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On the experience of conducting a Systematic Review in Industrial, Work, and Organizational Psychology: Yes, it is worthwhile

Citation for published version:

Rojon, C, McDowall, A & Saunders, MNK 2011, 'On the experience of conducting a Systematic Review in Industrial, Work, and Organizational Psychology: Yes, it is worthwhile', *Journal of Personnel Psychology*, vol. 10, no. 3, pp. 133-138. <https://doi.org/10.1027/1866-5888/a000041>

Digital Object Identifier (DOI):

[10.1027/1866-5888/a000041](https://doi.org/10.1027/1866-5888/a000041)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

Journal of Personnel Psychology

Publisher Rights Statement:

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Running head: SYSTEMATIC REVIEWS IN IWO PSYCHOLOGY

On the Experience of Conducting a Systematic Review in Industrial, Work and Organizational
Psychology: Yes, It Is Worthwhile

Abstract

Systematic Review methodology (SRm) is an increasingly popular choice for literature reviews in the Social Sciences. Although, compared to traditional narrative reviews SRm appears time-consuming and laborious, transparency and replicability of the methodology is argued to facilitate greater clarity of review. Nevertheless, researchers in Industrial, Work and Organizational (IWO) Psychology have yet to embrace this methodology. Drawing on experience from conducting a Systematic Review (SR) of individual workplace performance we explore the premise: The advantages of SRm to IWO Psychology researchers outweigh the disadvantages. We offer observations, insights and potential solutions to challenges faced during the reviewing process, concluding that SRm is worthwhile for IWO Psychology researchers.

Keywords: Systematic Review; literature review; evidence based research; performance

Prior to embarking on a new research project, an initial exploration of what is already known is crucial, supporting an informed decision about the focus and execution of future studies. Usually, this involves reviewing the literature on the topic; a range of possible review strategies (cf. Denyer, 2009; Jesson, Matheson & Lacey, 2011) being available to Industrial, Work and Organizational (IWO) Psychology researchers, including the Systematic Review methodology (SRm). SRm is argued to offer advantages over traditional literature reviews, allowing sense to be made of large bodies of information whilst minimizing bias (Petticrew & Roberts, 2006), and has already gained acceptance in the Social Sciences (Harlen & Crick, 2004). Yet, IWO Psychology researchers have still to embrace SRm, a search of 13 relevant journals (e.g. *Journal of Occupational and Organizational Psychology*, *Journal of Personnel Psychology*) eliciting no published systematic reviews (SRs). We therefore examine the premise that the advantages of SRm to IWO Psychology researchers outweigh the disadvantages, offering observations and insights from our experience of conducting a SR of individual workplace performance; addressing the question “is it worth it?”

What is Systematic Review methodology?

SRm is defined as:

a specific methodology that locates existing studies, selects and evaluates contributions, analyses and synthesizes data, and reports the evidence in such a way that allows reasonably clear conclusions to be reached about what is and is not known (Denyer & Tranfield, 2009, p. 671).

Originating in the medical sciences, SRm has been used widely, often to evaluate the effectiveness of specific therapies or treatments (Leucht, Kissling & Davis, 2009). During the last two decades, the methodology's importance has been recognized by other disciplines: Within Social Sciences, the Evidence for Policy and Practice Information and Coordinating Centre was established in 1995, utilizing SRm to provide more evidence-based guidance for policy and practice (Harlen & Crick, 2004). More recently, the value of SRm for evidence-based research has been acknowledged by Management and Organization Sciences (MOS) researchers, arguing it is a "key methodology for locating, appraising, synthesizing, and reporting 'best evidence'" (Briner, Denyer & Rousseau, 2009, p. 24), supporting its potential for IWO Psychology.

Reasons for Using Systematic Review methodology

SRm is distinguished from traditional narrative and other forms of literature review in two interrelated ways (Petticrew & Roberts, 2006). Firstly, SRm adheres closely to a set of processes to limit researcher bias through attempting to identify, appraise and synthesize all studies relevant to the research question(s). Secondly, these processes are defined in advance and reported in sufficient detail to enable replication.

However, the key question for IWO Psychology researchers is: What advantages does this methodology for reviewing the literature offer? This is important given the availability of alternatives including meta-narrative approaches (e.g. Greenhalgh et al., 2005), critical appraisals (e.g. Hill & Spittlehouse, 2003) and realist reviews (e.g. Pawson, Greenhalgh, Harvey & Walshe, 2005). With regards to our question, SRm literature highlights distinct advantages over such approaches, summarized in Table 1.

** Table 1 about here**

Yet literature also acknowledges SRm as laborious and time-consuming. The average SR requires seven months' work by a team of reviewers (Allen & Olkin, 1999; cited in Petticrew & Roberts, 2006), emphasizing the need to answer the question "is it worthwhile?" We undertake this by drawing on experiences of a transdisciplinary SR of individual workplace performance combining literatures from IWO Psychology and MOS. Our motivation for this SR was to provide an up-to-date, exhaustive integration of the available research evidence to inform researchers and practitioners alike, since previous reviews were undertaken mostly to the 1990s (e.g. Arvey & Murphy, 1998) addressing the topic less comprehensively than achieved here. Whilst we considered the structured and meticulous procedures applied in SRm a particularly suitable aid in consolidating the ample, heterogeneous literature available; it is useful to explore the extent the advantages of SRm outweigh the disadvantages.

Method

The focus and conduct of SRm varies between disciplines. Petticrew and Roberts (2006) have developed guidelines for the Social Sciences, using SRm to address evidence about a variety of questions, rather than focusing solely on cause-effect relationships as emphasized in medical sciences. In MOS research, Denyer and Tranfield (2009) have adapted medical sciences' guidance to suit their discipline, offering four (amended) methodological principles: i) transparent, ii) inclusive, iii) explanatory and iv) heuristic. Both sets of guidelines can be integrated as a process consisting of a scoping study followed by five discrete review stages. These we now outline and illustrate using the review topic Individual Workplace Performance, reflecting on challenges encountered and offering possible solutions.

0 Pre-Review Scoping Study

A scoping study typically precedes the actual review to determine the basis of the literature search, ascertaining if a review is actually needed or if it would be mere replication. This is of particular importance for cross-disciplinary topics such as individual workplace performance due to the dispersed spread of evidence. An a-priori search within relevant SR databases (e.g. Cochrane Database of Systematic Reviews) indicated no previous reviews had been undertaken on this topic, indicating a possible need. To identify the precise focus for the review, we undertook an initial, exploratory search for relevant literature. This revealed diverse understandings of the individual workplace performance construct, in particular its definition, conceptualization and measurement (for example is the construct uni- or multi-dimensional?). These issues provided the focus for our subsequent review.

1 Determination of Specific Review Questions

Clearly framed, answerable research questions provide the basis for selecting potentially relevant studies for a SR. As recommended (Denyer & Tranfield, 2009; Petticrew & Roberts, 2006), we consulted an advisory panel of ten experts (non-probability maximum variation sample). These comprised Psychology and MOS academics with research foci in workplace performance (e.g. professors of Human Resource Management (HRM) and Occupational Psychology), chosen on the grounds of having specific expertise on the topic; alongside private and public sector HRM practitioners (e.g. an Organisational Development Manager in government administration) to provide a practitioner perspective, based on real-world experience of performance management.

We conducted semi-structured interviews with these heterogeneous stakeholders asking broad open questions to ensure that the review questions would remain aligned with our focus, as elicited from the initial scoping stage, and useful to a wider community.

Qualitative content analysis of these interviews involved examination and interpretation of responses focusing on main themes to firm up review questions from the experts' suggestions. Reconciling different stakeholder perspectives proved challenging, especially integrating academic and practitioner views; we resolved this issue by ensuring a balance in the review questions. Feedback from the expert panel indicated that the final research questions were sufficiently focused to allow new meaningful theoretical insights, whilst comprehensive to inform practical performance contexts, namely:

1. How is individual workplace performance as a criterion defined and conceptualized?
2. How is individual workplace performance measured and why?
3. What are the relationships, if any, between overall versus criterion-specific measures of workplace performance and established predictors (i.e. ability and personality measures)?

2 Searching the Literature

We undertook a comprehensive search to locate all studies potentially relevant to these review questions. The challenge was to ensure that potential key references were not excluded. Tailored search strings combined terms relating to the research topic; for example, to find references pertaining to 'measurement', the string "“assess* OR apprais* OR evaluat* OR test OR rating OR review OR measure OR manage was used*”", the asterisk enabling searching on truncated word forms. Pilot database searches proved useful in determining the utility of such strings and specifying a start date.

To help ensure maximum saturation, twelve databases and proceedings from four conferences (e.g. Society for Industrial and Organizational Psychology Conference) were used following a subject librarian's advice. Further manual searches (for three journals inaccessible through the databases, e.g. 'Assessment & Development Matters') were undertaken and requests sent to scholars with relevant research interests. After removal of duplicates, this resulted in 59,465 references (Table 2).

Table 2 about here

3 Selecting and Evaluating References

References were screened initially by title for relevance to the three review questions, reducing their number to 3,010. Subsequent screening by title and abstract reduced their number to 314. Having obtained full text copies of all, these were read and evaluated using inclusion/exclusion criteria (Table 3) derived from researchers' (mostly with experience in SRm) suggestions (Briner et al., 2009; Cassell, 2010; Denyer, 2009) – this being a time-consuming process, taking approximately three months. Despite precisely defined criteria, digression was a potential challenge; being minimized through constant focus on the review questions. The 171 publications that met the inclusion criteria of satisfactory quality and contributing to answering the review questions were our final pool of references (Petticrew & Roberts, 2006). For each study key information (e.g. study context, data collection methods, findings in relation to the review questions) was recorded using a data extraction form.

** Table 3 about here**

4 Analyzing and Synthesizing Findings

SRm literature (e.g. Petticrew & Roberts, 2006; Rousseau, Manning & Denyer, 2008) indicates a variety of processes for synthesizing evidence recorded on data extraction forms (e.g. synthesis by explanation or aggregation), depending on the type of review questions asked and the available data. For the first two review questions, evidence was synthesized qualitatively through narrative integration, involving comparison and corroboration (Rousseau et al, 2008). The third review question was addressed quantitatively through aggregation, using statistical meta-analysis (Hunter & Schmidt, 2004). This combination of analytic methods allowed full integration of evidence considered.

5 Discussion and Utilization of the Findings

Review findings addressed all three questions accentuating what was known, what was not known, where future research should focus and how this might inform policy and practice. Overall, the SR process was laborious, taking nine months and offering a potential challenge regarding loss of motivation. We avoided this through regular discussions with other systematic reviewers.

Results

Some 84.8% of the 171 publications used to address the three review questions were peer-reviewed journal articles, having been published in a wide variety of journals ($N=52$) (Table 4), over half being published in six journals. Documents included in the SR were published between 1959 and 2010, with more than 75% published in the last 20 years. Over half (53.2%) of publications included were considered of high overall quality as defined through the inclusion/exclusion criteria (Table 3). 19.3% of publications addressed at least two of the review questions. Questions 1, 2 and 3 were addressed respectively by 27.5%, 36.3% and 49.7% of publications, indicating that how individual workplace performance was defined and

conceptualized as a criterion was the least researched aspect, analysis of the data extraction forms enabling identification of knowledge gaps.

Table 4 about here

Discussion

This note has explored the premise that the advantages of SRm to IWO Psychology researchers outweigh the disadvantages, addressing the question “is it worth it?” Based on the experiences outlined we consider that, despite SRm being laborious and time-consuming for establishing best evidence, both process and outcome are worthwhile given the effort required. Firstly, the rigor and standardization of SRm results in greater transparency, explicitness and replicability than may be achieved through traditional narrative reviews. It is suited to topics such as workplace performance, where different disciplines and theoretical and practical orientations need to be integrated. Secondly, using an expert panel of academics and professionals to help determine review questions facilitates theoretical rigor and practical relevance in the review. Thirdly, using precise inclusion/exclusion criteria alongside continued focus on review questions ensures quality whilst minimizing digression.

Table 5 about here

Invariably SRm, regardless of the review topic, presents challenges. In our case, a major challenge, which reviewers with narrower or less commonly researched questions might not face, was dealing with the large number of references. Further challenges addressed during our SR, which we believe fellow researchers in IWO Psychology and neighboring disciplines (e.g. HRM) might encounter, alongside solutions and challenges experienced by reviewers in different

disciplines, are summarized in Table 5. Moreover, individuals planning a SR in similar contexts are advised to ensure stakeholders from constituent disciplines are involved in the scoping study and determination of specific review questions. SRm is not a universal process to be applied to all literature reviews. Rather, the purpose is to establish current best evidence regarding specified research questions, thereby allowing more informed decisions about future studies. It is therefore necessary to ensure the review focus is appraisal, synthesis and reporting of existing evidence. While this focus and thus SR may not always be appropriate, this note offers a better understanding of the utility of this methodology. We have found the experience of conducting a SR rewarding, owing to the structured approach taken, skills acquired, and increased confidence from a sound understanding of extant literature. We would therefore encourage IWO Psychology researchers to embrace and use SRm to their advantage to review best evidence from existing knowledge.

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Table 1

Advantages of Systematic Review methodology compared to other reviewing approaches

SRm (e.g. Briner & Rousseau, 2011; Denyer & Tranfield, 2009; Petticrew & Roberts, 2006)	Traditional narrative review (Jesson, Matheson & Lacey, 2011)	Meta-analysis (Hunter & Schmidt, 2004)
Rigor, thoroughness and objectivity through adherence to clear principles and prescribed stages of reviewing	Does not generally have a formal methodology, thus resulting in lacking rigor, transparency and replicability by others; but: allows more flexibility and exploration of researcher's ideas	Once appropriate meta-analysis method has been chosen (e.g. statistical meta-analysis), it is crucial to illustrate clearly process of locating, evaluating, selecting and coding studies to allow replicability
Consideration and reconciliation of all potentially relevant sources of information allows comprehensive collation of all existing evidence across relevant studies and integration of different schools of thought and research findings and is particularly suitable when aware of main themes concerning the review topic, but unsure of actual evidence	Researcher can focus on 'preferred' literature sources (e.g. favorite databases) and base review on a personal, purposive selection of materials they believe to be important, thus potentially introducing a one-sided or even biased argument	Researcher can be very selective as to which studies to include in their meta-analyses, thus potentially introducing researcher bias; not always made clear enough why some studies have been included whilst others have not

Facilitation of reviews of topics where a vast and heterogeneous body of literature is available by following an a priori developed protocol that clearly states tasks and stages of the reviewing process (e.g. selection and evaluation of references by means of inclusion/exclusion criteria)	There is not usually a review protocol or strategy or a defined method to follow, which can make it difficult to identify and review topics where a vast and heterogeneous body of literature is available	Can facilitate the quantitative review of areas within Psychology and other Social Sciences in which number of available studies is large and findings seem contradictory by adhering to statistical and psychometric principles of data analysis in meta-analysis
Combination of analysis and synthesis methods possible, i.e. can include both a narrative and a meta-analysis component	Whilst review may contain a meta-analysis, it is typically focused on the narrative component (qualitative synthesis)	Whilst review may contain narrative element, it is typically focused on the meta-analysis component (quantitative synthesis)

Table 2

Number of References Identified in Systematic Review Stages 2 and 3

Stage	Source/Process	Number of potentially relevant references
2	Searching the literature	
	Web of Science database	35,173
	PsycInfo database	11,381
	Business Source Complete database	9,079
	Medline database	4,145
	Emerald Management eJournals database	2,200
	IBSS (International Bibliography of the Social Sciences) database	874
	Psychology & Behavioral Sciences Collection database	708
	AOM (Academy of Management) Conference Proceedings database	301
	Psybooks database	54
	CIPD (Chartered Institute of Personnel and Development) Research Summaries database	34
	Manual searches (3 journals, 4 conferences, scholars' literature)	29
	British Library e-Theses database	23
	I&DeA (Improvement and Development Agency for Local Government) database	5
	Total (prior to removal of duplicates)	64,006
	Total (after removal of duplicates)	59,465
3	Selecting and evaluating references	
	Screening by title alone	3,010
	Screening by title and abstract	314
	Evaluation by full text	171

Table 3

Sample Inclusion/Exclusion Criteria for Study Selection

Criterion	Explanation of criterion
Does the study address any/all of the review's questions ? Is it relevant to any/all of the review questions?	Only studies that can contribute to answering any or all of the review questions are useful for the systematic review; all others are excluded outright
Is the study well informed by existing theory?	Outlining of previous findings and existing theory and integration within study (cf. Cassell, 2010; Denyer, 2009)
Are the purpose and aims of the study clearly specified?	Clear specification of the research questions and objectives addressed (cf. Denyer, 2009)
Are the methods chosen appropriate to the stated purpose?	Clear explanation of what methods of data collection were chosen and why (cf. Cassell, 2010; Denyer, 2009)
Does the study claim a contribution ?	Study creates, extends or advances knowledge in a meaningful way. Guidance for future research is provided
Is the study relevant for the practice ?	Usefulness and applicability of the results for a practitioner, such as an IWO psychologist, a human resources manager etc. Author comments on how this is the case (cf. Cassell, 2010; Denyer, 2009)
Are the conclusions well linked to the purpose and aims of the research?	Reference back to initially formulated research questions and aims; establishment of clear links (Cassell, 2010).

Table 4

Descriptive Statistics of the Publications Used in the Review (N=171)

Type of document	%/N	Peer-reviewed journals	%/N	Year of publication	%/N	Quality	%/N
Peer-reviewed journal articles	84.8/145	Journal of Applied Psychology	17.0/29	2001-2010	35.1/60	High overall quality	53.2/91
Non-peer-reviewed journal articles	1.2/2	Personnel Psychology	9.4/16	1991-2000	40.9/70	Above average overall quality	25.1/43
Journal articles (with peer-review status unclear)	1.2/2	International Journal of Selection and Assessment	7.6/13	1981-1990	10.5/18	Average overall quality	21.6/37
Book chapters	9.4/16	Human Performance	7.0/12	1971-1980	9.4/16		
Doctoral theses	2.3/4	Journal of Occupational and Organizational Psychology	4.7/8	1961-1970	3.5/6		
Conference proceedings	1.2/2	Journal of Business & Psychology	4.7/8	1951-1960	0.6/1		
		Other journals	41.1/59				

Note. An overall quality score ranging from 1 (*low overall quality*) to 5 (*high overall quality*) was obtained for each publication – this was based on the application of previously determined inclusion/exclusion criteria relating to quality (Table 3).

Table 5

Potential Challenges and Solutions: SRs in IWO Psychology (#) and other disciplines ()*

Stage	Potential challenge	Potential solution
1	Expert consultation to reflect on the review topic and to determine review question(s) #	<ul style="list-style-type: none"> - Involve a heterogeneous sample of stakeholders - Ask open, broad interview questions - Ensure resulting review questions are comprehensive, yet sufficiently focused - Justify the role of each stakeholder in the expert panel
	Analysis and reconciliation of different stakeholder perspectives #	Whilst review questions may have a more academic focus, answers need to be formulated in a way meaningful to both academics/researchers and practical contexts
2	Development of appropriate search terms/strings	<ul style="list-style-type: none"> - Discuss planned literature searches with librarian - Include any terms in the search strings that are related to the review question(s) - Conduct pilot searches
3 & 4	Reference management	<ul style="list-style-type: none"> - Accept only relevant studies of a satisfactory quality - Establish well defined inclusion/exclusion criteria - Focus on review question(s) throughout to avoid digression - Allow sufficient time to acquire and assess references
	Stringent inclusion/exclusion criteria (Smith, Devane, Begley & Clarke, 2011) *	- SRs in healthcare (such as Smith et al., 2011) may restrict their inclusion criteria to studies that are randomized controlled trials; such criteria are unlikely to be useful to SRs in IWO Psychology as they would delimit the scope of the review too strongly
Across all	Time management	<ul style="list-style-type: none"> - Expect that most tasks will take longer than anticipated - Acquiring new knowledge and skills for SRm will take time, too

stages	Dwindling motivation	- Discuss process and progress with other systematic reviewers
	Large number of SRs of variable quality scope on important topics (Smith et al., 2011) *	- SRm being a new approach to reviewing literature in IWO Psychology, this aspect is unlikely to be a problem to researchers in this discipline; in the case of Smith and colleagues (2011), a SR of SRs is suggested to overcome this particular problem

Note. Challenges experiences by researchers in disciplines other than IWO Psychology have been marked with an asterisk (*), those applicable to SRs in IWO Psychology and neighboring disciplines with a hash (#). Challenges that are unmarked are considered applicable to SRs in any discipline.