



This is a repository copy of *Can Job Redesign Interventions Influence a Broad Range of Employee Outcomes by Changing Multiple Job Characteristics? A Quasi-Experimental Study*.

White Rose Research Online URL for this paper:  
<http://eprints.whiterose.ac.uk/98455/>

Version: Accepted Version

---

**Article:**

Holman, D. and Axtell, C. [orcid.org/0000-0002-4125-6534](https://orcid.org/0000-0002-4125-6534) (2016) Can Job Redesign Interventions Influence a Broad Range of Employee Outcomes by Changing Multiple Job Characteristics? A Quasi-Experimental Study. *Journal of Occupational Health Psychology*, 21 (3). pp. 284-295. ISSN 1076-8998

<https://doi.org/10.1037/a0039962>

---

This article may not exactly replicate the final version published in the APA journal. It is not the copy of record

**Reuse**

Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

**Takedown**

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing [eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk) including the URL of the record and the reason for the withdrawal request.



[eprints@whiterose.ac.uk](mailto:eprints@whiterose.ac.uk)  
<https://eprints.whiterose.ac.uk/>

**Can job redesign interventions influence a broad range of employee outcomes by changing multiple job characteristics? A quasi-experimental study**

**Dr David Holman**

Manchester Business School

University of Manchester

M15 6PB

UK

Tel: +44-161-306-3433

Email: david.holman@mbs.ac.uk

**Dr Carolyn Axtell**

Institute of Work Psychology

Sheffield University Management School

S10 1FLUK

Tel: +44-114-222-3267

Email: [c.m.axtell@sheffield.ac.uk](mailto:c.m.axtell@sheffield.ac.uk)

Accepted for publication at: Journal of Occupational Health Psychology, 2015

**Can job redesign interventions influence a broad range of employee outcomes by changing multiple job characteristics? A quasi-experimental study**

**Abstract**

Many job redesign interventions are based on a ‘multiple mediator/multiple outcome’ model in which the job redesign intervention indirectly influences a broad range of employee outcomes by changing multiple job characteristics. As this model remains untested, the aim of this study is to test a ‘multiple mediator/multiple outcome’ model of job redesign. Multilevel analysis of data from a quasi-experimental job redesign intervention in a call centre confirmed the hypothesized model and showed that the job redesign intervention affected a broad range of employee outcomes (i.e., employee well-being, psychological contract fulfillment, and supervisor-rated job performance) through changes in two job characteristics (i.e., job control, feedback). The results provide further evidence for the efficacy and mechanisms of job redesign interventions.

**Key Words; job redesign, quasi-experiment, well-being, performance, psychological contract, call centre**

Job redesign interventions are planned change initiatives that aim to modify job characteristics as a means of enhancing employee outcomes such as well-being and job performance (Parker & Wall, 1999; Semmer, 2006). Within the literature on job redesign, there is an increasing interest in understanding why job redesign interventions lead to successful outcomes (Biron, Karinka-Murray & Cooper, 2011). One approach to examining this issue has been to establish whether a change in job characteristics is the mechanism through which job redesign interventions have their effects. Specifically, studies have tested two models of this mediational process. The first is a ‘single mediator/multiple outcome’ model in which a job redesign intervention influences multiple types of employee outcome (e.g., affective, behavioral and attitudinal) through a change in one job characteristic, such as job control (Bond & Bunce, 2001; Bond, Flaxman & Bunce, 2008; Logan & Ganster, 2005). The second is a ‘multiple mediator/single outcome’ model in which a job design intervention influences one type of employee outcome (e.g., affect) by changing multiple job characteristics such as job control, feedback and participation (Holman, Axtell, Sprigg, Totterdell, & Wall, 2009).

Many job redesign interventions are based on a ‘multiple mediator/multiple outcome’ model in which the job redesign intervention influences a broad range of employee outcomes by making changes to multiple job characteristics (Semmer, 2008). But this model of the job redesign process has not been tested, so there is little evidence for the efficacy of job redesign interventions based on it. Indeed, it is possible that intervention-induced changes to multiple job characteristics may only affect one type of employee outcome, or that changes to multiple outcomes might only occur when a single job characteristic is changed (Bond & Bunce, 2001). The main aim of this paper is therefore to test a ‘multiple mediator/multiple outcome’ model of

job redesign intervention by examining whether a job redesign intervention can enhance a range of employee outcomes by changing multiple job characteristics.

To address the aim of this paper, we use data from a quasi-experimental job redesign intervention in a call centre. We focus on how the job redesign intervention affects two job characteristics, namely job control (discretion over the timing and methods of work tasks, Jackson, Wall, Martin, & Davids, 1993) and feedback (receiving information on job performance, Hackman & Oldham, 1980). These job characteristics were selected as their improvement was central to the objectives of the job redesign intervention, because of their significant role in a previous call centre job redesign intervention (Holman et al., 2009) and because previous research shows that they have significant effects on employee outcomes (Humphrey, Nahrgang, & Morgeson, 2007). We also focus on three types of employee outcome: affective, behavioral and attitudinal. The affective outcome is employee well-being, i.e., longer-term levels of pleasant affect such as enthusiasm and contentment, and a lack of unpleasant affect such as anxiety and depression (Warr, 1990). The behavioral outcome is supervisor ratings of job performance, i.e., the extent to which an employee meets task requirements (Griffin, Neal & Parker, 2007) and the attitudinal outcome is psychological contract fulfillment, which concerns employee beliefs on whether the organization has fulfilled its obligation to provide suitable work and employment characteristics (Rousseau, 1995). We examined employee well-being as its improvement was a central objective of the job redesign intervention. Job performance and psychological contract fulfillment were chosen as they are important behavioral and attitudinal outcomes that may be influenced by a job redesign intervention (Chaudhry, Wayne & Schalk, 2009; Judge & Kammeyer-Mueller, 2012; Parker & Wall, 1998).

The study makes a number of important contributions to the growing literature on why job redesign interventions lead to successful outcomes (Biron, Karinka-Murray & Cooper, 2011; Nielsen, Randall, Holten, & Gonzalez, 2010), particularly the literature on the mechanisms of job redesign interventions (Bond & Bunce, 2001; Bond et al., 2008; Holman et al., 2009; Logan & Ganster, 2005). First, in addition to providing important evidence for the efficacy of job redesign interventions, the study extends understanding of the mechanisms of job redesign interventions by testing a multiple mediator/multiple outcome model of the job redesign intervention process. Second, this study extends the range of behavioral and attitudinal outcomes included in studies of job redesign mechanisms by using an objective measure of job performance and a measure of psychological contract fulfillment. Previous studies of job redesign mechanisms have included subjective assessments of job performance (Bond & Bunce, 2001) or focused on job satisfaction attitudes (Logan & Ganster, 2005). Another important contribution is to provide empirical evidence for the causal effects of organizational change on psychological contract fulfillment, as the few longitudinal studies of the psychological contract have not compared groups receiving change with those not experiencing change. In the following sections, we first discuss the current literature on job redesign intervention mechanisms. We then outline a theoretical model that explains why job design interventions affect employee outcomes through changes in job characteristics.

### Job redesign interventions

Job redesign interventions try to modify job characteristics as a means of enhancing employee outcomes (Parker & Wall, 1999) and typically differ in terms of the intervention process (e.g., level of employee participation, management support, information provision) and the range of job characteristics and employee outcomes to be improved. In particular, some job redesigns are

limited in scope, while others seek to change multiple job characteristics and have a broad impact on employees affect, behavior and attitudes. There is an increasing interest in understanding why job redesign interventions lead to successful outcomes (Biron, Karinka-Murray & Cooper, 2011). One approach is to focus on how facets of the intervention process affect the extent to which changes are implemented (Nielsen et al., 2010). For example, empirical studies suggest that participative interventions have more successful outcomes, as employee involvement can generate greater employee commitment to implementing change (Israel, Baker, Goldenhar, Heaney, & Schurman, 1996; Kompier, Geurts, Gründemann, Vink, & Smulders, 1998).

Another approach has been to examine whether a change in job characteristics is the mechanism through which job redesign interventions have their effects. Studies taking this approach examine whether the indirect effect of the job redesign on employee outcomes is mediated by a change in job characteristics. Two mediational models have been tested so far. The first is a 'single mediator/multiple outcome' model in which a job redesign intervention influences multiple types of employee outcome through a change in one job characteristic (Bond & Bunce, 2001; Bond, Flaxman & Bunce, 2008; Logan & Ganster, 2005). For example, Bond and Bunce (2001) conducted a job redesign intervention that sought to change job control. They found that the change in job control mediated the relationship between the job redesign intervention and both affective (i.e., mental-ill health) and behavioral outcomes (i.e., sickness absence and self-rated performance). The second is a 'multiple mediator/single outcome' model in which a job design intervention influences one type of employee outcome by changing multiple job characteristics. Holman et al. (2009) conducted a job redesign intervention that sought to change multiple job characteristics. They reported that the relationship between the

job redesign intervention and psychological well-being was mediated by three job characteristics e.g., job control, feedback, skill utilization.

Many redesign interventions are, however, based on a ‘multiple mediator/multiple outcome’ model in which the aim of the job redesign intervention is to influence a broad range of employee outcomes by making changes to multiple job characteristics (Cox et al., 2000; Semmer, 2008). For instance, a job redesign intervention might seek to change job control, feedback and task variety in the expectation that this will improve employee well-being, employee performance and attitudes such as job satisfaction. Such designs are plausible given the wealth of theoretical and empirical evidence indicating that many job characteristics affect a broad range of employee outcomes (Humphrey et al., 2007). But ‘multiple mediator/multiple outcome’ models of the job redesign process have not been empirically tested. As such, evidence for the efficacy of job redesign interventions based on such models is lacking. It is entirely plausible that the complexity of such an approach may inhibit the achievement of successful outcomes. Practically, such a finding might suggest that simpler intervention models (e.g., single mediator/multiple outcome) are preferable when conducting job redesign.

### Theory and Hypotheses

A model of how job redesign interventions affect employee outcomes is shown in Figure 1. The model indicates job redesign interventions can change multiple job characteristics (in this case job control and feedback) and that these changes will in turn influence affective, behavioral and attitudinal employee outcomes which are, respectively, psychological well-being, job performance and psychological contract fulfillment. We now set out the theoretical and empirical evidence for this model.



Effects of job redesign intervention on job characteristics A participative job redesign intervention is likely to change job characteristics when the job redesign initiatives arising from the intervention (e.g., changes to job tasks) are implemented and enacted by employees (Daniels, 2006). For example, employees who enact new procedures that allow them to complete tasks or plan working time in different ways are likely to experience an increase in job control (Wrzesniewski & Dutton, 2001). This is supported by empirical evidence which shows that employee perceptions of job characteristics change in line with the extent to which job redesign initiatives are implemented (Campion & McClelland, 1991; Egan, et al., 2007; LaMontagne, Keegel, Louie, Ostry, & Landsbergis, 2007; Morgeson & Campion, 2002; Wall, Kemp, Jackson, & Clegg, 1986).

The nature of participative job redesign interventions makes it difficult to predict which job characteristics will be changed, although theory and empirical evidence suggests that changes will be related to participants' concerns and knowledge of job design. Employees in a participative job redesign intervention are most likely to implement changes in areas of the job viewed as problematic, which is in keeping with job crafting theory which asserts that employees are motivated to change those working conditions that prevent basic needs being met (Wrzesniewski & Dutton, 2001). For example, in a call centre-based participative job redesign intervention, Holman et al. (2009) found that employees sought to alter the working conditions perceived to be problematic (e.g., low job control, poor quality feedback, low participation) by making changes that included the adoption of new tasks and responsibilities to increase job control, as well as increasing the frequency of supervisory feedback and developing clear performance criteria to improve the quality of feedback. Crucially, these changes led to improvements in employee perceptions of job control and feedback (Holman et al., 2009). The

changes arising from participative job redesign intervention may also be shaped by those running the intervention (e.g., academic consultants), as they are likely to use their knowledge of job design theories (e.g., job characteristics model, Hackman & Oldham, 1976; job demands-resources model, Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) to ensure that employee-driven changes are not detrimental or counter-productive (Burnes, 2009).

Given this theoretical and empirical background, it can be proposed that call centre employees in a participative job redesign intervention will seek to address job characteristics that are typically perceived to be problematic in call centre jobs, such as low job control, a lack of variety and poor quality feedback and monitoring systems (Holman, Batt & Holtgrewe, 2007). In particular, call centre employees may try to increase job control by increasing task variety and responsibility for tasks, and they might seek improve feedback through greater involvement in feedback processes, increases in the frequency of feedback and by increasing the clarity of performance criteria. Job redesign initiatives such as these stand a high chance of being supported by consultants running a job redesign intervention, as they are in line with key propositions of job design theory, namely, that improvements to job control, task variety and feedback should promote better employee outcomes (Demerouti et al., 2001). It must also be noted that employee experiences of call centre jobs may get worse over time even without major organizational change (Holman & Wall, 2002). For example, feedback may become more repetitive and less useful over time in a call centre due to the restricted nature of the job. This implies that a job redesign intervention may improve some job characteristics but halt declines in others (deJoy, Wilson, Vandenberg, McGrath-Higgins, & Griffin-Blake, 2010).

In sum, there is strong theoretical and empirical evidence to propose that call centre employees in a job redesign intervention who implement job redesign changes will experience

greater changes to job characteristics than employees who are not involved in the job redesign intervention. Our first hypothesis is:

Hypothesis 1. Employees in an experimental group of a job redesign intervention who implement job redesign changes will experience greater changes to job characteristics than employees in a control group who are not involved in the job redesign intervention. Specifically, when employees in an experimental group implement changes relating to greater task variety and increased task responsibility they will experience greater job control, and when they implement changes that increase involvement in feedback processes, feedback frequency and clarity of performance criteria they will experience greater feedback quality.

Effects of job characteristics on employee outcomes There is strong theoretical and empirical evidence that job characteristics influence affective, behavioral and attitudinal employee outcomes, particularly with regard to the two job characteristics focused on in this study, job control and feedback (Humphrey et al., 2007).

Several theories can be used to explain the effects of job control and feedback on well-being, such as the job characteristics model (Hackman & Oldham, 1980) and the job demands-resource model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Job control can help employees to manage job demand more effectively by enabling employees to remove task obstacles or to tackle demands in new ways (Karasek & Theorell, 1990). One potential outcome of this is to reduce employee effort, which conserves energy reserves and reduces the likelihood that employees will experience fatigue and low well-being (Hockey, 1997; Lee & Ashforth, 1996).

Job control also enables employees to select the most appropriate skills and behaviors to achieve task goals (Frese, Garst & Fay, 2001). By aiding goal attainment, job control can promote the experience of positive emotions and generate higher levels of well-being (Lazarus, 1991). Feedback can supply employees with the information needed to develop knowledge and skills (Locke & Latham 1990), which then allows employees to manage demand more effectively, thereby reducing effort and improving well-being (Holman & Wall, 2002). Considerable empirical evidence exists to support these theoretical explanations, such as the meta-analysis by Humphrey et al. (2007) which found job control and feedback to have positive associations with well-being.

Similar theoretical explanations underlie the proposed effects of job control and feedback on employee performance. For example, as job control allows employees to tackle demands in new ways and select the most appropriate behaviors to achieve task goals (Frese & Zapf, 1994), improvements in task efficiency and goal attainment are likely to result. Feedback also provides employees with the information required to improve task performance (Locke & Latham 1990). Empirical evidence provides strong support for the effects of job control (Humphrey et al., 2007) and feedback (Locke & Latham 1990; London, 2003) on job performance.

Previous research shows that job characteristics such as job control and feedback can influence employee attitudes such as job satisfaction and organizational commitment (Humphrey et al., 2007; Meyer & Allen, 1997; Spector, 1997). There are also strong theoretical reasons to expect these two job characteristics to influence employee attitudes concerned with the psychological contract. The psychological contract can be defined, from an employee's perspective, as the set of expectations about the mutual obligations between the employee and the organization (Sparrow, 1996; Rousseau, 1995). An employee's perception of organizational

obligations typically covers areas such as pay and benefits, security, and working time (Robinson & Rousseau, 1994), as well as the organization's obligation to provide suitable job characteristics such as a reasonable level of autonomy, adequate feedback and variety (Westwood, Sparrow & Leung, 2001). Jobs with these characteristics are likely to fulfill the employee's psychological contract. As such, when employee perceive high levels of job control and feedback, they are likely to believe that the psychological contract is fulfilled, particularly that part pertaining to job design.

Based on the preceding discussion, there are strong theoretical and empirical reasons to expect that job control and feedback to positively influence employee well-being, job performance, and psychological contract fulfillment. We therefore set the following hypothesis:

Hypothesis 2: Job control and feedback will have a positive association with employee well-being, job performance and psychological contract fulfilment.

Overall, we have presented evidence to suggest that job redesign interventions will influence two job characteristics (job control and feedback) and that changes in these job characteristics will influence three employee outcomes, i.e., employee well-being, job performance and psychological contract fulfillment. This suggests that the effects of a job redesign intervention on these outcomes will be indirect and mediated by changes in job control and feedback. Our third hypothesis is:

Hypothesis 3: The effect of a job redesign intervention on employee outcomes (i.e., employee well-being, job performance and psychological contract fulfillment) will be mediated by changes in job characteristics.

Direct effects of a job redesign intervention The preceding discussion argued that job redesign interventions will have an indirect effect on employee outcomes. But interventions may also have direct effects on employee outcomes (Roethlisberger & Dickson, 1939). Accounting for the direct effects of a job redesign intervention is needed to provide a more complete understanding of intervention effects, and to ensure the correct estimation of indirect effects (Baron & Kenny, 1986).

Job redesign interventions may directly affect employee well-being, as participation in the intervention may provide respite from daily job demands and an opportunity to improve social relationships with colleagues and supervisors (Jackson, 1983). A job redesign intervention may also directly influence employee performance, as participation may provide a forum for discussing work-based problems that enables employees to get a better understanding of the job. The knowledge gained could then be used by employees to improve their performance. Lastly, a job redesign intervention may directly affect psychological contract fulfillment because it signals to employees that the organization is trying to fulfill its obligation to provide a decent job and good working conditions (Chaudhrey, Coyle-Shapiro & Wayne, 2010; Kickul, Lester, & Finkel, 2002; Morgan & Zeffane 2003; Turnley & Feldman, 1998). We therefore set the following hypothesis:

Hypothesis 4: Employees in an experimental group of a participative job redesign intervention will experience an increase in employee well-being, job performance and psychological contract fulfillment. Employees in a control group will not experience a similar increase in these three employee outcomes.

## **Method**

### Organizational Context

The study was conducted in one department of the U.K. Civil Service that dealt with transport-related issues (further detail would identify the department and breach confidentiality agreements). The department consisted of approximately 120 call centre agents, 30 back office staff, 15 team leaders and 12 managers. Call centre agents were organized into twelve teams (located on the same floor) with one team leader per team. The call centre agent role mainly involved dealing with customer queries, dealing with payments and making bookings for the general public and private transport organizations. Although many of the calls were repetitive (e.g., changing a booking), agents needed a good understanding of policy and procedure to deal with customer queries. Agents also had to deal with customer emails, some of which were follow-up emails to previous calls.

Managers were under pressure from trade unions to improve job quality and employee well-being in the call centre. Based on discussions with the research team, trade union representatives suggested to the call centre managers that a job redesign intervention should be conducted to improve agents' job quality and well-being. The call centre managers agreed and were very supportive of the job redesign intervention.

## Job Redesign Intervention

In this study, we conducted a quasi-experimental participative job redesign based on a scenarios planning method (Axtell, Pepper, Clegg, Wall, & Gardner, 2001; Clegg et al., 1996) that had proven successful in another call centre job redesign initiative (Holman et al., 2009). The primary aim of the intervention was to change the job characteristics of call centre agents' jobs to improve employee well-being. Call centre agents and supervisors in the experimental group (four of the twelve teams in the call centre) participated in the main phases of the intervention: assessment (i.e., problem definition and solution development) and implementation (planning, securing support, implementing changes) (Nielsen, Randall, Holten, & Gonzalez, 2010).

The assessment phase started with a two day workshop, facilitated by the research team, in which employees worked in small groups to identify core job tasks and the obstacles that prevent effective working. Employees then rated the current job design scenario (on a scale of 1–10) with regard to a range of job characteristics (e.g., job control, feedback, variety) and the effects of the job on employee well-being and performance. This process included a discussion of the initial survey results. After rating the current job design, employees discussed the advantages and disadvantages of three job design scenarios: one aimed at maximizing well-being, one aimed at maximizing performance and one aimed at optimizing well-being and performance. Including a focus on performance helps to ensure that any changes did not have a detrimental effect on the organization and helps employees to appreciate that trade-offs are sometimes required when making organizational changes (Morgeson & Campion, 2002). After discussing the different scenarios, employees were asked to suggest changes that would maximize well-being and



performance and enhance key job characteristics. The changes viewed as having a positive impact on well-being and performance were adopted as potential job redesign initiatives. Employees then rated the overall effect of these changes on job characteristics, well-being and performance. This process helps employees to appreciate that not all aspects of the job will change. At the end of the workshop, employees were tasked with developing workable proposals for each initiative within two weeks. The proposals were compiled into a report by the research team, which was then discussed at a joint meeting between employees, management and researchers. The outcome of this joint meeting was to agree which changes to job design would be implemented. In brief, the changes were:

**Administrative tasks** Call centre agents were given responsibility for a range of team administration tasks previously conducted by the team leader, as well as discretion over when to complete them. These included organizing break and lunch times, logging working time activities, logging performance data, rotating responsibility for collating all agents' performance data, and managing and recording agent flexi-time.

**Complaint emails** Agents were given greater discretion over whether to transfer 'minor' customer query and complaint emails to a centralized complaints unit and greater discretion over whether to respond to complaint emails immediately. Previously, all complaint emails had to be transferred and this was a source of much frustration to the call centre agents.

**Training** Employees were provided with training on team administrative tasks, how to deal with complaints, and how to write email complaint responses.

**Performance management** Agents and team leaders worked on improving the clarity of the performance criteria (especially with regard to call quality) against which agents were assessed. Agents and team leaders also worked on clarifying and simplifying the performance feedback

form on which agents were provided their performance assessment, and agents were given responsibility for collating their own and other team members' performance statistics.

Team briefings Agents were given responsibility for running and delivering weekly team briefing sessions.

The implementation of these initiatives was expected to enhance job control and feedback. First, it was expected that job control would be increased by giving call centre agents responsibility for administrative tasks by increasing discretion over when to complete team administration tasks, by giving agents discretion over complaint handling, and by giving agents responsibility for running and delivering weekly team briefing sessions. Second, performance feedback was expected to be improved by increasing the clarity of the performance criteria and how performance assessments were fed back, while agent involvement in the collation of their own and other team members' performance statistics should improve feedback on how agents performed in relation to other team members.

In the implementation phase, teams were tasked with implementing the proposed initiatives within four months (some were more complex to implement than others) and monitoring the effectiveness of the changes. The research team attended team meetings to discuss progress and raised questions with management if employees were experiencing difficulty in implementation. At the last of these meetings, employee representatives, team leaders and managers confirmed that each initiative had been fully implemented.

## Research design

A clustered quasi-experimental research design was used, with teams rather than individuals randomly assigned to an experimental group or a control group (Shadish, Cook & Campbell,

2002). The control group was an active control as they completed the initial survey and received feedback on the survey results but did not participate in the job redesign process. The study had five main stages (see Table 1).

At Stage 1 all employees were briefed on the study. Employees were informed that the job redesign intervention would be conducted on four randomly selected groups and that any successful changes would be rolled out to the other teams. At Stage 2, the Time 1 pretest survey was administered by the research team to all employees and team leaders completed a survey about each team member's performance. Employees were given time out of their working day to complete the survey in a private room. Teams were then randomly allocated to an experimental group or control group, which was done after the surveys were completed to minimize potential researcher bias effects. Stage 3 was the assessment phase of the job redesign intervention and involved a two-day workshop. The four teams in the experimental group were split into two groups and the workshop was run for each group. Initial survey results were fed back to the experimental group during these workshops (and to employees in the active control during scheduled team briefings). This stage concluded with a joint meeting of employees, management and researchers at which a set of job redesign initiatives were agreed. Stage 4 concerned the implementation phase of the job redesign intervention, in which agents implemented the agreed changes to job design. This stage lasted for four months. No other major changes occurred during the intervention to either the experimental or control group. At Stage 5, we administered the Time 2 post-test survey to all employees and team leaders completed a survey about each team member's performance. These surveys were administered just over one month after the last change had been implemented. A one month period was chosen as previous studies indicate that a short interval after an intervention can increase the

ability to detect effects of changes to job design and well-being (Holman et al., 2009; Le Blanc et al., 2007). The job redesign changes were rolled out to the control group two months after the second survey.

### Survey Sample

At Time 1, the employee survey was completed by 96 of 120 agents (80% response). Fifty-four per cent were women, the average age was 31.5 years and the average tenure was 25 months. At Time 2, all call centre agents were given the opportunity to complete the survey, including those who did not respond at Time 1 or had joined since Time 1. The Time 2 employee survey was completed by 107 of 118 agents (82% response). At Time 2, 56% were women, the average age was 32 years and the average tenure was 27 months. The longitudinal sample, those responding at Time 1 and 2, was 62. Twenty-three were in the experimental group and 39 were in the control group, and the mean number of respondents per team was 6.52 (range 5-6) in the experimental group and 6.33 (range 4-7) in the control group. The response rate for the longitudinal sample was 61% (this takes into account the eighteen call centre agents who had left the department since Time 1 due to internal transfers, voluntary exit, maternity leave or sick leave). The response rate for the longitudinal experimental sample was 72% and for the longitudinal control sample it was 56%.

### Employee survey measures

**Job characteristics** Job control was a six-item measure assessing the extent to which employees have discretion over methods used, the timing of work and customer interaction. It was based on a measure by Jackson et al (1993) but modified to reflect the service context (Holman, 2002). A five-point response scale was used ('not a lot' to 'a great deal'). An example

item is ‘Can you choose the methods to use in carrying out your work?’ Cronbach’s alpha was .70 at T1 and .83 at T2.

Feedback was a five-item measure assessing the extent to which employees received feedback on their performance from any source (Holman et al., 2009). A seven-point response scale was used (‘strongly disagree’ to ‘strongly agree’). An example item is ‘The feedback I receive about my performance is constructive’. Cronbach’s alpha was .91 at T1 and .94 at T2.

Job-related well-being. Warr (2012) suggests that when a comprehensive but parsimonious assessment of affective well-being is required, it is useful to use a global measure of well-being covering its main sub-components, i.e., anxiety, contentment, depression, enthusiasm. Given the small sample size and need for model parsimony, we used Warr’s (1990) twelve-item measure of well-being that assessed the extent to which the person has felt pleasant (e.g. enthusiasm, contentment) and not felt unpleasant (e.g. anxiety, depressed) affective states in the last month. A high score indicates greater well-being. Cronbach’s alpha was .87 at T1 and .89 at T2. A five-point response scale was used (‘Never’ to ‘All of the Time’).

Psychological contract fulfillment As no measure of psychological contract fulfillment with regard to job characteristics was available, we adapted a measure used by Robinson and Rousseau (1994). This single-item measure asks respondents to assess the extent to which the organization has fulfilled its obligations in general. Our adapted multi-item measure asked employees to assess the extent to which they perceived that the organization had fulfilled its obligations with regard to seven job characteristics, namely: variety in the job, interesting and meaningful work, the opportunity to develop skills, the opportunity to decide how your team operates, a high level of control over your work, non-intrusive monitoring, and monitoring that provides constructive feedback. These job characteristics were chosen to capture key job design-

related components of the psychological contract, particularly within call centers (Chambel & Alcover, 2011). Using multiple items makes the measure more sensitive to change than a single-item measure of psychological contract fulfillment (Freese & Schalk, 2008). A five-point response scale was used ('very poorly fulfilled' to 'fulfilled very well'). A factor analysis in SPSS with varimax rotation on the Time 1 data indicated that two items (non-intrusive monitoring and opportunity to decide how your team operates) did not load on the main factor. Removing these items led to a single factor solution, with all items loading above .45. Confirmatory factor analyses conducted in Mplus on the Time 1 and Time 2 data using the same five items found a good fit to the data at both time points (Time 1:  $\chi^2 = 5.46$ , df, 5, CFI = .99, SRMR = .03; Time 2;  $\chi^2 = 11.67$ , df, 5, CFI = .93, SRMR = .06) with item loadings all above .50 (Hu & Bentler, 1999). A five-item measure of psychological contract fulfillment was therefore used. Cronbach's alpha was .78 at T1 and .81 at T2.

Demographic measures Items on age (years), tenure (months) and gender (Female = 0, Male =1) were also included in the survey.

#### Team Leader Survey

A single measure of overall job performance (reflecting in-role and extra-role performance) was used due to the need for a comprehensive and parsimonious assessment of job performance. Based on a meta-analysis of performance measures, Viswesvaren, Schmidt and Ones (2005) concluded that overall job performance measures (that included different components of job performance) are valid as they reflect an underlying general performance factor and are psychologically meaningful. We assessed job performance using Williams and Anderson's (1991) twelve item measure. It includes items on in-role performance (e.g., 'This employee meets the formal performance requirements of the job') and organizational citizenship behaviors

that benefit other individuals (e.g., ‘This employee helps others who have heavy workloads’) and the organization (e.g., ‘This employee gives advance notice when unable to come into work’). A five point scale was used (‘Strongly Disagree’ to ‘Strongly Agree’). Cronbach’s alpha was .91 at T1 and .91 at T2.

### Statistical analysis

Multi-level modeling was used to test the hypotheses. A two-level model was used as measurement occasion was nested within person (A three-level model was not used due to a lack of significant variance in the dependent variables at the group-level and due to the small sample size). Level-one variables were group-mean centered and all random effects were fixed (Enders & Tofghi, 2007). All four hypotheses were tested simultaneously by constructing a ‘multiple mediator/multiple outcome’ model that included all independent, mediating and dependent variables. To test Hypothesis 1, the treatment effects of the intervention on job characteristics, we followed a procedure set out by LeBlanc et al. (2007) that involves conducting a level-1 moderation analysis. The model included dummy variables representing measurement time (i.e. pre- and post-intervention), group membership (i.e. experimental or control group), an interaction term representing the product of these two dummy variables, and paths from these variables to both job control and feedback. A significant interaction effect indicates that the level of change in the experimental group is significantly different from that of the control group. To test Hypotheses 2, the direct effects of job characteristics on employee outcomes, the model included paths from each job characteristic to each outcome. (The job characteristics and employee outcomes variables are time variant such that a significant path indicates that a change in a job characteristic is associated with synchronous change in an employee outcome, Le Blanc et al., 2007).

To test Hypothesis 3, concerning indirect effects of the intervention on employee outcomes, we followed the procedure for testing level-1 mediation recommended by Rucker, Preacher, Tormala and Petty (2011). This involved testing the significance of the indirect effect  $ab$  using bootstrapping to obtain bias corrected 95% confidence intervals (Bauer, Preacher & Gil, 2006; Preacher & Selig, 2010), where Path  $a$  is the path from the interaction term to the mediator and Path  $b$  is the path from the mediator to the dependent variable. Also included in the model were paths from the interaction term to the dependent variables, which was used to test Hypothesis 4 concerning the direct effects of the intervention on employee outcomes. Mediator variables were correlated to account for any multicollinearity (Preacher & Hayes, 2008)<sup>1</sup>.

Within group differences over time for the main study variables were tested simultaneously in an MLM model with time as independent variable. We also tested for non-random sampling effects due to participant attrition. Following Goodman and Blum's procedure (1996), we conducted a logistic regression in which the dependent variable was a dichotomous variable representing those present at Time 1 and 2 (i.e. stayers) and those who responded at Time 1 but opted out or had left at Time 2 (i.e. leavers). All the main study variables at Time 1 were entered as independent variables. A significant effect indicates that participant attrition might bias the results.

## Results

Table 2 shows the correlations between the Time 1 variables and the correlations between the Time 2 variables for the longitudinal sample, as well as the correlations between the Time 1 and Time 2 variables for the longitudinal sample. Table 3 shows the means and standard deviations for the main study variables of the experimental and control groups at Time 1 and Time 2.

---

<sup>1</sup> Adding a path between the mediators saturates the model, meaning that fit indices cannot be provided.



Hypothesis 1, concerning the effects of the intervention on the two job characteristics, was supported. The results, shown in Table 4, reveal a significant treatment effect on job control ( $\beta = .38, p < .01$ ) and feedback ( $\beta = .62, p < .01$ ). Further inspection of variable means (See Table 3) indicates that job control increased in the experimental group (1.59 to 1.85) and decreased in the control group (1.68 to 1.55), while feedback remained at a constant level in the experimental (3.62 to 3.67) group and decreased in the control group (4.08 to 3.71).

Hypothesis 2, concerning the effects of the job characteristics on the three outcome variables, was largely supported. Table 4 shows that there were significant positive associations between job control and well-being ( $\beta = .18, p < .05$ ), job performance ( $\beta = .60, p < .01$ ), and psychological contract fulfillment ( $\beta = .24, p < .01$ ). Feedback was positively associated with well-being ( $\beta = .44, p < .01$ ) and psychological contract fulfillment ( $\beta = .34, p < .01$ ) but not significantly related to job performance ( $\beta = .05, n.s.$ ).

Hypothesis 3 concerned the indirect effects of the intervention on the three outcome variables and was largely confirmed, as five of the six indirect paths were significant. The indirect path from the intervention to well-being was significant through changes in job control ( $\beta = .07, 95\% \text{ Bias Corrected CI LL} = 0.01, \text{ UL} = 0.16$ ) and feedback ( $\beta = .28, 95\% \text{ BC CI LL} = 0.08, \text{ UL} = 0.49$ ). The indirect path from the intervention to job performance was significant through changes in job control ( $\beta = .23, 95\% \text{ Bias Corrected CI LL} = 0.04, \text{ UL} = 0.49$ ) but not through changes in feedback ( $\beta = .03, 95\% \text{ BC CI LL} = -0.13, \text{ UL} = 0.21$ ). The indirect path from the intervention to psychological contract fulfillment was significant through changes in job control ( $\beta = .09, 95\% \text{ Bias Corrected CI LL} = 0.01, \text{ UL} = 0.18$ ) and feedback ( $\beta = .22, 95\% \text{ BC CI LL} = 0.06, \text{ UL} = 0.39$ ).

Hypothesis 4, regarding the direct effects of the intervention on the three employee outcomes, was largely unsupported. The results, shown in Table 4, revealed a significant treatment effect on well-being ( $\beta = .28$ ,  $p < .05$ ) but not on job performance ( $\beta = .11$ , n.s.) or psychological contract fulfillment ( $\beta = .11$ , n.s.).

Tests of within group differences (shown in Table 3) revealed that, for the experimental group there were significant increases in job control, job performance and psychological contract fulfillment (all  $p < .05$ ) but no significant change in the level of feedback or well-being. In the control group there was a significant increase in job performance ( $p < .05$ ), no significant change in job control or psychological contract fulfillment, and significant decreases in feedback and well-being (both  $p < .05$ ). Finally, we found no significant differences in the main study variables between those present at Time 1 and 2 (i.e. stayers) and those who responded at Time 1 but opted out or had left at Time 2 (i.e. leavers). As such, non-random sampling effects of participant attrition do not appear to bias the findings (Goodman & Blum, 1996).

## **Discussion and Conclusion**

The aim of this paper is was to test a ‘multiple mediator/multiple outcome’ model of job redesign intervention by examining whether a job redesign intervention can enhance a range of employee outcomes by changing multiple job characteristics. A key contribution of this study is to provide support for a ‘multiple mediator/multiple outcome’ model of job redesign intervention, as the results indicated the job redesign intervention influenced a broad range of employee outcomes (employee well-being, job performance and psychological contract fulfillment) by inducing change in multiple job characteristics (job control and feedback). This

extends support for the general efficacy of job redesign interventions as a means of enhancing employee outcomes (Semmer, 2006) and points to the general viability of the multiple mediator/multiple outcome model of job redesign intervention in addition the other types of models tested in earlier studies (Bond & Bunce, 2001; Bond, Flaxman & Bunce, 2008; Holman et al., 2009; Logan & Ganster, 2005). The results also provide further evidence that the mechanism through which job redesign intervention affect employee outcomes is a change in job characteristics (Bond & Bunce, 2001) and that the effects of job redesign interventions on employees are not simply a result of their involvement in the intervention.

Our findings also showed that intervention-induced changes in job control led to change in all three types of employee outcomes. These results are similar to those of Bond and colleagues, which also show changes in job control to have broad effects on employee outcomes in job redesign interventions (Bond & Bunce, 2001; Bond, Flaxman & Bunce, 2008). In combination, the empirical evidence from these studies suggests that changes to job control may be crucial to successful job redesign interventions. This study further extends the insights provided by Bond and colleagues by showing that the relationship between job control and job performance is unlikely result of common method variance or self-report bias, as a supervisor-rated measure of job performance was used.

In contrast to the results for job control that showed an impact on three types of employee outcome, changes in feedback affected well-being and psychological contract fulfillment but not job performance. According to goal-setting theory, the lack of a relationship between feedback and job performance may have occurred because feedback was not accompanied by goal-setting practices (Locke & Latham, 1990). This suggests that future job redesign interventions that seek

to improve job performance through changes to feedback, need to pay attention to the goal-setting practices that occur between employee and supervisor.

Another significant contribution of this paper is to extend understanding of the antecedents of psychological contract fulfillment. Specifically, it is the first to compare the impact of organizational change on psychological contract fulfillment between a group that participated in change and a group that did not - although a limitation is that psychological contract fulfillment was not manipulated directly by the intervention. Despite this limitation, our findings provide important evidence that organizational change is a key antecedent of psychological contract fulfillment (Chaudhrey, Coyle-Shapiro & Wayne, 2010; Rousseau & Tijoriwala, 1999; Schalk & Roe, 2007). Furthermore, the results suggest that it is changes in working conditions that induce changes in psychological contract fulfillment rather than participation in organizational change.

Overall, the study suggests that job redesign interventions affect employee outcomes through changes in job characteristics (Bond & Bunce, 2001, Holman et al., 2009). However, Golembiewski, Billingsley and Yeager's (1976) typology of change suggests that there may be different interpretations as to why the intervention led to changes in employee scores on self-reported job characteristics and employee outcomes. Their typology proposes that changes in employee scores can result from objective change in the level of the underlying construct (i.e., Alpha change), from employees' recalibration of a measure's response scale (Beta change) or from a fundamental change in employees' understanding of a construct (Gamma change).

An Alpha-based interpretation of change would assert that the intervention led to objective improvements in job characteristics in the experimental group, which is reflected in employees' scores on job characteristics measures i.e., job control. Support for this perspective comes from managers and team leader reports confirming that changes to job characteristics had occurred in

the experimental group. Similarly, an Alpha-based interpretation would suggest that the decreases in job characteristics reported by employees in the control group (i.e., feedback) reflect an objective worsening of job design characteristics. While such changes might not necessarily be expected in a control group, they are consistent with evidence from call centre studies showing that employee's experiences of the job can worsen over time even in the absence of major organizational change (Holman & Wall, 2002) and are also consistent with dynamic theories of job design which propose that job characteristics can change in the absence of organizational intervention (Daniels, 2006; Clegg & Spencer, 2007; Wrzesniewski & Dutton, 2001). For example, the usefulness of feedback may decline in a call centre because the limited nature of the job means that feedback becomes repetitive. Indeed, there is other evidence that job redesign interventions can buffer declines in job characteristics that occur over the course of an intervention as a result of other factors (deJoy, Wilson, Vandenberg, McGrath-Higgins, & Griffin-Blake, 2010). Taken as a whole, an Alpha-based interpretation suggests that the effect of the intervention was to enhance objective characteristics of the job in the experimental group or arrest their decline, which in turn helped to sustain employee well-being and improve job performance and psychological contract fulfillment.

An interpretation based on Beta or Gamma change would assert that the intervention caused employees to reconceptualize their understanding of job characteristics, and it was that this caused changes in employee scores rather than objective changes to the job. Although there was little in the intervention to stimulate wide ranging changes to participant's understandings of response scales or key constructs, one trigger could have been the definitions of job characteristics provided by researchers in workshops. But participants expressed no surprise or difficulty in understanding the meanings provided by researchers. This suggests that the

meaning of the constructs used in this study reflected participant understandings and is unlikely to have triggered Beta or Gamma change. It therefore seems unlikely that Beta change or Gamma change were the main cause of change in employee scores, although the small sample size of this study prevents this interpretation being ruled out more thoroughly by statistical analysis (Vandenberg & Self, 1993). Thus, of the different interpretations of the effect of the intervention on employee survey scores, those based on Beta or Gamma change seem the least plausible. An interpretation of the intervention effects based on Alpha change appears the most plausible, as managers confirmed that actual changes in job characteristics had occurred and results were consistent across subjective and objective outcome measures (Grant & Wall, 2009).

Another interpretation of the results is that they are due to a Hawthorne effect, i.e., from being studied rather than from the job redesign intervention. For example, being studied could have made employees change how they did their job by independently altering job tasks; although this seems unlikely to have occurred widely as task changes needed permission from supervisors who closely monitored employees' work. Being studied could also have made employees change how they perceived their job. Again, such an explanation seems unlikely because reports of job design changes in the experimental group from several sources (i.e., managers and team leaders reports, internal documentation) coincide with employee self-reports. In addition, any possible Hawthorne effect should not unduly affect the interpretation of the results, as the use of an active control means that changes in the experimental group were over and above the effects of being studied. Other threats to the internal validity of the findings are selection effects and halo and horns effects. However, the random selection of teams into the experimental and control groups is likely to have mitigated the likelihood of such selection effects, while the non-significant

changes within some groups indicates that a halo-effect or a horns effect has not unduly biased the results.

Despite the positive features of this study (e.g., its quasi-experimental design), its limitations need to be recognized. The small sample size, call centre context and participative nature of the intervention mean that the results of this study should be generalized with caution. Furthermore, as global measures of well-being and job performance were used due to the small sample size, it is not feasible to ascertain the effects of the intervention on their specific components. The study also did not assess the impact on team-level variables such as team control or interdependency, even though some of the changes might have had an effect on team processes as well as individual jobs (Morgeson, Medsker & Campion, 2006). In addition, only a limited number of job characteristics were examined as mediators, although a clear strength of the participative design is that the study focused on two job characteristics (job control and feedback) that were identified by employees as being important in their role. Nevertheless, the mediating role of a wider set of job characteristics such as job demands or skill utilization cannot be ascertained from this study, although their mediating role has been addressed by Holman et al. (2009) in relation to employee well-being. Common method variance might have inflated the relationships between self-report variables, although the presence of non-zero correlations between some variables and the use of supervisor performance ratings indicates that common method variance did not unduly bias the results. It is also difficult to ascertain the relative contribution of each job characteristic to the change in outcomes, as it cannot be assumed that their manipulation was equal in strength.

A further limitation of the study is that it was not possible to collect a third wave of data. A key benefit of collecting a third wave would have been to assess whether the effects of the

intervention were sustained over a longer time period, such as six months or one year. Another benefit would have been to assess meditation with temporally distinct measures to gain greater confidence in the causal ordering of the mediation process. While it can be argued that the intervention was temporally prior to the changes in the mediators and dependent variables, the current research design means that it cannot be established with certainty whether changes in the mediators were temporally prior to the changes in the dependent variables. One possibility is, therefore, that the intervention led to changes in the outcome variables (e.g., well-being), which then led to changes in the proposed mediators (e.g., job characteristics). However, evidence that changes to the mediators were temporally prior to changes in the dependent variables came from internal documentation, reports by managers and team leaders, and meetings between researchers and employees that changes to the job design occurred before the second wave of measurement. Furthermore, a study by de Jonge et al., (2001) found weak evidence for the reverse effects of well-being on job characteristics, and only with regard to job demands. They did not find any evidence for reverse effects with regard to job control. This gives us greater confidence that the causal order of the intervention, mediators and dependent variables was as set out in our theoretical model.

To conclude, the main aim of this paper was to test whether a job redesign intervention can influence a broad range of employee outcomes by changing multiple job characteristics. The results confirmed that job redesign interventions can impact on employees' affect, performance and job attitudes through changes in job control and feedback. Future job redesign interventions could be improved by combining changes in job control with feedback process that include goal-setting.

## **References**



- Axtell, C., Pepper, K., Clegg, C., Wall, T., & Gardner, P. (2001). Designing and evaluating new ways of working: The application of some sociotechnical tools. *Human Factors and Ergonomics in Manufacturing*, 11, 1–18. DOI: 10.1002/1520-6564(200124)11:1<1::AID-HFM1>3.0.CO;2-6
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182. doi: 10.1037/0022-3514.51.6.1173
- Bauer, D. J., Preacher, K. J., & Gil, K. M. (2006). Conceptualizing and testing random indirect effects and moderated mediation in multilevel models: New procedures and recommendations. *Psychological Methods*, 11, 142–163. doi: 10.1037/1082-989X.11.2.142
- Biron, C., Karinka-Murray, M., & Cooper, C. (2011). (Eds.) *Organizational stress and well-being interventions: addressing process and context*. London, Psychology Press.
- Bond, F. W., & Bunce, D. (2001). Job control mediates change in a work reorganization intervention for stress reduction. *Journal of Occupational Health Psychology*, 6, 290–302. doi: 10.1037/1076-8998.6.4.290.
- Bond, F.W., Flaxman, P.E., & Bunce, D. (2008). The influence of psychological flexibility on work redesign: Mediated moderation of a work reorganization intervention. *Journal of Applied Psychology*, 93, 645-654. doi: 10.1037/0021-9010.93.3.645
- Burnes, B. (2009). *Managing Change*. Harlow: FT/Prentice Hall.
- Campion, M. A., & McClelland, C. L. (1991). Interdisciplinary examination of the costs and benefits of enlarged jobs: A job design quasi-experiment. *Journal of Applied Psychology*, 76, 186–198. Doi: 10.1037/0021-9010.76.2.186

- Chambel, M. J., & Alcover, C-M. (2011). The psychological contract of call-centre workers: Employment conditions, satisfaction and civic virtue behaviours. *Economic & Industrial Democracy*, 32, 115-134. doi: 10.1177/0143831X10376421
- Chaudhrey, A., Coyle-Shapiro, J.A-M., Wayne, S.J. (2010). A longitudinal study of the impact of organizational change on transactional, relational, and balanced psychological contracts. *Journal of Leadership & Organizational Studies*, 20, 1-13. DOI: 10.1177/1548051810385942
- Chaudhry, A., Wayne, S. J., & Schalk, R. (2009). A sense making model of employee evaluation of psychological contract fulfillment: When and how do employees respond to change? *Journal of Applied Behavioral Science*, 45, 498-520. doi: 10.1177/0021886309341739
- Clegg, C., Coleman, P., Hornby, P., Maclaren, R., Robson, J., Carey, N., Symon, G. (1996). Tools to incorporate some psychological and organizational issues during the development of computer-based systems, *Ergonomics*, 39, 482-511, DOI: 10.1080/00140139608964476
- Clegg, C., & Spencer, C. (2007). A circular and dynamic model of the process of job design. *Journal of Occupational and Organisational Psychology*, 80, 321-339. DOI: 10.1348/096317906X113211
- Cox, T., Griffiths, A., Barlowe, C., Randall, R., Thomson, L., and Rial-Gonzalez, E. (2000). *Organisational interventions for work stress: A risk management approach (HSE Contract Research Report 286/2000)*. Colegate, Norwich: Her Majesty's Stationery Office.
- Daniels, K. (2006). Rethinking job characteristics in work stress research. *Human Relations*, 59, 267-90.
- De Jonge, J., Dormann, C., Janssen, P. P. M., Dollard, M. F., Landeweerd, J. A., & Nijhuis, J. N., (2001). Testing reciprocal relationships between job characteristics and psychological

- well-being: A cross-lagged structural equation model. *Journal of Occupational and Organisational Psychology*, 74, 29-46. DOI: 10.1348/096317901167217
- deJoy, D. M., Wilson, M. G., Vandenberg, R. J., McGrath-Higgins, A. L., & Griffin-Blake, C. S. (2010) Assessing the impact of healthy work organisation intervention. *Journal of Occupational & Organizational Psychology*, 83, 139-165. DOI:10.1348/096317908X398773
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86, 499–512. doi: 10.1037/0021-9010.86.3.499
- Egan, M., Bambra, C., Thomas, S., Pettigrew, M., Whitehead, M., & Thomson, H. (2007). The psychosocial and health effects of workplace reorganization. 1. A systematic review of organizational-level interventions that aim to increase employee control. *Journal of Epidemiology and Community Health*, 61, 945-954. doi: 10.1136/jech.2006.054965
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12, 121-138. doi: 10.1037/1082-989X.12.2.121
- Freese, C., & Schalk, R. (2008). How to measure the psychological contract: A critical criteria based review of measures. *South African Journal of Psychology*, 38, 269-286. doi: 10.1177/008124630803800202
- Frese, M., Garst, H., & Fay, D. (2007). Making things happen: Reciprocal relationships between work characteristics and personal initiative in a four-wave longitudinal structural equation model. *Journal of Applied Psychology*, 92, 1084-1102. doi: 10.1037/0021-9010.92.4.1084
- Frese, M., & Zapf, D. (1994). Action as the core of work psychology: A German approach. In H. C. Triandis, M. D. Dunnette, & J. M. Hough (Eds.), *Handbook of industrial and*

- organizational psychology (Vol. 4, pp. 271–340). Palo Alto, CA: Consulting Psychologists Press.
- Golembiewski, R. T., Billingsley, K., & Yeager, S. (1976). Measuring change and persistence in human affairs: Types of change generated by OD designs. *Journal of Applied Behavioral Science*, 12, 133-157. doi: 10.1177/002188637601200201
- Goodman, J. S., & Blum, T. C. (1996). Assessing the non-random effects of subject attrition in longitudinal research. *Journal of Management*, 22, 627–652. doi: 10.1177/014920639602200405
- Grant, A. M. & Wall, T. D. (2009) The neglected science and art of quasi-experimentation: Why-to, when-to, and how-to advice for organizational researchers. *Organizational Research Methods*, 12, 653-686. doi: 10.1177/1094428108320737.
- Griffin, M., Neal, A., & Parker, S. (2007). A new model of work role performance: positive behavior in uncertain and interdependent contexts. *Academy of Management Journal*, 50, 327-347.
- Hackman, J. R., & Oldham, G. R. (1980). *Work redesign*. Reading, MA: Addison-Wesley.
- Hockey, G. J. (1997). Compensatory control in the regulation of human performance under stress and high workload: A cognitive–energetical framework. *Biological Psychology*, 45, 73–93. doi: 10.1016/S0301-0511(96)05223-4
- Holman, D. (2002). Employee stress in call centres. *Human Resource Management Journal*, 12, 35–50. DOI: 10.1111/j.1748-8583.2002.tb00076.x
- Holman, D., Axtell, C. M., Sprigg, C. A., Totterdell, P., & Wall, T. D. (2009) The mediating role of job characteristics in job redesign interventions: A serendipitous quasi-experiment. *Journal of Organizational Behavior*, 31, 84-105. DOI: 10.1002/job.631

- Holman, D., & Wall, T. D. (2002). Work characteristics, learning outcomes and strain: A test of competing direct effects, mediated and moderated models. *Journal of Occupational Health Psychology, 7*, 283–301. DOI: 10.1037//1076-8998.7.4.283
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.
- Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology, 92*, 1332–1356. doi: 10.1037/0021-9010.92.5.1332
- Israel, B. A., Baker, E. A., Goldenhar, L. M., Heaney, C. A., & Schurman, S. J. (1996). Occupational stress, safety, and health: Conceptual framework and principles for effective prevention interventions. *Journal of Occupational Health Psychology, 1*, 261–286. doi: 10.1037/1076-8998.1.3.261
- Jackson, S. E. (1983). Participation in decision making as a strategy for reducing job-related strain. *Journal of Applied Psychology, 68*, 3–19. doi: 10.1037/0021-9010.68.1.3
- Jackson, P. R., Wall, T. D., Martin, R., & Davids, K. (1993). New measures of job control, cognitive demand, and production responsibility. *Journal of Applied Psychology, 78*, 753–762. doi: 10.1037/0021-9010.78.5.753
- Judge, T. A., & Kammeyer-Mueller, J. D. (2012). Job Attitudes, *Annual Review of Psychology, 63*: 341-367. DOI: 10.1146/annurev-psych-120710-100511
- Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. New York: Basic Books.

- Kickul, J., Lester, S. W., & Finkl, J. (2002). Promise breaking during radical organizational change: do justice interventions make a difference? *Journal of Organizational Behavior*, 23, 469-488. DOI: 10.1002/job.151
- Kompier, M. A. J., Geurts, S. A. E., Gründemann, R. W. M., Vink, P., & Smulders, P. G. W. (1998). Cases in stress prevention: the success of a participative and stepwise approach. *Stress Medicine*, 14, 155-168. DOI: 10.1002/(SICI)1099-1700(199807)14:3<155::AID-SMI773>3.0.CO;2-C
- LaMontagne, A. D., Keegel, T., Louie, A. M., Ostry, A., & Landsbergis, P. A. (2007). A systematic review of the job-stress intervention evaluation literature 1990-2005. *International Journal of Occupational Environmental Health*, 13, 268-80. doi: 10.1037/0021-9010.92.1.213
- Lazarus, R.S. (1991). *Emotion and Adaptation*. New York: Oxford Univ. Press.
- Le Blanc, P. M., Hox, J. J., Taris, T.W., Schaufeli, W. B., & Peeters, M. C.W. (2007). Take Care! The evaluation of a team-based burnout intervention program for oncology care providers. *Journal of Applied Psychology*, 92, 213–227. doi: 10.1037/0021-9010.92.1.213
- Lee, R. T., & Ashforth, B. E. (1996). A meta-analytic examination of the correlates of the three dimensions of job burnout. *Journal of Applied Psychology*, 81, 123–133. doi: 10.1037/0021-9010.81.2.123
- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance*. Englewood Cliffs, NJ: Prentice Hall.
- Logan, M. S., & Ganster, D. C. (2005). An experimental evaluation of a control intervention to alleviate job-related stress. *Journal of Management*, 31, 90–107. doi: 10.1177/0149206304271383

- London, M. (2003). *Job Feedback: Giving, seeking and using feedback for performance improvement*. Mahwah, NJ, Lawrence Erlbaum.
- Meyer, J. & Allen, N. (1997). *Commitment in the Workplace: Theory, Research, and Application*. Sage, London.
- Morgan, D.E., & Zeffane, R. (2003). Employee involvement, organizational change and trust in management. *The International Journal of Human Resources Management*, 14, 55-75. DOI: <http://dx.doi.org/10.1080/09585190210158510>
- Morgeson, F. P., & Campion, M. A. (2002). Minimizing tradeoffs when redesigning work: Evidence from a longitudinal quasi-experiment. *Personnel Psychology*, 55, 589–612. DOI: 10.1111/j.1744-6570.2002.tb00122.x
- Morgeson, F. P., Medsker, G. J., & Campion, M. A. (2006). Job and team design. In G. Salvendy (Ed.), *Handbook of human factors and ergonomics* (3rd ed., pp. 428-455). New York: Wiley.
- Nielsen, K., Randall, R., Holten, A. L., & Gonzalez, E. R. (2010). Conducting organizational-level occupational health interventions: What works? *Work & Stress*, 24, 234-259. DOI: 10.1080/02678373.2010.515393
- Parker, S., & Wall, T. D. (1999). *Job and work design*. London: Sage.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40, 879-891.
- Preacher, K. J., & Selig, J. P. (2010, July). Monte Carlo method for assessing multilevel mediation: An interactive tool for creating confidence intervals for indirect effects in 1-1-1 multilevel models [Computer software]. Available from <http://www.quantpsy.org>.

- Robinson, S. L., & Rousseau, D. M. (1994). Violating the psychological contract: Not the exception but the norm. *Journal of Organizational Behaviour*, 15, 245–259. DOI: 10.1002/job.4030150306
- Roethlisberger, F. J., & Dickson, W. J. (1939). *Management and the worker: An account of a research program conducted by the Western Electric Company, Hawthorne Works*. Chicago, Cambridge, MA: Harvard University Press.
- Rousseau, D. M. (1995). *Psychological contracts in organizations*. Thousand oaks, CA: Sage.
- Rousseau, D. M., & Tijoriwala, S. A. (1998). Assessing psychological contracts: Issues, alternatives, and measures. *Journal of Organizational Behavior*, 19, 679–695. DOI: 10.1002/(SICI)1099-1379(1998)19:1+<679::AID-JOB971>3.0.CO;2-N
- Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, 5/6, 359-371. DOI: 10.1111/j.1751-9004.2011.00355.x
- Semmer, N. K. (2006). Job stress interventions and the organization of work. *Scandinavian Journal of Work Environment & Health*, 32, 515-527. doi:10.5271/sjweh.1056
- Semmer, N. K. (2008). *Stress management and mental well-being in the workplace*. State-of-Science Review: SR-C6. Government Office for Science. London, UK.
- Schalk, R., & Roe, R.E. (2007). Towards a dynamic model of the psychological contract. *Journal for the Theory of Social Behaviour*, 37, 167-182. DOI: 10.1111/j.1468-5914.2007.00330.x
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental design for generalized causal inference*. Boston: Houghton, Mifflin.



- Sparrow, P. (1996). Careers and the Psychological Contract: Understanding the European Context, *European Journal of Work and Organizational Psychology*, 5, 479–500. DOI: 10.1080/13594329608414874.
- Spector, P. E. (1997). *Job satisfaction: Application, Assessment, Causes, and Consequences*. Sage, London.
- Turnley, W.H., & Feldman, D.C. (1998). Psychological contract violation during corporate restructuring. *Human Resource Management*, 37, 71–83. DOI: 10.1002/(SICI)1099-050X(199821)37:1<71::AID-HRM7>3.0.CO;2-S
- Vandenberg, R. J., & Self, R. M. (1993). Assessing newcomer's changing commitments to the organization during the first 6 months of work. *Journal of Applied Psychology*, 78, 557-568. doi: 10.1037/0021-9010.78.4.557.
- Viswesvaran, C., Schmidt, F. L., & Ones, D. S. (2005). Is there a general factor in ratings of performance? A meta-analytic framework for disentangling substantive and error influences. *Journal of Applied Psychology*, 90, 108-131.
- Wall, T. D., Kemp, N. J., Jackson, P. R., & Clegg, C.W. (1986). Outcomes of autonomous workgroups: A long-term field experiment. *Academy of Management Journal*, 29, 280–304. doi: 10.2307/256189
- Warr, P. B. (1990). The measurement of well-being and other aspects of mental health. *Journal of Occupational Psychology*, 63, 193–210. DOI: 10.1111/j.2044-8325.1990.tb00521.x
- Warr, P. (2012). How to think about and measure psychological well-being. In Wang, M., Sinclair, R. R., and Tetrick, L. E. (Eds.) *Research Methods in Occupational Health Psychology*. New York: Psychology Press/Routledge,

Westwood, R., Sparrowe, P., & Leung, A. (2001). Challenges to the psychological contract in Hong Kong, *International Journal of Human Resource Management*, 12, 621-651. DOI: 10.1080/09585190122611.

Williams, L. J., & Anderson, S. E. (1991). Job satisfaction and organizational commitment as predictors of organizational citizenship behaviors and in-role behaviors. *Journal of Management*, 17, 601-617.

Wrzesniewski, A., & Dutton, J. E. (2001). Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, 26, 179–201. DOI: 10.2307/259118

**Table 1. Stages of the research**

<b>Stage</b>	<b>Procedure</b>	<b>Time</b>
Stage 1	Employee briefing on study purposes	Month 1
Stage 2	Administration of the pre-test Time 1 questionnaire. Allocation of teams to experimental and control conditions	Month 2
Stage 3	Job redesign workshops: assessment and development of job redesign change initiatives	Months 3-4
Stage 4	Job redesign: implementation of changes to job design.	Month 8
Stage 5	Administration of the post-test Time 2 questionnaire	Months 10-11

**Table 2. Correlations for longitudinal sample (N = 62)**

	Within Time 1 and Time 2 <sup>1</sup>					Between Time 1 and 2				
	1	2	3	4	5	1	2	3	4	5
1. Well-Being	-	.11	.56**	.14	.33**	.58**				
2. Job Performance	-.03	-	.10	-.02	.19	-.06	.26*			
3. Psychological Contract Fulfillment	.57**	-.07	-	.35**	.58**	.51*	.06	.41*		
4. Job Control	.07	-.11	.00	-	.05	.02	.10	-.05	.33*	
5. Feedback	.36**	.04	.36**	.23	-	.22	.13	.18	-.08	.24*

Note: \*  $p < .05$ , \*\*  $p < .01$ . <sup>1</sup>Time 1 correlations in lower half, Time 2 correlations in upper half.

**Table 3. Means and standard deviations of main study variables for experimental (N=23) and control groups (N=39) at each time point**

	Control Group		Experimental Group	
	Mean	SD	Mean	SD
Well-Being 1	3.42	.65	3.15	.67
Well-Being 2	3.16*	.63	3.17	.76
Job Performance 1	4.00	.68	3.70	.71
Job Performance 2	4.13*	.76	4.36*	.63
Psych Contract Fulfillment 1	2.83	.67	2.71	.69
Psych Contract Fulfillment 2	2.71	.63	2.84*	.68
Job Control 1	1.68	.56	1.59	.47
Job Control 2	1.55	.75	1.85*	.79
Feedback 1	4.08	.79	3.62	.64
Feedback 2	3.71*	.82	3.67	.82

\*p < .05 between time 1 and time 2 within group

**Table 4: Model Results**

	Mediators			Dependent Variables	
	Job	Feedback	Well Being	Job	Psychological
	Control			Performance	Contract
Job Control			.18*	.60**	.24**
Feedback			.44*	.05	.34**
Intervention Group	-.19*	-.31*	-.14	.01	-.05
Time	-.12	-.35**	-.07	.59**	.04
Treatment effect (group * time)	.38**	.62**	.28*	.11	.11

Note: \* =  $p < .05$ , \*\* =  $p < .01$ . Figures in table are unstandardized path coefficients ( $\beta$ 's). Not shown are correlations between: feedback and job control .32\*\*; well-being and performance, .17\*; well-being and psychological contract fulfillment, .39\*\*; job performance and psychological contract fulfillment, -.11. Job control and feedback are time-variant variables.

**Figure 1: A model job redesign intervention mechanisms**

