

Job Demands–Resources And Mental Health: The Mediating Role Of Psychological Contract Breach

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Abstract : *This study investigated the mediating role of perceived psychological contract breach (PCB) in the relationship between job demands–resources and employee mental health. It is the first study to explore whether the extent of PCB, which reflects the subjective evaluation of the employment relationship with regard to its psychological contract, can explain the effects of individual job characteristics on mental health. The analyses were based on a sample of 3,870 employees derived from a longitudinal linked employer–employee study (LEEP-B3) involving large organisations across various industries in Germany. Results of mediated structural equation modelling suggest that job demands (e.g. perceived job insecurity, physical strain) are related to impaired mental health, whereas job resources (e.g. job autonomy) have positive effects on mental health, and they confirmed that these relationships are mediated in part by PCB. In addition, PCB was shown to fully mediate the association between some job characteristics (e.g. overtime, shift work, flexible working hours) and mental health. By showing that PCB, as an indicator of a reciprocity imbalance in the employment relationship, is an important mediator of this association, this study enhances existing knowledge about the processes underlying the association of individual job characteristics with employee mental health.*

Keywords: *Mental health, psychological contract breach, job demands–resources, SF-12*

I. INTRODUCTION

As a result of globalisation, growing competition and rapidly changing technologies, organisations are being increasingly challenged to adapt to these developments by reorganising work and employment, particularly when it comes to managing the changes in employer–employee relationships (Herriot, Manning, & Kidd, 1997; Tyagi&Agrawal, 2010). Against this background, ensuring employee mental health is one aspect relevant to organisations because employees' ill health is negatively associated with job-related attitudes such as work performance (e.g. Bakker, Demerouti, &Verbeke, 2004; Demerouti, Bakker, &Leiter, 2014; Wright, Bonett, & Sweeney, 1993) and organisational commitment (e.g. Hakanen, Schaufeli, &Ahola, 2008; Lin, Lin, & Cheng, 2013).

To understand the ongoing changes and their influence on work-related outcomes, psychological contracts have been identified as a key element in contemporary employer–employee relations (Conway &Briner, 2005; Guest, 2004, 2016; Shore &Tetrick, 1994). Psychological contracts refer to employees' expectations regarding reciprocal exchange agreements with their employers, implying that employees expect employers to fulfil certain obligations (Freese&Schalk, 1996; Rousseau, 1995; Rousseau & Parks, 1993). An employee's perception that the organisation has failed to fulfil one or more of its obligations is referred to as a 'psychological contract breach' (PCB) (Robinson & Rousseau, 1994; Rousseau, 1989), indicating a reciprocity imbalance in the employment relationship. The aim of this study is to examine these kind of reciprocity imbalances in the exchange within modern employment relationships and their role in the process that underlies the relationship between individual employment conditions and employee mental health.

Extensive research based on the job demands–resources model shows that mental health can be negatively affected by job demands and positively affected by job resources (Bakker & Demerouti, 2007; Bakker, Demerouti, &Verbeke, 2004; Demerouti et al., 2001). There is also evidence that the extent of PCB is increased by job demands and decreased by job resources (Vantilborgh et al., 2016). In addition, we know from the literature that PCB is related to poorer employee mental health (e.g. Chambel& Oliveira-Cruz, 2010; Conway &Briner, 2002a; Gracia et al., 2007; Parzefall&Hakanen, 2010; Robbins, Ford, &Tetrick, 2012). Taken together, it can be expected that (a) job demands are related to a greater extent of PCB, whereas job resources are related to a lesser extent of PCB; (b) PCB is negatively related to mental health; and (c) job demands are negatively related and job resources are positively related to mental health. Therefore, job demands should lead to impaired and job resources to better mental health, mediated by PCB (see Figure 1, Theoretical model). Because psychological contracts help employees to evaluate their own efforts in relation to the rewards they receive from their employers (Conway &Briner, 2005), a high level of job demands will lead to greater PCB because the effort expended exceeds the reward received, resulting in a perception of unfairness in the exchange relationship (Robbins, Ford, &Tetrick, 2012). This reciprocity imbalance reflects a state of emotional distress associated with stress reactions that can then lead to health problems (Siegrist, 1996; Siegrist, Siegrist, &

Weber, 1986). In contrast, job resources are related to less PCB and thus a more balanced and fair perception of the employment relationship, which is then associated with better mental health. Although a number of studies have shown that PCB may be a mediator of job characteristics and work-related outcomes in general (Birtch, Chiang, & Van Esch, 2015; Dulac et al., 2008; Piccoli & De Witte, 2015), the specific issue of PCB intervening in the relationship between job demands–resources and mental health has not yet been addressed.

Intended to fill this research gap, this study is the first to explore whether the extent of PCB, which reflects the subjective evaluation of the exchange in the employee–employer relationship regarding the psychological contract, can explain the effects of job demands and job resources on mental health. In addition to this main contribution, this study adds to the literature in several other ways. First, the findings enhance the current research on PCB by investigating both the antecedents and consequences of PCB, because most of the previous research considered either one or the other (Conway & Briner, 2005; 2009). Second, the study population consists of a representative longitudinal sample of 3,870 employees from large work organisations across a wide range of industries in Germany, allowing for the results to be generalised with respect to specific industries or occupational groups from previous studies that examined the relationship between psychological contracts and health, such as among soldiers (Chambel & Oliveira-Cruz, 2010) and managers (Guerrero & Herrbach, 2008), and enhancing previous studies that were based mostly on cross-sectional data (Conway & Briner, 2005, 2009). Third, this approach will provide new insights into the job demands–resources literature by examining a possible underlying psychological process in the relationship between job characteristics and employee mental health that arises from the exchange in the employment relationship and that is traditionally not part of research in this area. Finally, by promoting PCB as a possible indicator of this psychological process, this study contributes to the research on the relationship between work characteristics and mental health as a way of understanding the mechanisms involved in this relationship (Stansfeld & Candy, 2006).

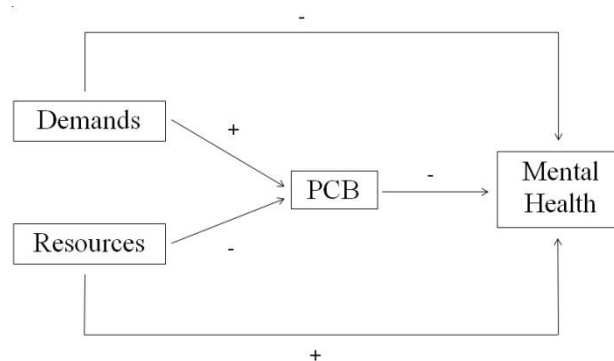


Figure 1. Theoretical model

II. THEORETICAL BACKGROUND AND STATE OF THE ART

2.1 Job demands–resources and mental health

There is an extensive body of literature on the effects of working conditions, whether detrimental or beneficial, on employee mental health outcomes. Basically, mental health can be negatively affected by psychological strain due to the joint effects of stressors in the workplace (Karasek, 1979). According to the job demands–resources (JD–R) model (Bakker & Demerouti, 2007; Bakker, Demerouti, & Verbeke, 2004; Demerouti et al., 2001), employment conditions can be classified into two broad categories: job demands and job resources.

Job demands include the physical, psychological, social and organisational aspects of a job that require effort (physical or psychological) and are thus associated with certain physical or psychological costs (Bakker & Demerouti, 2007). The JD–R model assumes a process of health impairment in which job demands deplete employees' physical and psychological resources and may therefore result in a state of exhaustion, eventually leading to negative health effects (Hakanen, Schaufeli, & Ahola, 2008). Such demands thus act as stressors that result in strain and impaired employee mental health (Bakker, Demerouti, & Verbeke, 2004; Bakker, Demerouti, & Euwema, 2005). For example, job demands that may impair an employee's mental health include a heavy workload, irregular working hours, job insecurity, emotional demands and lack of support from supervisors.

Job resources include physical, psychological, social and organisational aspects of a job that allow employees to achieve their work goals, reduce the costs of job demands or stimulate personal growth and development (Bakker & Demerouti, 2007). Regarding job resources, these job characteristics appear to play a motivational role because they are intrinsically or extrinsically rewarding and thus may have a beneficial effect on employee mental health (Hakanen, Schaufeli, & Ahola, 2008). Job resources that may improve employee mental health include supervisor support, participation in continued training and a high level of autonomy.

With regard to psychological health problems in particular, previous studies have indicated that job demands increase while job resources decrease burnout (e.g. Bakker, Demerouti, & Verbeke 2004; Hakanen, Bakker, & Schaufeli, 2006; Hakanen, Schaufeli, & Ahola, 2008; Schaufeli & Bakker, 2004; Schaufeli, Bakker, & Van Rhenen, 2009), emotional exhaustion and psychological distress (Dollard & Bakker, 2010; Idris et al., 2012; Janssen et al., 2004). Therefore, mental health should be negatively affected by job demands and positively affected by job resources.

Hypothesis 1a: Job demands are negatively associated with mental health.

Hypothesis 1b: Job resources are positively associated with mental health.

2.2 Job demands–resources and psychological contract breach

Based on the general assumptions of social exchange (Blau, 1964), psychological contracts are intended to cover the unwritten and possibly implicit elements of employment relationships, which are basically defined as ‘individual beliefs, shaped by the organization, regarding terms of an exchange agreement between individuals and their organization’ (Rousseau, 1995, p. 9). Thus, employees expect organisations to reward their efforts, because the two parties are bound by reciprocal obligations (Coyle-Shapiro & Conway, 2004; Rousseau, 1989, 1995). Because reciprocity is a key element in all social relationships (Gouldner, 1960), a certain amount of initial and persistent trust that an employer will fulfil its obligations is necessary to maintain the exchange agreement and an employee’s psychological contract (Robinson, 1996). Through this process of reciprocity, psychological contracts can reduce uncertainty about the terms and conditions of the employment relationship by providing orientation for the employee’s work-related behaviour (Shore & Tetrick, 1994). Such contracts serve to help employees to evaluate their own efforts and the rewards they receive from their employers, and to respond to imbalances or balances by adjusting their attitudes and behaviours (Conway & Briner, 2005).

PCB is a subjective experience in which the employee perceives that the employer has failed to appropriately fulfil one or more of the obligations included in the psychological contract (Morrison & Robinson, 1997; Rousseau, 1989). In line with the work of Cassar and Briner (2005), this study examines PCB in terms of its magnitude. This ‘magnitude’ component refers to the breach that occurs when what is delivered is less than what was promised (Cassar, Briner, & Buttigieg, 2016, p. 568 f.) – specifically, the extent to which the organisation has failed to fulfil its obligations (‘extent of PCB’). The literature suggests that individual job characteristics, among other factors, play an important role in determining whether PCB occurs, and if so, to what extent (Coyle-Shapiro & Neuman, 2004; De Vos & Meganck, 2007; Rousseau, 2004; Shih & Chuang, 2012). Recently it has been shown that job demands are related to the perception of more PCB, whereas job resources are related to the perception of less PCB (Vantilborgh et al., 2016).

Hypothesis 2a: Job demands are positively associated with PCB.

Hypothesis 2b: Job resources are negatively associated with PCB.

2.3 Psychological contract breach and mental health

In line with the theory of effort–reward imbalance (ERI) (Siegrist, 1996; Siegrist, Siegrist, & Weber, 1986), PCB can be characterised as a perceived reciprocity imbalance in the employment relationship that acts as a psychosocial work stressor (Gakovic & Tetrick, 2003; Robbins, Ford, & Tetrick, 2012). Previous research has confirmed that psychosocial work stressors such as reciprocity imbalances are specifically relevant for mental ill health (for a meta-analysis, see Stansfeld & Candy, 2006). Similar to psychological contract theory, the ERI model builds on the key assumption of a social exchange relationship between employees and their employer that is based on reciprocity between an employee’s ‘efforts’, such as the number of working hours and level of performance, and compensation in the form of appropriate ‘rewards’ (gratifications), such as pay, career opportunities, job security and recognition. It has been argued that a lack of reciprocity between efforts and rewards results in an effort–reward imbalance – that is, a state of emotional distress associated with stress reactions that in turn cause health problems (Siegrist, 1996).

Previous studies have suggested that PCB is associated with reduced psychological well-being (Conway & Briner, 2002a; Gracia et al., 2007), burnout (Chambel & Oliveira-Cruz, 2010; Topa, Cantisano, Morales Domínguez, & Caeiro García, 2007) and emotional exhaustion (Gakovic & Tetrick, 2003; Piccoli & De Witte, 2015). PCB is also closely related to emotions of betrayal and hurt (Conway & Briner, 2002a) and to negative emotions such as anger, violation and depression (Conway & Briner, 2002b). In contrast, the fulfilment of psychological contracts is positively associated with mental health (Parzefall & Hakanen, 2010). Therefore, we hypothesise that PCB will be negatively associated with an employee’s mental health.

Hypothesis 3: PCB is negatively associated with mental health.

2.4 The mediating role of psychological contract breach

Earlier work on PCB focused on either the antecedents or the consequences of a breach of the psychological contract (for an overview, see Conway & Briner, 2009). Taken together, the direct relationships

between (a) job demands–resources and PCB, (b) PCB and mental health, and (c) job demands–resources and PCB have all been recognised in previous literature, as noted above. Although psychological contracts are considered to be a mediator in the relationship between job characteristics and job-related outcomes (Birtch, Chiang, & Van Esch, 2015; Dulac et al., 2008; Piccoli & De Witte, 2015), the specific mediating role of PCB in the observed job demand–resources/employee mental health relationship continues to be a blind spot in the literature.

Mediation analysis has long been used to explore the psychological processes involved in explaining the effects of independent variables on dependent variables, thus clarifying the nature of these relationships by examining mediator variables (MacKinnon, 2008; Rucker et al., 2011). In line with the general framework of social exchange, the ERI model and psychological contracts theory, this study promotes reciprocity imbalance in the form of PCB as a potential explanation for the psychological process that underlies the relationship between job demands–resources and mental health. Given that psychological contracts help employees to evaluate both their own efforts and the rewards they receive from their employers (Conway & Briner, 2005), as discussed above, a high level of job demands will lead to a perception of imbalances, because employees' efforts will exceed their rewards. In addition, employees confronted with high demands are more likely to focus on the ratio of efforts to rewards and are also prone to evaluate the quality of their relationship with the organisation (Piccoli & De Witte, 2015). Therefore, we assume that high job demands will lead to a greater extent of PCB, which then represents the perception of a reciprocity imbalance initiating a state of emotional strain that subsequently has a negative influence on employees' mental health. Conversely, if the level of job resources is high, the extent of PCB will be less, because the employee feels rewarded by the employer; a low extent of PCB then enhances mental health because the employee feels that the employment relationship is a balanced one.

It is important to consider this mediating process because not all job characteristics that are themselves theoretically classified as job demands have to be directly relevant as stressors leading to impaired employee mental health. Employees expect job demands to be common, but they also expect appropriate rewards and compensations (Siegrist, 1996). Therefore, if rewards or compensations for high job demands are not provided with regard to the psychological contract, the perception that the reciprocity of the exchange agreement of the employment relationship is unfavourable and out of balance would then have a negative influence on the employee's mental health. However, it should be noted that the mediation hypothesis is limited to mediation in part. Job demands may act as strong health-relevant stressors by themselves, and other processes may also play a role in the relationship between job demands–resources and mental health, as proposed by the JD–R model (Bakker & Demerouti, 2007). Therefore, this study proposes a fourth hypothesis:

Hypothesis 4: PCB partly mediates the relationship between job demands–resources and mental health.

III. METHODS

3.1 Sample and procedure

The empirical analysis used to test the four hypotheses described above was based on a linked employer–employee dataset collected as part of the study 'Interactions Between Capabilities in Work and Private Life' (LEEP-B3; for further information, see Diewald et al., 2014), which consisted of an employer survey of large organisations in various segments of the German economy that had at least 500 employees who paid social security taxes, and of a survey of employees from these organisations. Topics covered in the employee survey, which was used for the present study, included occupation, personal life, work–life balance, health, preferences and satisfaction. The employees included in the survey were representative of employees who worked for large organisations that employ about 40% of all workers in Germany (Destatis, 2014), and these employees agreed to participate in computer-assisted telephone interviews (CATI). To date, two waves of data collection have been completed. The first wave (t1), which took place from April 2012 to July 2013, involved 100 organisations and 6,454 employees (response rate = 29%). Of these, 4,000 employees also participated in the second wave (t2), which took place from February 2014 to April 2015 (response rate for panel respondents = 73.3%).

The final sample used for this study included 3,870 panel cases (46% women and 54% men). The largest groups of employees worked in organisations representing two sectors: 'Manufacturing, energy and water supply, construction' (36%) and 'Human health and social work activities' (22%); of the rest, 16% worked in the sector 'Public administration, education', 11% in 'Information and communication', 8% in 'Wholesale and retail trade, transportation and storage' and 8% in 'Insurance and financial activities, economic services'. Respondents were mainly employed full-time (69%), and 92% of the participants were permanent employees, while the remaining 8% had temporary contracts. Employees ranged in age from 21 to 53 years (average age = 43) and had an average of 14.2 years of education; 85% of the participants lived in a partnership, and 71% had children.

3.2 Measures

Mental health (t1): The outcome variable ‘mental health’ was measured using the SF-12 Health Survey (German Socio-Economic Panel version) (see Andersen et al., 2007). In this short, 12-item questionnaire concerning health-related quality of life, two superordinate dimensions (mental health and physical health) are represented by six items each. Scores for the mental component summary (MCS) and the physical component summary (PCS) were generated by conducting a confirmatory factor analysis for t1 and t2 [$\chi^2(45) = 906.922, p < 0.001, RMSEA = 0.069, CFI = 0.952, TLI = 0.930$; see Appendix, Figure A1]. In contrast to the conventional computation of the MCS/PCS scales, the factors were allowed to correlate, which would reflect the more realistic notion that these two aspects of health may influence each other (Schunck, Sauer, & Valet, 2015; Tucker, Adams, & Wilson, 2014). In accordance with the original approach, the MCS score was standardised to a sample mean of 50 and a standard deviation of 10, with higher values indicating better mental health.

PCB (t1): Psychological contract breach was considered to have occurred if what was provided to the employee was less than what the employee had expected (see Morrison & Robinson, 1997; Robinson & Rousseau, 1994). PCB was measured according to the extent of the breach across the following ten specific contents of the psychological contract: good career opportunities, high pay, performance-based pay, continuing advanced training, long-term job security, an interesting job, job autonomy, flexible working hours, a pleasant social atmosphere and social appreciation. Using 5-point scales, as inspired by Rousseau (1990) and Robinson (1996), respondents were asked to indicate the extent to which they expected each of these ten specific obligations to be met by their employers and the extent to which these obligations had actually been met. The difference between the scores for expectation and provision was then calculated, resulting in scores ranging from -4 to $+4$, where positive values meant discrepancies that were to the employee’s disadvantage and negative values meant discrepancies in the employee’s favour. The values for each specific obligation were added up to reveal the extent of PCB, ranging from 0 to 34 (the higher the value, the higher the extent of PCB). Discrepancies in favour of the employee were regarded as 0 breach, because such discrepancies were not part of this study. Using this approach allowed to measure the extent of a breach rather than simply whether it existed (De Jong et al., 2015).

Job demands (t1): Employees were asked whether they had a permanent or a temporary contract (1 = temporary), whether they had supervising responsibilities (1 = yes), how frequently they worked overtime (1 = daily, weekly or seasonal, 0 = rarely or never) and whether they did shift work (1 = yes). Respondents were also asked whether they experienced physical strain regularly (1 = yes) and, in order to capture perceived job security, to rate the likelihood of being laid off within the next two years (0 = low; 1 = high). To examine negative aspects of employees’ relationships to their direct supervisors, the respondents were asked to indicate how often they felt unjustly criticised or bullied by their direct supervisor, using a 5-point scale that ranged from ‘Never’ (= 1) to ‘Always’ (= 5), and the variable was dichotomised to ‘High’ (1 = always or often) or ‘Low’ (0 = sometimes, rarely or never).

Job resources (t1): Job autonomy (see Breugh, 1985) was measured based on three items (e.g. ‘During my working hours, I have control over the sequencing of my work activities’). These values were added to an index that ranged from 3 to 15, with higher values indicating greater job autonomy. Employees were also asked whether they used flexible work arrangements (1 = yes) and whether they had participated in further training within the last two years (1 = yes). To capture positive aspects of employees’ relationships with direct supervisors, the respondents were asked to indicate how often they received appreciation from their direct supervisor, using a 5-point scale that ranged from ‘Never’ (= 1) to ‘Always’ (= 5), and the variable was dichotomised to ‘High’ (1 = always or often) or ‘Low’ (0 = sometimes, rarely or never).

Control variables (t1): For these analyses, the industrial sector was condensed to six groups using the German Classification of Economic Activities (WZ 2008): ‘Manufacturing, energy and water supply, construction’ (= 1); ‘Wholesale and retail trade, transportation and storage’ (= 2); ‘Information and communication’ (= 3); ‘Insurance and financial activities, economic services’ (= 4); ‘Public administration, education’ (= 5) and ‘Human health and social work activities’ (= 6). The analyses also controlled for actual working hours (in hours) and earnings (monthly gross income in €) divided by 100. Gender (1 = male), age (in years) and migration status (0 = born in Germany; 1 = not born in Germany) were included as sociodemographic context variables. In addition, employees were asked whether they were in a partnership (1 = yes) and whether they had children (1 = yes); education was included as years of education (metric).

3.3 Analysis

The multivariate analysis was conducted via mediated structural equation modelling with MCS as the dependent variable. To address the issue of reverse causality, two waves of panel data were used for the analysis. All dependent and independent variables were measured at both t1 (2012) and t2 (2014). The independent variables were used from t1, and MCS was used from t2. Because of the restrictions imposed by these two time points, the mediator PCB was measured at the same time as the other independent variables (t1).

A given indicator may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the dependent variable (Baron & Kenny, 1986). Thus, mediation analysis tests for the direct, indirect and total effects of job demands and resources on MCS. Confidence intervals for the indirect effects were controlled for by computing bias-corrected bootstrap estimates on 1,000 bootstrap samples (see MacKinnon, Lockwood, & Williams, 2004). Because the dependent variable MCS is already standardized, unstandardized coefficients were used to render the interpretation of results more plausible.

IV. RESULTS

4.1 Descriptiveresults

Table 1 reports the means, standard deviations and correlations of all study variables. Inter-correlations of the independent variables were comparably low, with a Pearson correlation coefficient of $r = 0.26$ (job autonomy/use of flexible working hours) being the highest among the job demands and job resources. Correlations of job demands and job resources with MCS were mostly significant and in line with the hypotheses that job demands are negatively associated with MCS and job resources are positively associated with MCS, the exceptions being that having supervisory responsibilities and having a temporary job correlated positively with MCS. The correlation of PCB and MCS was negative and significant ($r = -0.17, p < 0.05$).

Table 1. Correlations of all study variables (N = 3,867)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1 MCS	50.11	0.18	-												
2 Extent of PCB	7.42	0.09	-0.17*	-											
3 Temporary job (1 = yes)	0.08	0.00	0.01	0.02*	-										
4 Supervisory responsibilities (1 = yes)	0.38	0.01	0.06*	-0.03*	-0.05*	-									
5 Frequent overtime (1 = yes)	0.82	0.01	0.02*	0.05*	0.01	0.11*	-								
6 Shift work (1 = yes)	0.28	0.01	-0.07*	0.15*	0.01	-0.03*	-0.12*	-							
7 Physical strain (1 = high)	0.20	0.01	-0.19*	0.21*	-0.01	0.03*	0.05*	0.17*	-						
8 Perceived job insecurity (1 = high)	0.11	0.01	-0.11*	0.16*	0.18*	-0.05*	-0.01	0.04*	0.04*	-					
9 Unjust criticism/Bullying by supervisor (1 = high)	0.06	0.00	-0.14*	0.24*	-0.03*	0.01	0.01	0.09*	0.19*	0.05*	-				
10 Appreciation Supervisor (1 = high)	0.36	0.01	0.07*	-0.23*	0.01*	0.04*	-0.01*	-0.08*	-0.04*	-0.05*	-0.13*	-			
11 Job autonomy (3–15)	10.66	0.05	0.12*	-0.20*	-0.01*	0.21*	0.07*	-0.35*	-0.14*	-0.06*	-0.15*	0.16*	-		
12 Use of flexible working hours (1 = yes)	0.61	0.01	0.06*	-0.13*	-0.03*	0.00	0.13*	-0.42*	-0.16*	0.00	-0.08*	0.05*	0.26*	-	
13 Participation in further training (1 = yes)	0.77	0.01	0.07*	-0.13*	-0.01	0.14*	0.10*	-0.07*	-0.05*	-0.07*	-0.07*	0.08*	0.11*	0.07*	-
14 Manufacturing, energy and water supply, construction	0.35	0.01	0.03*	-0.05*	-0.13*	0.08*	-0.06*	0.06*	-0.06*	0.07*	0.02*	-0.05*	-0.02*	0.08*	-0.08*
15 Wholesale and retail trade, Transportation and storage	0.08	0.00	-0.02*	-0.02*	-0.02*	-0.02*	0.02*	0.06*	0.02*	-0.04*	-0.00	-0.01	-0.05*	-0.10*	-0.08*
16 Information and communication	0.11	0.01	0.03*	0.02*	-0.05*	-0.07*	0.03*	-0.12*	-0.08*	0.05*	-0.03*	0.02*	0.06*	0.14*	0.05*
17 Insurance and financial activities, economic services	0.07	0.00	0.01*	-0.05*	0.01*	-0.01*	0.05*	-0.12*	-0.02*	0.00	-0.02*	0.07*	0.04*	0.09*	0.00
18 Public administration, Education	0.16	0.01	-0.03*	0.01	0.11*	-0.08*	-0.03*	-0.22*	-0.02*	-0.07*	-0.02*	0.02*	0.06*	0.13*	0.00
19 Human health and social work activities	0.22	0.01	-0.03*	0.08*	0.10*	0.05*	0.04*	0.25*	0.14*	-0.03*	0.03*	-0.01	0.07*	0.10*	0.11*
20 Actual working hours	39.69	0.17	0.06*	0.03*	-0.02*	0.30*	0.20*	-0.05*	0.05*	0.03*	0.05*	0.01*	0.12*	0.02*	0.07*
21 Monthly gross income / 100	39.02	0.71	0.10*	-0.06*	-0.06*	0.20*	0.09*	-0.15*	-0.07*	-0.03*	-0.03*	0.03*	0.13*	0.09*	0.08*
22 Male (1 = male)	0.55	0.01	0.10*	-0.07*	-0.08*	0.17*	0.02*	-0.00	-0.11*	0.00	-0.03*	-0.04*	0.05*	0.08*	0.01*
23 Age (in years)	42.76	0.14	-0.02*	-0.05*	-0.23*	0.11*	-0.03*	-0.10*	0.05*	-0.04*	-0.00	-0.01*	0.05*	0.06*	-0.00
24 In Partnership (1 = yes)	0.85	0.01	0.07*	-0.04*	-0.08*	0.09*	-0.01	-0.06*	-0.01*	-0.04*	-0.06*	0.00	0.08*	0.03*	0.05*
25 Years of Education	14.17	0.05	0.10*	-0.02*	0.09*	0.09*	0.16*	-0.36*	-0.14*	-0.03*	-0.06*	0.02*	0.19*	0.23*	0.17*
26 Children (1 = yes)	0.71	0.01	0.02*	-0.04*	-0.12*	0.08*	-0.05*	-0.02*	0.02*	-0.04*	-0.03*	0.02*	0.05*	0.01	0.03*
27 Migration status (1 = not born in Germany)	0.08	0.00	-0.05*	0.03*	0.03*	-0.02*	-0.09*	0.10*	0.03*	0.03*	0.01*	0.02*	-0.05*	-0.07*	-0.07*
			14	15	16	17	18	19	20	21	22	23	24	25	26
15			-0.22*	-											
16			-0.26*	-0.10*	-										
17			-0.21*	-0.08*	-0.10*	-									
18			-0.32*	-0.13*	-0.15*	-0.12*	-								
19			-0.40*	-0.16*	-0.19*	-0.15*	-0.23*	-							
20			0.15*	0.06*	0.07*	0.01	-0.12*	-0.17*	-						
21			0.12*	-0.06*	0.10*	0.04*	-0.11*	-0.11*	0.34*	-					
22			0.36*	0.04*	0.10*	-0.01*	-0.18*	-0.35*	0.42*	0.25*	-				
23			0.03*	-0.02*	-0.00	0.01	0.00	-0.03*	-0.05*	0.12*	0.01*	-			
24			0.05*	-0.02*	0.01	-0.03*	0.01*	-0.04*	-0.03*	0.06*	0.04*	0.16*	-		
25			-0.16*	-0.15*	0.19*	0.12*	0.06*	0.01	0.10*	0.20*	0.01	-0.03*	0.05*	-	
26			0.03*	-0.02*	-0.08*	0.00	0.01	0.04*	-0.15*	0.03*	-0.01	0.45*	0.34*	-0.06*	-
27			0.03*	0.04*	-0.01*	-0.01*	-0.04*	-0.00	-0.00	-0.04*	-0.02*	-0.05*	0.02*	-0.03*	0.04*

Note: MCS = mental component summary scores, PCB = psychological contract breach, Pearson correlation coefficients; * $p < 0.05$.

4.2 Main effects

Table 2 shows the results of the mediated structural equation modelling. The model was able to explain 10.4% of individual variance on MCS.

The results showed significant negative effects of job demands on MCS, indicating that MCS is 3.3 points lower ($p < 0.001$) if employees experience frequent physical strain at work, about 3.1 points lower ($p < 0.001$) if they are unjustly criticised or bullied by their direct supervisor and 2.5 points lower ($p < 0.001$) lower if they perceive a high level of job insecurity, which supports Hypothesis 1a. In comparison, only higher job autonomy was positively associated with MCS, so Hypothesis 1b was only partly supported. Moreover, the higher the extent of PCB, the more impaired the employee’s mental health ($\beta = -0.170$, $p < 0.001$), thus supporting Hypothesis 3.

With regard to the effects of job demands–resources on PCB, the results showed that frequent overtime ($\beta = 0.679$, $p < 0.01$), shift work ($\beta = 0.780$, $p < 0.001$), physical strain ($\beta = 1.648$, $p < 0.001$) and perceived job insecurity ($\beta = 2.202$, $p < 0.001$) led to greater PCB to a statistically significant degree. Most remarkably, experiencing unjust criticism or bullying by the direct supervisor predicted a 3.7-point greater extent of PCB. Having a temporary instead of a permanent job or having supervisory responsibilities, however, did not significantly influence PCB.

Regarding job resources, appreciation by the direct supervisor ($\beta = -1.849$, $p < 0.001$), the use of flexible working hours ($\beta = -0.575$, $p < 0.01$), participation in further training ($\beta = 2.202$, $p < 0.001$) and greater job autonomy ($\beta = -0.176$, $p < 0.001$) were associated with a lesser extent of PCB. Overall, these findings support Hypotheses 2a and 2b, in that job demands were positively related to PCB, but job resources were negatively associated with PCB.

Table 2. Mediated structural equation model (N=3,870)

	Extent of PCB			MCS		
	Coef.		SE	Coef.		SE
Extent of PCB				-0.170	***	(-0.032)
Temporary job (1 = yes)	-0.448		(-0.302)	0.766		(-0.603)
Supervisory responsibilities (1 = yes)	0.085		(-0.174)	0.310		(-0.347)
Frequent overtime (1 = yes)	0.679	**	(-0.213)	0.099		(-0.426)
Shift work (1 = yes)	0.780	***	(-0.214)	0.430		(-0.428)
Physical strain (1 = high)	1.648	***	(-0.202)	-3.307	***	(-0.407)
Perceived job insecurity (1 = high)	2.202	***	(-0.252)	-2.489	***	(-0.508)
Unjust criticism/bullying by supervisor (1 = high)	3.673	***	(-0.347)	-3.050	***	(-0.704)
Appreciation from supervisor (1 = high)	-1.849	***	(-0.164)	0.484		(-0.333)
Job autonomy (3–15)	-0.176	***	(-0.030)	0.161	**	(-0.060)
Use of flexible working hours (1 = yes)	-0.575	**	(-0.185)	-0.145		(-0.370)
Participation in further training (1 = yes)	-1.287	***	(-0.191)	0.380		(-0.384)
Industrial sector (ref. Manufacturing, energy and water supply, construction)						
Wholesale and retail trade, Transportation and storage	-0.347		(-0.327)	-0.469		(-0.648)
Information and communication	1.058	***	(-0.292)	-0.108		(-0.580)
Insurance and financial activities, economic services	-0.078		(-0.335)	-0.259		(-0.664)
Public administration, Education	0.966	***	(-0.269)	-0.805		(-0.535)
Human health and social work activities	0.553	*	(-0.263)	-0.022		(-0.522)
Actual working hours	0.032	**	(-0.010)	0.027		(-0.020)
Monthly gross income / 100	-0.002		(-0.002)	0.009	*	(-0.004)
Male (1 = male)	-0.491	**	(-0.191)	0.875	*	(-0.381)
Age (in years)	-0.029	**	(-0.011)	-0.051	*	(-0.022)
In Partnership (1 = yes)	-0.042		(-0.230)	1.333	**	(-0.461)
Years of Education	0.113	***	(-0.031)	0.196	**	(-0.063)
Children (1 = yes)	0.162		(-0.202)	0.427		(-0.404)
Migration status (1 = not born in Germany)	0.148		(-0.295)	-1.362	*	(-0.591)
Constant	8.000	***	(-0.810)	46.301	***	(-1.640)

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, standard errors in parentheses.

4.3 Mediation effects

In a test of the mediation hypothesis (Hypothesis 4), unstandardized direct, indirect and total effects of job demands and resources on MCS were predicted in the mediation model, as presented in Table 3. The results showed that physical strain had a total effect of $\beta = -3.587$ on MCS ($p < 0.001$). Although the total effect of physical strain on MCS was due mainly to the direct effect (92.2%), physical strain also indirectly affected MCS through PCB (7.8%). Moreover, the total effect of perceived job insecurity on MCS is with a share of 13.1% ($\beta = -0.375$, $p < 0.001$), and the effect of unjust criticism and bullying by the direct supervisor is with 17% ($\beta = 0.625$, $p < 0.001$) explained by the indirect effects through PCB. Also, the effect of job autonomy on MCS was partly mediated by PCB, with the indirect effect accounting for 15.7% of the total effect ($\beta = 0.030$, $p < 0.001$).

These findings support Hypothesis 4 – that is, that the relationship between job demands–resources and mental health is mediated in part by PCB. In addition, the mediation analysis revealed that with regard to some job demands and resources, only the indirect effects on MCS were significant, meaning that the relationship was fully mediated by PCB. The indirect negative effects of overtime ($\beta = -0.116$, $p < 0.01$) and shift work ($\beta = -0.133$, $p < 0.01$) on mental health were mediated by PCB. Appreciation from one’s supervisor ($\beta = 0.315$, $p < 0.001$), use of flexible working hours ($\beta = 0.098$, $p < 0.01$) and participation in further education ($\beta = 0.219$, $p < 0.001$) influenced MCS positively through PCB. Because there were only significant indirect effects estimated for these job demands and job resources, the main model (Table 2) predicted no significant main effects.

Table 3. Direct, indirect and total effects of mediation (N=3,870)

	Direct effects			Indirect effects			Total effects		
	Coef.		SE	Coef.		SE	Coef.		SE
MCS (t2)									
Extent of PCB	-0.170	***	0.032				-0.170	***	0.032
Temporary job (1 = yes)	0.766		0.603	0.076		0.053	0.842		0.605
Supervisory responsibilities (1 = yes)	0.310		0.347	-0.015		0.030	0.295		0.348
Frequent overtime (1 = yes)	0.099		0.426	-0.116	**	0.042	-0.016		0.427
Shift work (1 = yes)	0.430		0.428	-0.133	**	0.044	0.297		0.429
Physical strain (1 = high)	-3.307	***	0.407	-0.281	***	0.063	-3.587	***	0.405
Perceived job insecurity (1 = high)	-2.489	***	0.508	-0.375	***	0.083	-2.864	***	0.505
Unjust criticism/bullying by supervisor (1 = high)	-3.050	***	0.704	-0.625	***	0.132	-3.675	***	0.697
Appreciation from supervisor (1 = high)	0.484		0.333	0.315	***	0.066	0.799	*	0.329
Job autonomy (3-15)	0.161	**	0.060	0.030	***	0.008	0.191	**	0.060
Use of flexible working hours (1 = yes)	-0.145		0.370	0.098	**	0.036	-0.048		0.371
Participation in further training (1 = yes)	0.380		0.384	0.219	***	0.053	0.599		0.383

Note: Model additionally controls for industrial sector, actual working hours, monthly gross income, gender, age, partnership status, years of education, children and migration status; MCS = Mental component summary scores, PCB = Psychological contract breach; Unstandardized coefficients; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, standard errors in parentheses.

V. CONCLUSION

This study investigated the mediating role of PCB in the relationship between job demands–resources and employee mental health. Its aim was to advance our knowledge about how reciprocity imbalances in the employment relationship play a role in the process that underlies the relationship between individual employment conditions and employee mental health. Another aim was to enrich our understanding of the role psychological contracts play against the background of ongoing changes in modern employment relationships (see Guest, 2016; Tyagi&Agrawal, 2010). The following four contributions to this topic can be derived from our results.

First and foremost, this study – being the first of its kind to analyse the mediation hypothesis – provided evidence concerning the mediating effects of PCB on the relationship between job demands–resources and mental health. Consistent with the results of previous research, the findings suggest that job demands impair employees’ mental health, whereas job resources are beneficial in this regard (e.g. Bakker, Demerouti, & Verbeke, 2004; Hakanen, Schaufeli, & Ahola, 2008; Schaufeli, Bakker, & Van Rhenen, 2009). The results also confirm that this relationship is mediated in part by PCB, meaning that several job demands (e.g. perceived job insecurity, unjust criticism or bullying by a supervisor) and job resources (e.g. job autonomy) are both directly and indirectly related to PCB mental health. Moreover, some job characteristics are only indirectly related to mental health, being fully mediated by PCB, both negatively (overtime, shift work) and positively (appreciation from supervisor, use of flexible working hours, participation in further education). The results indicate that PCB intervenes in this relationship; thus, the degree to which an employment relationship is perceived as imbalanced with regard to the psychological contract can explain whether job demands produce strain that impairs mental health and whether job resources help protect or even improve mental health. Thus, the findings of this study demonstrate that PCB is an important psychological factor in the employment relationship that underlies the relationship between job demands–resources and mental health; examining the mediating role of PCB helps us better to understand how job characteristics, either demanding or supporting, function to lead to differences in employee mental health. Therefore, these results make an important contribution to the literature on job-related mental health; specifically concerning the relevance of psychosocial work stressors (see also Stansfeld& Candy, 2006).

Second, this study contributes to the job demands–resources literature (Bakker & Demerouti, 2007; Bakker, Demerouti, & Verbeke, 2004; Demerouti et al., 2001) by demonstrating important implications for its theoretical framework, which does not consider PCB to be a potential mediator. The finding that the effects of some job demands and job resources are fully mediated by PCB has consequences for other research in that these variables might have no significant effects in empirical models that do not consider the possibility that

PCB might act as a mediator, thus underestimating the roles of both PCB and job demands–resources in determining employees' mental health. Considering that PCB both partially and fully mediated certain effects in this study, it behoves future researchers in the area of job demands–resources to include PCB in their studies, because it is not only a direct predictor of employee mental health but also a potential mediator of this relationship.

Third, the results showed that whether employees perceive PCB, and if they do, to what extent, will depend on whether their experience of job demands and resources – that is, the work environment of very specific experience of the job – supports previous empirical evidence (De Vos & Meganck, 2007; Ho, Weingart, & Rousseau, 2004; Vantilborgh et al., 2016).

Finally, the results suggest that a higher extent of PCB is associated with poorer mental health, which is consistent with earlier findings (e.g. Chambel & Oliveira-Cruz, 2010; Conway & Briner, 2002a; Gracia et al., 2007; Topa-Cantisano, Morales Domínguez, & Caeiro García, 2007; Parzefall & Hakanen, 2010). Therefore, the results show that PCB is also relevant for mental health as a direct psychosocial work stressor. This was revealed through the study of a large, longitudinal sample drawn from large organisations in Germany covering a broad workforce structure, thus overcoming the limitations of previous studies that analysed mainly specific occupational groups or cross-sectional data. As a consequence, this study contributes to the psychological contract literature by integrating the study of both the antecedents and the consequences of PCB, as well as showing that PCB is worth considering as a mediator of other relationships, as has been demonstrated in previous studies involving other work-related outcomes (Birtch, Chiang, & Van Esch, 2015; Dulac et al., 2008; Piccoli & De Witte, 2015).

In Conclusion, this first study designed to examine the mediating role of PCB in the relationship between job demands–resources and mental health provides evidence of the role of reciprocity imbalances in the employment relationship. Against the background of the ongoing changes in employer–employee relations (Herriot, Manning, & Kidd, 1997; Tyagi & Agrawal, 2010) the results of this study enhances the state of the art by providing additional support for the crucial role psychological contracts play within contemporary employment relationships (Conway & Briner, 2005; Guest, 2004, 2016; Shore & Tetrick, 1994) and how they impact the life of employees.

VI. PRACTICAL IMPLICATIONS

The results also offer some practical advice. Ill health of employees represents an important cost for organisations (Goetzel et al., 2004). Therefore, employee health promotion, specifically with regard to aspects of mental health, has become a larger consideration among modern human resource managers (see e.g. Cancelliere et al., 2011). If employers want to promote employee mental health, it may be necessary to look not only at the tangible demands at work, but also at the subjective perception of the employment relationship and the psychological contract and how it is evaluated. As job demands such as frequent overtime and shift work become relevant to the mental health of employees only if the employee also perceives a reciprocity imbalance in the employment relationship in the form of PCB, psychological contracts could be a promising starting point for intervention. As previous research has shown, effective employer–employee communication is crucial in fulfilling psychological contracts (Herriot & Pemberton, 1997; Turnley & Feldman, 1999), so clearly and periodically communicating reciprocal expectations on both sides of the employment relationship appears to be crucial and could be accomplished by means of periodic individual discussions concerning objectives and goals to explore these expectations. Moreover, previous research recommends that employees be provided with additional and different types of job resources to improve their mental health (Birtch, Chiang, Van Esch, 2015). According to this study, some resources, such as job autonomy, might be regarded as particularly relevant and, being associated with both fewer perceived breaches of the psychological contract and better mental health, are thus doubly important.

VII. LIMITATIONS AND FUTURE RESEARCH

Several limitations of this study suggest topics for further research. The selection of job demands and job resources used here was of course limited; according to the job demands–resources literature, there are many more possible job characteristics (Bakker & Demerouti, 2007). However, owing to restrictions posed by the data and the bootstrapping method used to test the significance of the indirect effects, the number of independent variables had to be limited. Because this was the first study to investigate the mediating role of PCB in the association between job demands–resources and employees' mental health, it would be interesting to broaden analysis in future studies to include other job characteristics in order to confirm and enhance the results of the present study. To understand the processes that underlie the relationships of job characteristics and health, it also would be beneficial to empirically compare the role of PCB as a mediator with related constructs of reciprocity imbalance, such as distributive justice (Piccoli & De Witte, 2015) and effort–reward imbalances (Siegrist, 1996; Siegrist, Siegrist, & Weber, 1986). Although this study is based on longitudinal data obtained at two time points,

future studies should involve more advanced longitudinal datasets, because we know from earlier research that psychological contracts change over time (e.g. De Vos, Buyens, & Schalk, 2003; Robinson, Kraatz, & Rousseau, 1994), and these changes might affect the mediating role of PCB.

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APPENDIX

Figure A1. Confirmatory Factor Analysis for Employee mental and physical health (SF-12)

