Chapter 2: Designing Impactful Research

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Abstract

This chapter discusses the five key research design principles central to the applied scientific method which high quality research is recommended to adopt. These five principles are: (1) The inclusion of reliable and valid measures; (2) the inclusion of sufficient and generalizable research samples; (3) the inclusion of evidence of theoretical sophistication; (4) the inclusion of research designs that promotes causal generalizations; and (5) the inclusion of research implications for the end users. We argue that the inclusion of these five principles maximises the opportunities of research to achieve an external impact, and that this should be one of the key aims of conducting research at all levels. This chapter also discusses the process of research evaluation and discusses the importance of planning this evaluation process within the research design stages.

Introduction: Ensuring research has impact

The necessity of spending sufficient time designing a research project cannot be emphasised enough. In practice, research projects are often influenced by time, resources, or sampling constraints and these are, of course, the key ‘research limitations’ commonly listed in both published research articles and research theses. It is unfortunate that producing research which has relatively little impact (other than for the researcher themselves) is quite easy to accomplish. We acknowledge that a student’s experience of research training gained via the production of a research thesis is a viable outcome in itself. However, we also recognise that student research projects can often produce minimal other impact (i.e., for an

organisation and/or for scholarly knowledge) and this is often a consequence of an inadequate project design. Appropriately designing a research project to produce useful insights and actual advances in knowledge requires time and thoughtful consideration. Allowing for insufficient time to thoroughly design a project is a common mistake made at all levels of research. In this chapter we discuss five of the basic features of applied psychological research which are essential to consider in the appropriate design of research and which maximise the opportunities of research achieving an actual external impact.

The Applied Scientific Method

The training in how to conduct impactful research is a continuous developmental process that is improved with direct experience and with the value of hindsight. However, good research is also directly informed by the existing scholarly evidence and the critical consideration of key research principles, namely those of the *scientific method*. As researchers we are taught the basic principles of conducting *good science*, which in sum consists of the planned inclusion of: “reliable and valid measures, sufficient and generalizable samples, theoretical sophistication, and research design that promotes causal generalizations” (Sinclair, Wang, & Tetrick, 2013, p. 397). Additionally as *applied researchers* appropriate considerations must also be given to the implications of the research for society, organisations, and/or other end users. Pertinent discussions of the evolution of the scientific method for applied psychology research are plentiful and are recommended for further reading (e.g., Gurung et al., 2016; Hubbard, 2016). These discussions also include notable critiques of pertinent research issues, such as the recognition of common weaknesses (e.g., bias, replicability), avoiding arbitrary choices of analyses (e.g., Ioannidis et al., 2014), and an understanding of *conceptual* and *terminological diversity* which is the use of multiple names within the literature for the same essential ideas (Sinclair et al., 2013). The components of the

applied scientific method identified above can be considered as a useful guide to planning and designing research projects. We discuss these five research principles in more detail here and strongly encourage researchers to confirm that their projects do adequately address each one of these principles.

1. The inclusion of reliable and valid measures

It is rare for a psychological construct to be assessed by just one specific measure. Instead multiple measures commonly exist within the literature purporting to assess any single construct. For example, even a construct as specific as psychological burnout is typically assessed by one of three instruments: the *Maslach Burnout Inventory* (MBI) (Maslach, Jackson, & Leiter, 1981), the *Copenhagen Burnout Inventory* (CBI) (Kristensen, Borritz, Villadsen, & Christensen, 2005), and the *Oldenburg Burnout Inventory* (OLBI) (Halbesleben & Demerouti, 2005). However, a very commonly assessed construct such as job satisfaction is measured by a multitude of different instruments, some of which assess job satisfaction within specific occupations such as human services (Spector, 1985) and nursing (Mueller & McCloskey, 1990; Stamps & Piedmonte, 1986). Other job satisfaction measures are targeted more generally across workers from multiple occupations (e.g., Brayfield & Rothe, 1951; Lambert, Hogan, & Barton, 2001; Seashore, Lawler, Mirvis, & Cammann, 1982; Warr, Cook, & Wall, 1979). While other ‘measures’ of job satisfaction are devised of just one item; for a pertinent review of these single item assessments see for example, Wanous, Reichers, and Hudy (1997).

The diligent researcher is therefore recommended to amass the multiple measures of *each* research construct from the literature and review each measure for appropriate levels of validity and reliability (as well as other characteristics such as relevance to the research sample, etc.). These two psychometric characteristics for each measure should be described

within the thesis (both as reported within the literature and as produced by the researcher's project), thereby clearly demonstrating evidence for the suitability of each individual measure included in the research. With such an array of published measures to choose from, the inclusion of an instrument with *inadequate* psychometric characteristics (e.g., a scale reliability coefficient of below .70) is difficult to justify within a research thesis, and is indicative of an inadequate level of research skills and/or comprehension. It is therefore, surprising and very unfortunate how often measures described by inadequate psychometric characteristics are actually included in post-graduate research projects. A more detailed discussion about the selection of appropriate research measures is provided in Chapter 5: *Instrumentation*.

2. The inclusion of sufficient and generalizable research samples

Often applied psychological research is restricted by the access to an appropriate research sample. The inclusion of a relatively easy to access ('convenient') undergraduate student research sample is often utilised within pilot studies testing new methods or measures. However, the majority of applied research requires the inclusion of specific 'real life' samples such as full-time workers, school children, or clinical health populations. Certainly the ability to publish applied research may be restricted for studies wholly reliant on student research samples; for pertinent discussions see for example, Dipboye and Flanagan (1979) and Gordon, Slade, and Schmitt (1986). This restriction is primarily due to the relevance of the research; that is the degree to which a student sample can adequately represent a 'real life' sample, or the degree to which the research results can be *generalised* to a 'real life' sample.

The development of electronic survey administrations has increased the scope for including large samples within research investigations. The time and costs associated with hard-copy pen and paper survey administrations are no longer considered to be limitations for

the design of electronic-based survey-based research. Instead for example, researchers often have the capacity to sample *all* workers with access to a computer employed by an organisation, as opposed to sampling only a small proportion of workers with hard-copy surveys. The development of computer modelling for data analysis (e.g., structural equation modelling; SEM) has also increased the need for large numbers of survey *respondents*, which in turn has also resulted in large samples of workers being *invited* to participate in research investigations (taking into account participant non-response and attrition). The inclusion of large research samples in research investigations is accompanied by a number of strengths and weaknesses which require consideration and these are discussed in more detail in Chapter 3: *Research sampling* in this book, as well as elsewhere (e.g., Sarpy, Rabito, & Goldstein, 2013). Two key advantages of large research samples, for example, are of course that concerns about statistical power and the representativeness of the respondents are greatly reduced. However, questions about the representativeness of the research respondents to workers external to a specifically sampled organisation or employment sector or even a specific country or geographical region, are now increasingly being raised (e.g., Brough et al., 2013) and hence require appropriate consideration in the research design stage.

3. The inclusion of evidence of theoretical sophistication

As noted above, it is paramount that a research investigation is designed on the premise that it is able to contribute to current scholarly discussions of the research topic. This requires demonstration by the researcher that they are aware of these current discussions *and* also aware of the wider older research which informs these discussions. Failure to conduct a thorough literature review can produce instances of ‘reinventing the wheel’, simple replications of existing research, or the omission of key theoretical approaches and/or research constructs. Research which purports to introduce ‘new’ measures or constructs

should especially take care to ensure the genuine novelty of these constructs and should appropriately demonstrate that the new measure/construct is not simply re-badging existing tools/variables, as is more broadly described by *conceptual or terminological diversity* noted above.

The issue of theoretical sophistication also includes consideration being given to the *advancement* of scholarly knowledge, by actually building on existing research findings and recommendations. One pertinent example of where research recommendations are often ignored and the research field consequentially suffers from stagnation, is the continued popularity of designing and conducting cross-sectional research investigations for the study of concepts which are well established as a *process*, rather than a state; such as the stress and coping process for example. Despite repeated calls for stress and coping research to incorporate longitudinal research designs (Biggs, Brough, & Drummond, in press; Brough, O'Driscoll, Kalliath, Cooper, & Poelmans, 2009; Taris & Kompier, 2014; Zapf, Dormann, & Frese, 1996), the vast majority of investigations in this field still adopt cross-sectional research methods. This of course, is primarily because cross-sectional research is easier, cheaper and quicker to conduct and analyse compared to research based on longitudinal designs, but consequentially does little to advance our knowledge of the process of stress and coping (see also: Brough, Drummond, & Biggs, in press). Thus due consideration must be given to both the specific topic being investigated *and* its appropriate method of assessment in order to adequately address the issue of theoretical sophistication.

4. The inclusion of research designs that promotes causal generalizations

A common mistake when writing the hypotheses and results of a cross-sectional research investigation is to describe the associations between the research variables using language which implies a *causal* relationship, i.e., *X predicts Y* or *X causes Y*. Even though a research

investigation may have been designed based upon an independent variable ‘having an impact’ upon a dependent variable, and we may test this ‘impact’ with multiple regression analyses which (somewhat confusingly) describes independent variables as ‘predictor’ variables, if this investigation is cross-sectional then it is unable to demonstrate any causality. Cross-sectional research designs only inform us of ‘associations’ or ‘relationships’ which exist between the variables and this is the correct terminology to adopt in the write-up of this research. Longitudinal research designs which assess how a variable impacts upon a second variable over time do provide a test of causality, although this is dependent upon a ‘suitable’ time lag occurring; see Chapter 13 *Longitudinal data collection* for a detailed discussion of this point.

As we noted above, the inclusion of a research design which does test causality remains in the minority within applied psychological research. This is despite repeated reviews promoting the need for this research and calling for researchers to conduct more investigations based upon longitudinal or quasi-experimental research designs, for example (e.g., Brough & Biggs, 2015; Brough & O’Driscoll, 2010; Taris & Kompier, 2014; Zapf et al., 1996). Both experimental and quasi-experimental research designs in the field of applied psychology are discussed in detail in Chapter 10 of this book. While we acknowledge the increased difficulties associated with conducting research investigations based upon longitudinal or quasi-experimental research designs, these difficulties alone should not actively hinder their use.

5. The inclusion of research implications for the end users

One of the primary aims of applied psychological research is to provide information and/or an outcome for the end user, be that a client, an organisation, a research participant, or such like. Research articles and theses commonly provide this evidence in a section headed

‘practical implications of the research’, in addition to a section discussing the ‘theoretical implications’. It is important that the practical implications or outcomes of the research are duly considered in the initial research design stage, and it is surprising how often this consideration is lacking. So it is important to actually consider and specifically describe how an employee self-report survey for example, will actually improve the working conditions for the respondents and will improve the social and/or financial outcomes for the sampled organisation. Such considerations are doubly important for research including an intervention or training components. This process of *research evaluation* should be considered during the research design process and formally built into the research project, but it is surprising how often this evaluation process is not considered in sufficient detail.

In their recent chapter discussing the research evaluation process, Brough, Campbell, and Biggs (2016) emphasised the importance of identifying exactly why a research intervention succeeds or fails, and how any success can best be objectively assessed. Thus, the purposeful design and adoption of *evidence-based practices* is a core characteristic of applied research and this certainly includes a formal research evaluation process. Brough et al., (2016) described a basic model of the research evaluation process, consisting of four key characteristics:

1. **A formal needs assessment.** To ascertain that the intervention is actually required for the specific research participants and to identify the specific behaviours or procedures requiring change.
2. **The intervention.** Appropriately designed to achieve the identified changes and including a consideration of how both organisational (macro) and individual (micro) processes may impact on the intervention success (see also: Biggs & Brough, 2015; Brough & Biggs, 2015).

3. **Improvement of performance.** Demonstrating via objective evidence that the intervention actually did improve the goals specified in the needs assessment. Careful consideration of the appropriate length of time required to show evidence of any improvement is required.
4. **Feedback process.** Feedback about the impact and difficulties experienced during the intervention stage is necessary for organisational learning and development, and to ensure the validity and efficacy of any future delivery of the intervention program. This simple research evaluation process is illustrated in Figure 2.1:

Figure 2.1: A Basic Research Evaluation Process

From: (Brough et al., 2016), cited with permission.

Conclusion

In this chapter we have focused on the intrinsic principles which govern good psychological research, focusing specifically on the five key characteristics of the applied scientific method. Due to space restraints we have not addressed the more basic research components such as types of research variables (e.g., independent and dependent variables), associations between these variables (e.g., direct, indirect, moderating, and reciprocal relationships), and the development of research hypotheses and research models. This information is of course, also essential in the research design process and does require appropriate consideration (see for example: Badia & Runyon, 1982; Becker, 2005; Creswell, 2013; Goodwin, 2009; Marks & Yardley, 2004; Sommer & Sommer, 1991; Spector & Meier,

2014). We discussed how the five key characteristics of the applied scientific method should each be duly considered by researchers in the design of research which aims to have an external impact. These five characteristics consist of: The inclusion of reliable and valid measures; the inclusion of sufficient and generalizable research samples; the inclusion of evidence of theoretical sophistication; the inclusion of research designs that promotes causal generalizations; and the inclusion of research implications for the end users. In the discussion of the research implications for the end users we also described the four basic components of the research evaluation process and urged researchers to ensure this process is directly addressed by their research projects. In sum, this chapter suggests that by directly considering each one of these five methodological characteristics, a researcher will take the correct steps to ensure their research project is appropriately designed and actually does have some form of external impact.

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