchange knowledge and get support from colleagues.

The third strongest association, and the most extensively studied, was the relationship between interprofessional work and job satisfaction. A total of 23 articles reported results for 25 independent samples. The estimated effect size was the same as that found by Zangaro and Soeken (2007), whose results were based on only six studies.

The strongest negative relationship was found between interprofessional work and the main dimension of burnout: emotional exhaustion. It seems that the interest in the relationship of interprofessional work and burnout is relatively new. The first study that reported results for emotional exhaustion was published in 1997 followed by two studies from 2001 and 2006, and in nine articles that were published after 2011. The results from the present study replicate the relationship between the job resources social support and safety climate with burnout in health care personnel as found in a meta-analysis by Nahrgang, et al. (2011). In their meta-analysis, however, Nahrgang and colleagues' variable for burnout included depression, anxiety, health, and stress, while burnout was primarily assessed using the Maslach Burnout Inventory in the current meta-analysis.

Engagement, on the other hand, is a relatively new concept, compared to burnout, and the studies that examined the relationship with interprofessional work were all published after 2011. None of them were conducted in the USA. Compared to other job resources that were examined in other meta-analyses, the strength of the relationship between interprofessional work and engagement was about the same as between social support, autonomy, or feedback with engagement (Crawford, et al., 2010; Halbesleben, 2010).

Moderator Analyses

In general, there was a high amount of true variance between the studies. This does not seem to be unusual as two out of the three meta-analyses that used the JD-R model reported comparable results (Crawford, et al., 2010; Halbesleben, 2010). Unfortunately, none of those meta-analyses reported or conducted moderator analyses to examine the sources of this variation. Although we conducted multiple categorical moderator analyses, there were only five significant results; three of the significant results were based on the different ways that interprofessional work was assessed. Effect sizes were larger for teamwork and burnout (emotional exhaustion and depersonalization), and teamwork and turnover intention compared to the effect sizes for nurse-physician collaboration. These results suggest that teamwork is more important for the prevention of burnout and turnover. The type of interprofessional work did not significantly identify differences for the remaining effect sizes for the outcomes job stress, autonomy, job satisfaction, and perceived service quality.

Attitudes and norms of interprofessional work might not only vary between different professions within a country but also between countries. For example, there may be a stronger hierarchical relationship between nurses and physicians in Germany compared to the Scandinavian countries or to the USA as indicated by Hofstede's (1991) power distance index. Because of the limited number of studies, we could only test for differences between the USA and countries that are not the USA for four of the nine outcomes (autonomy, job satisfaction, turnover intention, and perceived service quality). Differences were only found for the mean correlation of interprofessional work and perceived service quality. The mean correlation was more than twice as high for studies from the USA compared to the coefficient for studies that were not from the USA. The studies from the USA that reported this outcome were conducted using either nurse or physician samples. These findings underline the

importance of interprofessional working relationships and how the employees rate the quality of service they provide as crucial in the USA.

The meta-regression analyses indicated a stronger relationship between interprofessional work and turnover intention for younger workers compared to older ones. Similarly, Kim and Kao (2014) found a negative, small relationship between age and turnover intention among child welfare workers but concluded that the effect of demographic predictors was small and negligible, especially when compared to the other variables they examined (e.g., emotional exhaustion).

Limitations

The majority of included studies examined female nurses who worked in hospitals and one could question if those findings are also valid for other health or social care professionals such as social or child protection workers, physicians, or midwives. This may reduce the generalizability of our findings to other professions working in other institutions than hospitals.

The vast majority of included studies in the meta-analyses were cross-sectional. Studies with a longitudinal design would be desirable in order to explore the possible causal links and the direction of the relationship between interprofessional work and other important variables. Furthermore, the findings of the articles that were included in the meta-analysis were based on self-report measurements that were filled in by the employees, which may result in reporter bias. Another source of potential bias is the use of a large number of different questionnaires to assess interprofessional work in the primary studies.

The categorization of interprofessional work in teamwork, collaboration, nurse-physician collaboration, and cooperation was sometimes problematic. Generally, it seems to be difficult to establish a clear border between these concepts as they share many key

dimensions. The Journal of Interprofessional Care writes on its homepage that there is an “ongoing terminological uncertainty within the interprofessional field”. Studies using these concepts do not always give a clear definition of its content. As mentioned before, the measures do assess aspects of the same construct, that is, how professionals assess their work relationship with other professionals in order to fulfill work-related tasks. Studies that assessed the social aspects of work relationships were excluded.

Some moderator analyses could not be conducted because there were too few studies. It would have been interesting to examine, for example, if there are differences in the relationship between interprofessional work and perceived service quality ratings between different professionals as indicated by Shannon, Mitchell, and Cain (2002). The moderator analyses were also based on a relatively small number of studies. This does not only lead to low power and unreliable estimates, but also to the fact that individual studies might have a strong influence on the results, as shown in the meta-regression analyses (López-López, Marín-Martínez, Sánchez-Meca, Van den Noortgate, & Viechtbauer, 2014). Because of this potential for overly influential studies, the findings were reported with and without those studies included in the meta-regression. Another limitation is that the analysis of many outcomes can increase the risk of the incorrect rejection of the null hypothesis due to chance (Bender et al., 2008; Imberger, Vejlbj, Hansen, Moller, & Wetterslev, 2011).

Conclusion

Job resources are important for the health and well-being of employees because they temper the negative effects of job demands, promote work engagement, and produce positive organizational outcomes. The results of this study suggest that interprofessional work (teamwork, collaboration, cooperation) is linked to important outcomes for employees working in the health and social care sector. The relationship between interprofessional work and the outcome variables was, as expected, negatively related with job stress, burnout, and

turnover intention and positively related with autonomy, engagement, job satisfaction, and perceived service quality. Identifying interprofessional work as a job resource has implications related to the training of professionals as well as to how health and social services should be organized in order to lead to better outcomes for employees and clients.

The findings underline the importance of measures or interventions that promote interprofessional working relationships at the pre- and post-licensed level, and that additional research is needed to examine their impact on effectiveness. In the meantime, health and social care organizations should ensure that there are systems in place that promote interprofessional work.

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Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (N) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|------------------|----------------|---------------------------|---------------------------------------|--|--|
| Adams (2000) | England | Hospital | Nurses (N = 834) | Collaboration | -Job satisfaction |
| Baggs (1990) | USA | Hospital | Nurses (N = 68) | -Nurse-physician collaboration | -Job satisfaction |
| Baumgardt (2015) | Switzerland | Doctor's practice | Psychiatrists (N = 352) | -Cooperation (quality; 1 very good to 5 unsatisfying) | -Perceived service quality (patient care) -Job satisfaction (global item) -EE, PA, and depersonalization |
| Begat (2005) | Norway | Hospital | Nurses (N = 71) | -Collaboration | -Perceived service quality (patient-oriented care and the desire to provide high-quality care) |
| Blake (2013) | USA | Hospital | Nurses (N = 415) | -Collaboration | -Turnover intention (intention to leave) |
| Bratt (2000) | USA and Canada | Hospital | Nurses (N = 1728) | -Nurse-physician collaboration | -(Professional) job satisfaction -Job stress |
| Brunetto (2013) | Australia | Hospital | Nurses (N = 510) | -Teamwork | -Engagement -Turnover intention |
| | USA | Hospital | Nurses (N = 718) | -Teamwork | -Engagement -Turnover intention |
| Byers (1999) | USA | Army primary care clinics | Mixed (physicians and nurses, N = 58) | -Collaboration | -Autonomy -Job satisfaction |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (<i>N</i>) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|-----------------|-------------|-------------|---|--|--|
| Caselman (2007) | USA | School | Social workers (<i>N</i> = 48) | -Collaboration (1 = excellent to 4 = poor) | -Turnover intention (intent to stay) |
| Chaboyer (2001) | Australia | Hospital | Nurses (<i>N</i> = 555) | -Collaboration | -PA (job valuation) |
| Chaboyer (1999) | Australia | Hospital | Nurses (<i>N</i> = 135) | -Collaboration | -Job satisfaction |
| Cheng (2013) | Australia | Hospital | Nurses (<i>N</i> = 201) | -Teamwork | -EE -Perceived service quality (quality of care, socio and tech) -Turnover intention -Depersonalization (disengagement) |
| Decker (1997) | USA | Hospital | Nurses (<i>N</i> = 376) | -Mixed | -Job satisfaction |
| Foley (2002) | USA | Hospital | Nurses (<i>N</i> = 103) | -Nurse–physician collaboration | -Autonomy |
| Galletta (2016) | Italy | Hospital | Nurses (<i>N</i> = 1024) | -Nurse–physician collaboration | -Job satisfaction -Turnover intention |
| Galletta (2013) | Italy | Hospital | Nurses (<i>N</i> = 832) | -Nurse–physician collaboration | -Turnover intention |
| Gevers (2010) | Netherlands | Hospital | Mixed (nurses, and physicians, <i>N</i> = 48) | -Teamwork | -Job stress (chronic cognitive- and emotional demands) |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (N) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|-------------------|---------|---------------|---|--------------------------------|--|
| Hamric (2007) | USA | Hospital | Physicians (N = 29), | -Collaboration | -Perceived service quality (satisfaction with quality of care) |
| | USA | Hospital | Nurses (N = 106) | -Collaboration | -Perceived service quality (satisfaction with quality of care) |
| | USA | Hospital | Nurses (N = 90) | -Collaboration | -Perceived service quality (satisfaction with quality of care) |
| Havens (2010) | USA | Hospital | Nurses (N = 747) | -Collaboration | -Perceived service quality (quality of patient care) |
| Heponiemi (2014) | Finland | Mixed setting | Physicians (N = 2776) | -Teamwork | -Job stress (time pressure and patient-related stress) -Autonomy (job control) -Job satisfaction |
| Karanikola (2014) | Italy | Hospital | Nurses (N = 566) | -Nurse-physician collaboration | -Job satisfaction -(Overall) autonomy -Turnover intention (intention to quit) |
| Kivimäki (2007) | Finland | Hospital | Mixed (hospital staff, N = 5098) | - Teamwork | -Turnover intention (intention to leave) |
| Kruzich (2014) | USA | Child welfare | Public child welfare workers (N = 1040) | - Teamwork | -Turnover intention (intention to stay) |
| Kudo (2006) | Japan | Hospital | Nurses (N = 168) | -Cooperation | -Turnover intention |
| Larrabee (2004) | USA | Hospital | Nurses (N = 90) | -Nurse-physician collaboration | -Job satisfaction |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis (continued)

| Study | Country | Institution | Profession (<i>N</i>) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|--------------------|---------|-------------------------------------|--|--------------------------------|---|
| Laschinger (2003) | Canada | Hospital | Nurses (<i>N</i> = 233) | -Nurse-physician collaboration | -Job satisfaction |
| | | Hospital | Nurses (<i>N</i> = 263) | -Nurse-physician collaboration | -Job satisfaction |
| | | Hospital | Nurses (<i>N</i> = 55) | -Nurse-physician collaboration | -Job satisfaction |
| Laubach (1999) | Germany | Hospital | Nurses (<i>N</i> = 134) | -Cooperation | -Job stress (stress due to work conditions and patients) |
| Lee (2015) | Taiwan | Hospital | Nurses (<i>N</i> = 1283) | -Teamwork | -Autonomy (milieu of respect and autonomy) -Turnover intention (intention to leave the organization) -Perceived service quality (nursing staffing and patient care) |
| Leiter (2006) | Canada | Hospital | Nurses (<i>N</i> = 8597) | -Nurse-physician collaboration | -EE, PA, and depersonalization -Perceived service quality (nursing model) |
| Manojlovich (2005) | USA | Hospital | Nurses (<i>N</i> = 284) | -Nurse-physician collaboration | -Job satisfaction |
| Martinussen (2016) | Norway | Different community health services | Mixed (mostly health professionals including nurses, <i>N</i> = 118-122) | -Collaboration | -Job stress (workload) -Autonomy -EE -Engagement -Perceived service quality -Job satisfaction |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (<i>N</i>) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|--------------------|--------------------------|-------------------------------------|--|--------------------------------|---|
| Martinussen (2012) | Norway | Different community health services | Mostly health professionals with only a few nurses (<i>N</i> = 146-151) | -Collaboration | -Job stress (workload) -Autonomy -EE -Engagement -Perceived service quality |
| Maylone (2011) | USA | Mixed setting | Nurses (<i>N</i> = 99) | -Collaboration | - Autonomy |
| Mijakoski (2015) | Croatia | Hospital | Nurses (<i>N</i> = 138) | -Teamwork | -EE and Depersonalization -Job stress (emotional- and cognitive demands) |
| | Macedonia | Hospital | Nurses (<i>N</i> = 185) | -Teamwork | -EE and depersonalization -Job stress (emotional- and cognitive demands) |
| Montgomery (2015) | Seven European countries | Hospital | Nurses (<i>N</i> = 1156) | -Teamwork | -Job stress (workload and emotional demands) -EE and depersonalization -Engagement (vigor and dedication) |
| Nolting (2006) | Germany | Hospital | Nurses (<i>N</i> = 454) | -Nurse-physician collaboration | -Turnover intention (intention to leave the organization) |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (<i>N</i>) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|-----------------|-------------|-------------------------------|--|--------------------------------|---|
| Onyett (1997) | UK | Community mental health teams | Mixed (mental health professions including nurses, <i>N</i> = 445) | -Teamwork | -EE, PA, and depersonalization -Job satisfaction |
| Ouzouni (2009) | Greece | Hospital | Nurses (<i>N</i> = 85) | -Nurse-physician collaboration | -Stress -Job satisfaction |
| Rafferty (2001) | England | Hospital | Nurses (<i>N</i> = 5006) | -Nurse-physician collaboration | -Autonomy -EE -Job satisfaction -Perceived service quality (perceived quality of care) |
| Roulin (2014) | Switzerland | Mixed setting | Nurses (<i>N</i> = 1547) | -Nurse-physician collaboration | -EE, PA, and depersonalization -Autonomy -Job satisfaction -Turnover intention (intent to leave) |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (N) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|-----------------|-----------|---------------|---------------------------------|---|--|
| Sakowski (2012) | Poland | Mixed setting | Nurses (N = 200) | -Cooperation | -Job satisfaction |
| Shannon (2002) | USA | Hospital | Nurses (N = 518) | -Nurse-physician collaboration (assessed by nurses) | -Perceived service quality (nurses assessed views on quality and patient satisfaction) -(Nurses) job satisfaction |
| | | | Physicians (N = 515) | -Nurse-physician collaboration (assessed by physicians) | -Perceived service quality (physicians assessed views on quality and patient satisfaction) |
| So (2011) | Hong Kong | Hospital | Mixed (hospital staff, N = 197) | -Teamwork | -Job stress (work stress) -Autonomy -Job satisfaction |
| | England | Hospital | Mixed (hospital staff, N = 273) | -Teamwork | -Job stress (work stress) -Autonomy -Job satisfaction |

(continued)

Table 1

Characteristics of Studies Included in the Meta-Analysis

| Study | Country | Institution | Profession (<i>N</i>) | Assessment of interprof. work | Outcome measures (label/s reported in study) |
|---------------------|-----------------------------|-------------|---------------------------|--------------------------------|---|
| Van Bogaert (2013) | Belgium | Hospital | Nurses (<i>N</i> = 1201) | -Nurse-physician collaboration | -Job stress (workload) -EE, PA, and depersonalization -Perceived service quality (nurse-assessed quality of care) |
| Van der Doef (2012) | Kenya, Tanzania, and Uganda | Hospital | Nurses (<i>N</i> = 305) | -Cooperation | -Job stress (workload) -Job satisfaction -EE, PA, and depersonalization |

Note. Assessment of Interprofessional work = the labels used in the moderator analyses are reported; EE = emotional exhaustion; PA = personal

accomplishment.

Table 2

Meta-analyses Results for the Relationship between Interprofessional Work and Different Predictors and Outcomes

| Variable | <i>K</i> | <i>N</i> | Mean <i>r</i> Interp. work | 95% CI | <i>Q</i> | <i>I</i> ² |
|--------------------------------|----------|----------|-------------------------------|--------------|------------|-----------------------|
| Demands & resources | | | | | | |
| Job stress | 13 | 5841 | -.13 | -.23 to -.02 | 170.76*** | 92.97 |
| Autonomy | 11 | 9400 | .38 | .31 to .45 | 89.46*** | 88.82 |
| Worker well-being | | | | | | |
| Emotional exhaustion | 13 | 19524 | -.22 | -.26 to -.18 | 51.69*** | 76.78 |
| Depersonalization | 10 | 14250 | -.17 | -.22 to -.11 | 52.60*** | 82.89 |
| Personal accomplishment | 6 | 12447 | .15 | .13 to .17 | 3.47 | 0.00 |
| Engagement | 5 | 2775 | .33 | .22 to .42 | 28.46*** | 85.94 |
| Organizational outcomes | | | | | | |
| Job satisfaction | 25 | 15321 | .36 | .30 to .42 | 372.97*** | 93.57 |
| Turnover intention | 14 | 13904 | -.21 | -.25 to -.17 | 60.97*** | 78.68 |
| Perceived service quality | 15 | 18984 | .46 | .33 to .57 | 1127.69*** | 98.76 |

Note. *K* = number of samples; *N* = total sample size; Interp. work = interprofessional work;

95% CI = 95% confidence interval; *Q* = test for homogeneity; *I*² = percent of true heterogeneity.

****p* < .001.

Table 3

Results of the Categorical Moderator Analyses for the Different Correlations between Interprofessional Work and Different Predictors and Outcomes

| Variable | Q_B | K | N | Mean r Interp. work | 95% CI | Q | I^2 |
|--------------------------------|----------|-----|-------|--------------------------|--------------|-------------------|-------|
| Demands & Resources | | | | | | | |
| Job stress | | | | | | | |
| Interprof. work | 0.01 | | | | | | |
| Nurse-physician | | 3 | 3014 | -.18 | -.42 to -.09 | 84.16*** | 97.62 |
| Teamwork | | 6 | 2120 | -.19 | -.25 to -.13 | 7.72 | 35.24 |
| Autonomy | | | | | | | |
| Country | 0.04 | | | | | | |
| Non-USA | | 8 | 9140 | .40 | .33 to .46 | 55.84*** | 87.46 |
| USA | | 3 | 260 | .35 | -.13 to .70 | 31.30*** | 93.61 |
| Institution | 0.00 | | | | | | |
| Non-hospital | | 3 | 326 | .40 | .21 to .55 | 6.53* | 69.36 |
| Hospital | | 6 | 7428 | .39 | .35 to .44 | 13.58* | 63.18 |
| Interprof. work | 0.18 | | | | | | |
| Collaboration | | 3 | 326 | .40 | .21 to .55 | 6.53* | 69.36 |
| Nurse-physician | | 5 | 7321 | .39 | .27 to .49 | 71.67*** | 94.42 |
| Teamwork | | 3 | 4529 | .36 | .27 to .44 | 5.51 | 63.68 |
| Worker well-being | | | | | | | |
| Emotional exhaustion | | | | | | | |
| Institution | 0.00 | | | | | | |
| Non-hospital | | 4 | 1065 | -.23 | -.40 to -.04 | 25.92*** | 88.42 |
| Hospital | | 8 | 16912 | -.23 | -.26 to -.19 | 23.95** | 70.77 |
| Interprof. work | 15.72*** | | | | | | |
| Nurse-physician | | 4 | 16351 | -.20 | -.23 to -.17 | 9.41* | 68.11 |
| Teamwork | | 5 | 2248 | -.30 | -.34 to -.26 | 0.73 | 0.00 |
| Depersonalization | | | | | | | |
| Interprof. work | 17.83*** | | | | | | |
| Nurse-physician | | 3 | 11345 | -.14 | -.18 to -.09 | 5.93 [†] | 66.28 |
| Teamwork | | 5 | 2248 | -.26 | -.29 to -.22 | 3.57 | 0.00 |
| Organizational outcomes | | | | | | | |
| Job satisfaction | | | | | | | |
| Country | 0.84 | | | | | | |
| Non-USA | | 18 | 12199 | .33 | .28 to .38 | 116.78*** | 85.44 |
| USA | | 7 | 3122 | .44 | .20 to .62 | 238.92*** | 97.49 |
| Institution | | | | | | | |
| Non-hospital | 0.33 | 4 | 975 | .41 | .22 to .57 | 27.14*** | 88.94 |
| Hospital | | 19 | 12599 | .35 | .28 to .43 | 335.24*** | 94.63 |
| Interprof. work | 0.36 | | | | | | |
| Collaboration | | 5 | 1702 | .35 | .27 to .42 | 8.55 | 53.23 |
| Nurse-physician | | 14 | 11671 | .38 | .28 to .46 | 324.89*** | 96.00 |
| Teamwork | | 3 | 915 | .32 | .08 to .53 | 28.37*** | 92.95 |

(continued)

Table 3

Results of the Categorical Moderator Analyses for the Different Correlations between Interprofessional Work and Different Predictors and Outcomes

| Variable | Q_B | K | N | Mean r Interp. work | 95% CI | Q | I^2 |
|---------------------------|--------|-----|-------|--------------------------|--------------|------------|-------|
| Turnover intention | | | | | | | |
| Country | 0.00 | | | | | | |
| Non-USA | | 10 | 11683 | -.21 | -.25 to -.17 | 30.22*** | 70.22 |
| USA | | 4 | 2221 | -.21 | -.35 to -.06 | 30.58*** | 90.19 |
| Interprof. work | 9.43** | | | | | | |
| Nurse-physician | | 5 | 4423 | -.18 | -.20 to -.15 | 2.01 | 0.00 |
| Teamwork | | 6 | 8850 | -.26 | -.30 to -.21 | 16.55** | 69.78 |
| Perceived service quality | | | | | | | |
| Country | 5.95* | | | | | | |
| Non-USA | | 9 | 16979 | .27 | .14 to .39 | 448.01*** | 98.21 |
| USA | | 6 | 2005 | .70 | .39 to .86 | 438.00*** | 98.86 |
| Institution | 9.23** | | | | | | |
| Non-hospital | | 3 | 620 | .26 | .18 to .33 | 0.21 | 0.00 |
| Hospital | | 12 | 18364 | .50 | .37 to .62 | 1103.51*** | 99.00 |
| Profession | 0.81 | | | | | | |
| Non-nurse | | 4 | 1044 | .65 | .01 to .91 | 389.22*** | 99.23 |
| Nurse | | 10 | 17820 | .39 | .27 to .50 | 528.25*** | 98.30 |
| Interprof. work | 0.50 | | | | | | |
| Collaboration | | 6 | 1240 | .49 | .32 to .64 | 46.99*** | 89.36 |
| Nurse-physician | | 5 | 15837 | .58 | .37 to .74 | 966.15*** | 99.59 |

Note. Q_B = test for subgroup differences; K = number of samples; N = total sample size;

Mean r collab. = mean r collaboration; 95% CI = 95% confidence interval; Q = test for

homogeneity; I^2 = percent of true heterogeneity; Interp. work = interprofessional work;

Nurse-physician = nurse-physician collaboration. The results of the moderator analyses were reported for categorical variables with at least three studies included in at least two subgroups.

† $p = .052$. * $p < .05$. ** $p < .01$. *** $p < .001$.

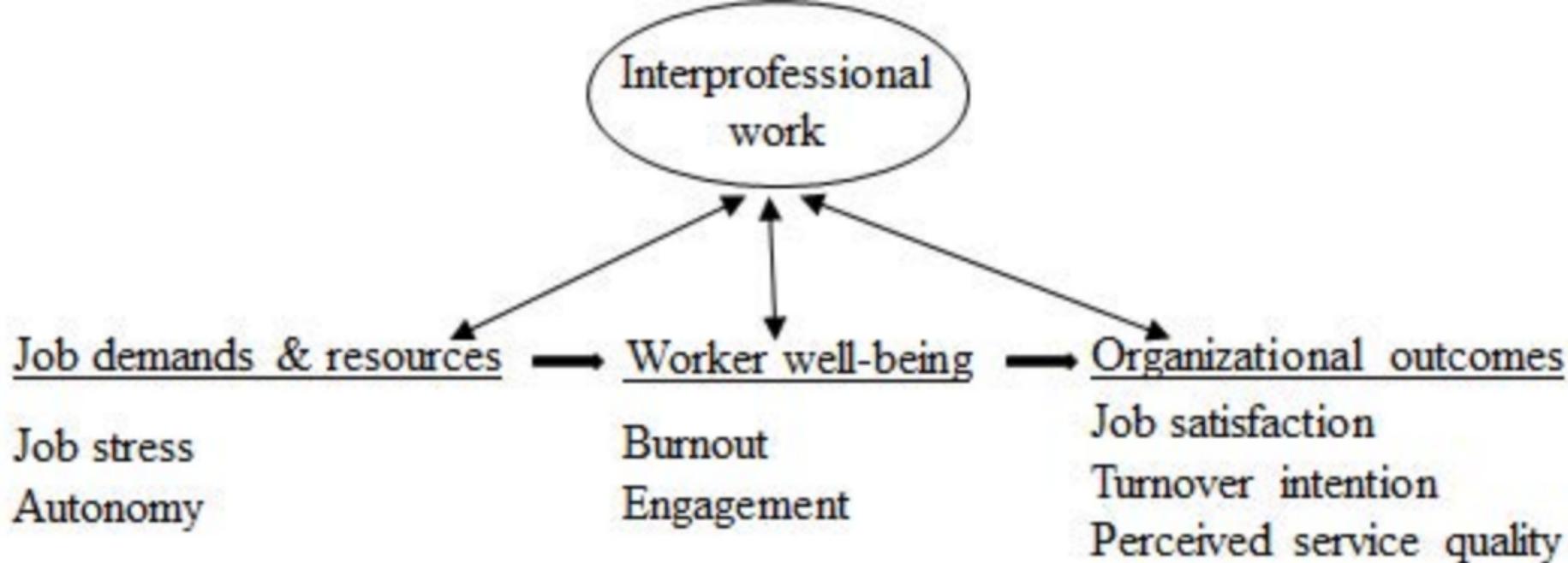


Figure 1. An illustration of the conceptual framework used in the current meta-analysis. The unidirectional arrows from job demands & resources to worker well-being and to organizational outcomes represent the theoretical relationship of the variables according to the Job Demands-Resources model.

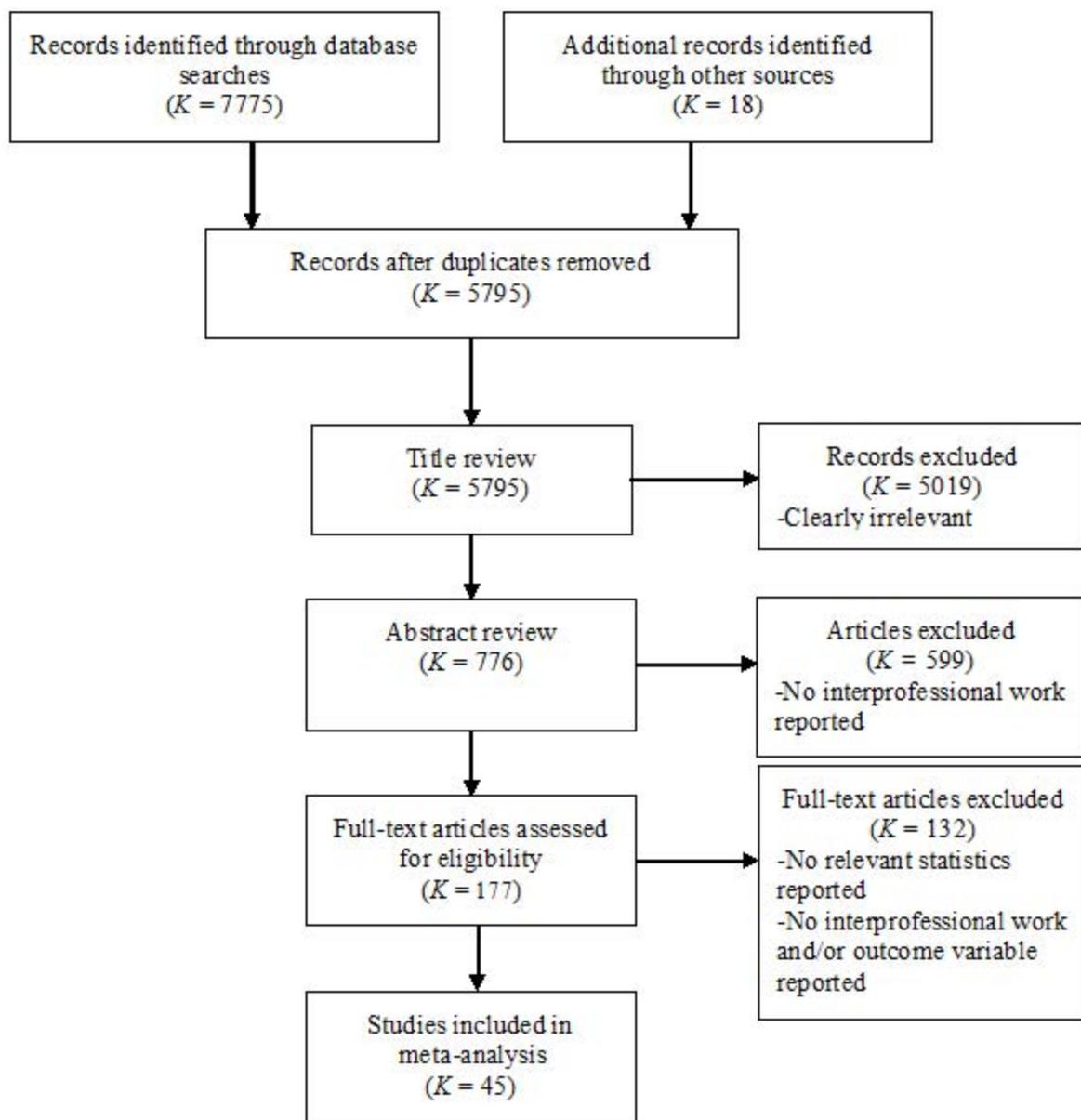


Figure 2. Flow diagram of the literature search.