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How psychological contract breach affects long-term mental and physical health: the longitudinal role of effort–reward imbalance

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Abstract

This study contributes to the research of employee health and well-being by examining the longitudinal effects of psychological contract (PC) breach on employees' health. We integrate Social Exchange and Conservation of Resources theories to position effort–reward imbalance (ERI) as the mediating mechanism. We also assessed the moderating role of perceived job control as a boundary condition through which employees could prevent PC breach and ERI from adversely affecting their health. Using three-wave longitudinal survey data from 389 employees, we estimated a path model using each variable's growth parameters (intercept and slope). We found support for our hypotheses regarding stable effects; we found positive associations between PC breach and physical and mental health complaints and a need for recovery through ERI perceptions. We further tested employees' perceived control over the work environment as a boundary condition and found support for its role in attenuating the positive relationship between PC breach and ERI perceptions, but not for its moderating role in the ERI–health outcomes relationship. Our findings indicate that exposure to PC

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breach has a detrimental impact on employee health/well-being via perceptions of ERI and allow us to unravel one of the cognitive mechanisms leading to potential employee ill-health. We conclude with theoretical and practical implications.

KEYWORDS

effort–reward imbalance, employee mental and physical health, longitudinal, need for recovery, psychological contract breach

INTRODUCTION

Experiencing stress at work is "one of the most significant workplace health hazards" faced by employees in developed countries (Spector, 2002, p. 133). Poor physical and mental health and well-being at work are pervasive and costly, exemplified by the fact that at any given time, 20% of the working-age adults have a mental health problem (OECD, 2012), which carries a high economic cost. While a range of studies identify what supports (e.g. Carolan et al., 2017) and hinders (e.g. Gilboa et al., 2008) employee health and well-being, there remains a need to extend the study of work and health beyond the "immediate job-worker interaction" (Wilson et al., 2004, p. 566). That is, the predominant focus remains on the role of specific job demands and stressors as sources of job strain, despite the fact that it is increasingly recognized that the nature of the social exchange relationship underpinning employment, or what employees contribute to and receive in return from their employer, may have implications for employees' health and well-being (e.g. Ruokolainen, et al., 2018).

The psychological contract (PC) is one such construct that captures the "state" of the employee–employee social exchange. The PC refers to "individual beliefs, shaped by the organisation, regarding an exchange agreement between individuals and their organisation" (Rousseau, 1995, p. 9). That is, the PC is a subjective construct that captures a wide a range of elements constituting workers' employment exchanges, making it a valuable inclusion in the study of employee health and well-being (Guest & Conway, 2009). In particular, the experience of PC breach (i.e. the perceived failure of one party to meet its obligations; Robinson & Morrison, 2000) is shown to predict a range of adverse attitudinal and behavioral outcomes (for a meta-analysis, see Zhao et al., 2007). Due to the stress associated with perceptions of PC breach, scholars argue that it is likely to be an important antecedent to reduced employee health and well-being (e.g. Gakovic & Tetrick, 2003). Indeed, evidence suggests a positive relationship between PC breach and health/well-being indicators such as anxiety, depression, and feelings of betrayal and hurt (Conway & Briner, 2009), burnout and a need to recover (Chambel, & Oliveira-Cruz, 2010), and general work stress (Gakovic & Tetrick, 2003).

However, relatively little theoretical and empirical attention is paid to the mechanisms through which PC breach affects one's health and well-being. Understanding these mechanisms is important because (a) research demonstrates that PC breach can occur weekly (Griep & Vantilborgh, 2018) or daily (Conway & Briner, 2009) and (b), as noted above, understanding the precursors to employees' poor physical and mental health and well-being is a significant and socially relevant issue. To address this research gap, we leverage Social Exchange (Blau, 1964) and Conservation of Resources (Hobfoll, 2001) theories to unpack the "black box" linking perceptions of PC breach to health outcomes. Specifically, we argue that the PC provides a sense of stability regarding what can be expected

from the organisation in return for their contributions (Rousseau, Hansen & Tomprou, 2018). PC breach, however, imposes the experience of working in an organisation that is unjust and inequitable, potentially generating under-reward perceptions (high effort/low reward). This constitutes effort–reward imbalance (ERI), which has been shown to activate adverse health and well-being outcomes. Specifically, ERI scholarship suggests that non-reciprocity (under-reward) in the employment exchange activates two stress axes in the body (Siegrist, 1996), straining the nervous system and, when prolonged, generates physical and mental health disorders and ill-being (van Vegchel et al., 2005). Following Conservation of Resources theory (Hobfoll, 2001), we then argue that once employees establish perceptions of ERI, this imbalance creates fear of losing valued resources despite investing efforts to either maintain or accrue them. As a corollary, employees feel drained and depleted, with the lack of gains relative to effort expenditure generating higher risk of mental and physical ill-being (e.g. von dem Knesebeck & Siegrist, 2003; Koch et al., 2014). Thus, the resource depletion generated through ERI will likely reduce employees' mental and physical health and well-being while increasing their need for recovery. Finally, we suggest that employees' perceived control over their jobs, as a boundary condition, should attenuate the overall PC breach–ERI and ERI–health outcomes relationships.

We aim to extend the employee health and well-being literature by looking beyond the worker–job relationship (Wilson et al., 2004) to instead focus on how the "state" of the wider employee–employer social exchange impacts employee health and well-being outcomes. More specifically, we further contribute to PC literature by studying ERI as a mediating mechanism between PC breach and health outcomes. In doing so, we have a better understanding of the cognitive process that leads to a decrease in employee health and well-being in the aftermath of PC breach. We also demonstrate how connecting PC breach to employee health and well-being requires leveraging both Social Exchange and Conservation of Resources theories in order to link perceptions of breach to ERI and ERI to health outcomes, respectively. Generally, PC research draws on either Social Exchange or Conservation of Resources to theorize PC breach outcomes, despite evidence suggesting a need to integrate both theories (Deng et al., 2018). Further, instead of offering one solution targeted at reducing the detrimental effects of PC breach, our longitudinal study allows us to propose practical solutions that (a) can be implemented between the occurrence of PC breach and ERI and between ERI and the decrease in health and well-being, and (b) can be targeted at the immediate relationship (i.e. stable intercept effects) between our variables under study or can be targeted at the changing nature (i.e. slope effects) of that relationship over time (see Figure 1 for our hypothesized model, which will be elaborated on in detail in the following pages).

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Psychological contract breach and effort–reward imbalance

The functioning of the PC is underpinned by Social Exchange theory (Blau, 1964) and the norm of reciprocity (Gouldner, 1960). Once formed, the PC is fairly stable and provides employees with some certainty regarding how the employment relationship will unfold (Rousseau, 1995). When in "equilibrium"—and employees perceive that their contributions match what the organisation provides in return—PC fulfillment is perceived and a functional employment relationship ensues. A key disruptive event in the contracting process is PC breach, or one party's perception that the other party has failed to meet one or more of their obligations in the exchange (Robinson & Morrison, 2000), likely (but not always, see Bankins, 2015; Tomprou et al., 2015) resulting in negative employee attitudinal and behavioral reactions (for a

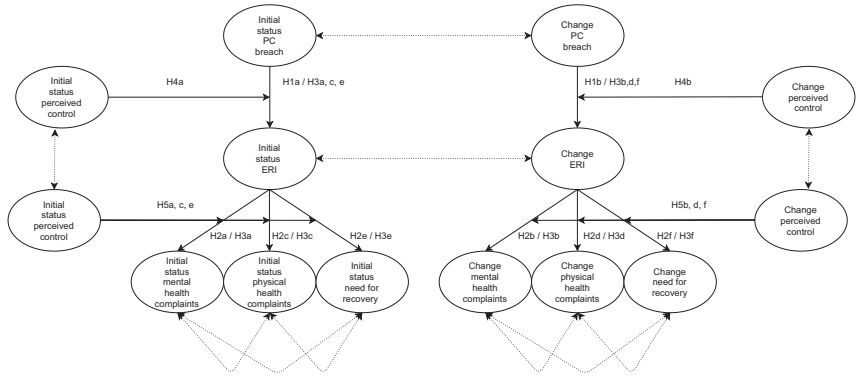

FIGURE 1 Hypothesized model. Note: Double-arrowed dotted lines indicate correlations

meta-analysis, see Zhao et al., 2007). Given the open-ended nature of social exchanges, it is recognized that employees' PCs involve "zones" of tolerance, or threshold points within which deviations from perceived obligations are tolerable (Schalk & Roe, 2007). However, a potential outcome of employees' identifying a PC breach is the generation of perceptions of exchange imbalance (Robinson & Morrison, 2000). To link PC breach to physical and mental health and well-being outcomes, we draw on the ERI literature.

Often utilized in the occupational health and stress management fields, in an employment context, the "ERI hypothesis" suggests that understanding employees' health and well-being requires understanding the level of balance between their efforts (the work they undertake) and the rewards received (specifically salary, recognition, job security, and promotional prospects; Koch et al., 2014, p. 2). Employees experiencing non-reciprocity via a high-effort/low-reward condition face a threat to continued work role benefits, thus generating stress and negative emotions (Siegrist & Li, 2016). This distress in turn activates physiological stress responses through the autonomic nervous system, contributing to the development of adverse health outcomes (van Vegchel et al., 2005).

At this point, it is important to distinguish PC breach from ERI (see also Griep & Bankins, 2020, for the said differentiation and for a differentiation of ERI from other Social Exchange concepts) and theoretically support our positioning of PC breach as preceding ERI perceptions. ERI is distinguishable from PC breach in that the ERI model focuses on individuals' overall perceptions of imbalance between efforts expended and rewards received, while perceptions of PC breach focus on individuals' beliefs about the employer's failure to fulfill specific obligations or promises. It is this differentiation between broader equity perceptions (as in ERI) and specific breach perceptions (see Morrison & Robinson, 1997) that supports our positioning of PC breach as preceding ERI perceptions.

Employees' identification of, and responses to, PC breach forms a complex process (e.g. Bankins, 2015; Parzefall & Coyle-Shapiro, 2011; Rigotti, 2009; Schalk & Roe, 2007). For example, determining an employer PC breach is rarely "a yes-or-no decision" for employees as promises can be fully, partly, or not at all kept (Rigotti, 2009, p. 444). Indeed, the identification of a PC breach may simply be a trigger for further sense-making such as determining whether the breached obligation is important or can be compensated for by the fulfillment of other obligations (Bankins, 2015), whether the employee can re-frame or downplay the PC breach (Parzefall & Coyle-Shapiro, 2011), or whether the PC breach lies within an employee's zone of tolerance for PC deviations (Rigotti, 2009; Schalk & Roe, 2007). Given these evaluations, an employee may determine that the PC breach is acceptable, with no adverse cognitive, behavioral, or health and well-being outcomes ensuing.

However, drawing on ERI literature and PC theorizing (e.g. Morrison & Robinson, 1997; Rigotti, 2009), we suggest that higher perceptions of PC breach signal widening perceptions of imbalance between employee contributions and employee inducements, which then results in higher perceptions of ERI (under-reward). It is in this situation, when perceptions of PC breach are generating perceptions of ERI, that negative employee health and well-being outcomes will ensue. Given this, and as the first leg of our relationships linking PC breach to employee health and well-being, we hypothesize that higher perceptions of PC breach will result in higher perceptions of ERI (under-reward) at one point in time, as well as over time.

Hypothesis 1 *Initial status and change of PC breach are positively related to initial status (H1a) and change (H1b) of ERI.*

Effort–reward imbalance and negative health outcomes

ERI research establishes the link between under-reward perceptions and negative physical and mental health and well-being (Siegrist, 2002). Theoretically, positioning reciprocity as critical within social relationships means that "if experienced recurrently, non-reciprocity in social exchange may have a profound impact on human well-being and health" (von dem Knesebeck & Siegrist, 2003, p. 209). This argument is confirmed (see van Vegchel et al., 2005) via evidence of positive associations between ERI and a range of biomarkers (e.g. lowered heart rate variability; Siegrist & Li, 2016). Although changes in heart rate variability do not constitute health per se, lowered heart rate variability has been related to chronic physical and mental health disorders (e.g. Koch et al., 2014; Kivimäki et al., 2007; von dem Knesebeck & Siegrist, 2003). Therefore, we posit that higher perceptions of ERI will lead to more physical and mental health complaints and a higher need for recovery, both at a single point in time and over time.

However, the mechanism through which the ERI–health outcomes relationship operates is often unspecified. To theorize this link, we draw on Conservation of Resources theory (Hobfoll, 2001). This approach adopts a resource-based view of stress and suggests that stress is generated when individuals perceive that the resources they seek to accrue and protect are threatened or lost, or when they perceive that important resources fail to accrue despite having invested significant effort (Hobfoll, 2001). The latter condition informs an ERI perspective, to show how ERI also implies resource loss. To protect against, or recover from, these resource losses, employees must expend further resources. However, this can ultimately drain individuals and lead to emotional and physical exhaustion (Deng et al., 2018; Hobfoll, 2001). We thus suggest that higher perceptions of ERI are positively associated with lower perceptions of physical and mental health and also a higher need for recovery from work, both at one point in time and over time.

Hypothesis 2 *Initial status and change of ERI are positively related to initial status (H2a) and change (H2b) of mental health complaints, initial status (H2c) and change (H2d) of physical health complaints, and initial status (H2e) and change (H2f) of need for recovery.*

Taken together, these hypotheses form the two main paths of our overall theoretical model.

Hypothesis 3 *Initial status and change of ERI mediate the positive relationship between initial status and change of PC breach and initial status (H3a) and change (H3b) of mental health complaints, initial status (H3c) and change (H3d) of physical health complaints, and initial status (H3e) and change (H3f) of need for recovery.*

Control as a boundary condition

The stress and coping, including Conservation of Resources (Hobfoll, 2001), literature recognizes that particular resources offer protection against the negative effects of stressful work events, such as perceptions of PC breach and ERI (e.g. Bankins, 2015). While ERI literature posits the importance of work time control as a boundary condition of the ERI–health outcomes relationship, this proposition is rarely examined. However, Ala-Mursula et al. (2005) found that work time control lessened the impact of ERI on sickness absences. This omission is stark, given that in the employee health and well-being literature, the perception of control is one of the most critical elements for understanding why occupational stress causes adverse health outcomes (Spector, 2002; Heponiemi et al., 2014). Because job control (hereon also termed "perceived control") acts as both "a favorable work resource and coping mechanism" (Chiang et al., 2010, p. 26), extensive research demonstrates its role in minimizing negative outcomes at multiple points in the stress process (Spector, 2002).

As a resource, employees generally experience greater positivity and higher job satisfaction when their perceptions of control are higher (e.g. Chiang et al., 2010). This can then reduce the likelihood that employees experience an adverse event (Miller, 1979) or perceive it as a significant threat. While a range of intra- and inter-personal resources can support employee well-being at work, empirical work shows that the buffering effects of perceived job control are stronger than those of, for example, self-efficacy (e.g. Schreurs et al., 2010). In the PC literature, perceived control is also theoretically recognized as an important self-based resource that buffers the effects of contract violation by supporting employees' efforts to remedy such events and successfully adjust in their aftermath (Tomprou et al., 2015). Therefore, the level of perceived control of one's job is a key personal resource that lessens the likelihood of individuals perceiving a situation as threatening, which in our model is the PC breach–ERI relationship. As a coping mechanism, when stressful events are experienced, higher job control increases the likelihood of constructive (i.e. seek to overcome the challenge), rather than destructive, coping strategies being employed (Spector, 2002). This then increases the chances of individuals effectively managing incidences of stress, which in our model is the ERI–health outcomes relationship.

In line with the above, we position perceived control as an important person-specific resource, an "intrinsic" component of the ERI model (Siegrist & Li, 2016), that will reduce the likelihood of PC breach heightening ERI perceptions at a single point in time and over time and subsequently mitigate the ERI–adverse health outcomes relationship at a single point in time and over time.

Hypothesis 4 *Employees' initial status and change of perceived control moderate the positive relationship between initial status and change of PC breach and initial status (H4a) and change (H4b) of ERI in such a way that higher levels of initial status and change of control will attenuate the relationships.*

Hypothesis 5 *Employees' initial status and change of perceived control moderate the positive relationship between initial status and change of ERI and initial status (H5a) and change (H5b) of mental health complaints, initial status (H5c) and change (H5d) of physical health complaints, and initial status (H5e) and change (H5f) of need for recovery in such a way that higher levels of initial status and change of control will attenuate the relationships.*

METHOD

Procedure

The study was approved by the appropriate institutional and/or national research ethics committee of the first author's university. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards. The data for this manuscript were collected in collaboration with a Belgian Human Resources magazine. In total, we collected data at three points in time, each separated by a 6-month time lag. To reduce attrition, we raffled five multimedia vouchers of €20 (ca. $22) at each point in time. Upon completion of the first survey, respondents were informed about the results of the first wave of data collection and were invited to participate in a second and/or third wave of data collection. To ensure the anonymity of study results, we informed respondents that their information (i.e., email address) would only be used for scientific goals and would be treated in a confidential manner. We also informed them that their email address would be removed from the final dataset.

Upon completion of the first survey, we deleted the following responses from the data: unemployed individuals ($N = 930$), self-employed workers ($N = 128$), employees outside of the legal working age in Belgium (younger than 18 years and older than 65 years; $N = 14$), and respondents who completed the survey multiple times questionnaires ($N = 391$). We retained 3,415 respondents who completed the survey at Time 1. A total of 2,223 respondents indicated that they were willing to take part in the follow-up surveys at Times 2 and 3. At Time 2, a total of 957 respondents completed the survey (a response rate of 43.1% relative to Time 1). At Time 3, a total of 858 employees completed the survey (a response rate of 38.6% relative to Time 1). Once all three waves of data collection were completed, we deleted data from those who failed to complete all surveys, resulting in a final sample of 389 respondents who completed all three surveys1. We conducted several post hoc power analyses for a desired statistical power level of 0.95 and a probability level of 0.05 at the effect sizes of 0.20, 0.10, and 0.05. We found that a sample size of 80 respondents was deemed sufficiently large to detect significant results at the effect size of 0.20 or larger, a sample size of 216 respondents at the effect size of 0.10 or larger, and a sample size of 310 respondents at the effect size of 0.05 or larger. Hence, our sample size was deemed sufficiently large.

Sample

Our sample is representative of the Belgian working population regarding age, contract type, and temporary workers: 7.70% of the employees were younger than 25 years; 61.70% were aged between 25 and 49 years; and 30.60% were older than 49 years (mean age = 42.00 years, SD = 10.60 years) compared with 7.40%, 66.50%, and 26.10%, respectively, in the working population. Most respondents had an open-ended contract ($93.10\%_{\text{sample}}$, $91.90\%_{\text{population}}$) and most worked full-time ($78.90\%_{\text{sample}}$, $74.90\%_{\text{population}}$). Women ($57.80\%_{\text{sample}}$; $45.50\%_{\text{population}}$) and respondents working for the public sector ($40.40\%_{\text{sample}}$ versus $24.20\%_{\text{population}}$) were over-represented in our sample, whereas blue-collar workers were under-represented in our sample ($10.50\%_{\text{sample}}$ versus $28.40\%_{\text{population}}$).

We conducted a logistic regression analysis to test whether dropout could be predicted by (a) the above-described demographic and work-related characteristics and (b) the study variables. Older respondents (OR = −0.037, $p < .001$), full-time employees (OR = −0.373, $p = .018$), and employees with more physical health complaints (OR = −0.246, $p = .005$) were less likely to drop out, whereas respondents with a higher need for recovery were more likely to drop out (OR = 0.272, $p = .004$).

Measures

We adopted a full-panel design, measuring all variables at all three points in time. We counter-balanced scales to rule out potential order effects. Additionally, to reinforce the period over which respondents were requested to report (i.e. six months), we reworded items such that they included "since the previous survey."

Perceptions of psychological contract breach were measured with four items2 (Robinson & Morrison, 2000). An example item was as follows: "My employer has broken many of his promises to me even though I've upheld my side of the deal." Respondents rated each item on a 5-point Likert scale ranging from (1) "totally disagree" to (5) "totally agree." Reliabilities were satisfactory: $\alpha_{T1} = 0.90$, $\alpha_{T2} = 0.91$, and $\alpha_{T3} = 0.91$.

Effort–Reward Imbalance was assessed via an individual's global assessment of the effort–reward ratio using Janssen's (2000) 3-item effort–reward imbalance scale3. An example item was as follows: "I invest more in my job than I receive in return." Respondents rated each item on a 5-point Likert scale ranging from (1) "totally disagree" to (5) "totally agree." Reliabilities were satisfactory: $\alpha_{T1} = 0.77$, $\alpha_{T2} = 0.78$, and $\alpha_{T3} = 0.77$.

Perceived control was measured with Ashford et al. (1989) 3-item measure to assess whether individuals believe they have power to control negative events that may affect their job. An example item was: "I have enough power in this organisation to control events that might affect my job." Respondents rated each item on a 5-point Likert scale ranging from (1) "totally disagree" to (5) "totally agree." Reliabilities were satisfactory: $\alpha_{T1} = 0.77$, $\alpha_{T2} = 0.78$, and $\alpha_{T3} = 0.77$.

Mental health complaints were measured with five items (Berwick et al., 1991). An example item was as follows: "How much did you feel so down in the dumps that nothing could cheer you up?" Respondents rated each item on a 6-point Likert scale ranging from (1) "none of the time" to (6) "all of the time." Reliabilities were satisfactory: $\alpha_{T1} = 0.85$, $\alpha_{T2} = 0.86$, and $\alpha_{T3} = 0.86$.

Physical health complaints were measured with four items (Ware, 1999). An example item was as follows: "I expect my health to get worse in the near future." Respondents rated each item on a 5-point Likert scale ranging from (1) "totally disagree" to (5) "totally agree." Reliabilities were satisfactory: $\alpha_{T1} = 0.79$, $\alpha_{T2} = 0.79$, and $\alpha_{T3} = 0.82$.

Need for recovery was measured with four items (Note laers et al., 2007). An example item was as follows: "Generally, I need more than an hour before I feel completely recuperated after work." Respondents rated each item on a 5-point Likert scale ranging from (1) "totally disagree" to (5) "totally agree." Reliabilities were satisfactory: $\alpha_{T1} = 0.82$, $\alpha_{T2} = 0.86$, and $\alpha_{T3} = 0.82$.

Analytical strategy: latent growth parameters in a path model

We started by determining how our variables changed over time before relating characteristics of stability (effects at the same point in time) and change (effects over time) to each other in a path model. We started by estimating a univariate latent growth curve model (LGCM) to assess the complexity of change in our variables. First, we specified an LGCM with an intercept only, representing static differences between respondents. Next, we added a slope to represent linear change in the variables over time. Because an LGCM requires a k + 1 (i.e. k = complexity of growth parameters) number of waves for it to not be fully identified, the most complex LGCM we can estimate with three waves of data is an intercept and slope model, representing our stable and change effects. After having identified best fitting univariate LGCM for each variable, we saved the growth parameters using the SAVEDATA and SAVE = FSCORES command in Mplus 7.4 (Muthén and Muthén, 2013) so that

TABLE 1 Descriptive statistics and correlations

		Mean	SD	1	2	3	4	5	6	7	8	9
1.	Psychological contract breach T1	2.53	0.84	–								
2.	Psychological contract breach T2	2.57	0.81	0.69	–							
3.	Psychological contract breach T3	2.67	0.87	0.64	0.74	–						
4.	Effort–reward imbalance T1	2.96	0.79	0.60	0.51	0.48	–					
5.	Effort–reward imbalance T2	3.01	0.82	0.51	0.57	0.50	0.69	–				
6.	Effort–reward imbalance T3	3.03	0.82	0.49	0.49	0.60	0.63	0.71	–			
7.	Perceived control T1	2.57	0.77	−0.20	−0.18	−0.23	−0.24	−0.17	−0.16	–		
8.	Perceived control T2	2.64	0.76	−0.30	−0.36	−0.36	−0.27	−0.23	−0.22	0.56	–	
9.	Perceived control T3	2.56	0.79	−0.23	−0.21	−0.31	−0.23	−0.21	−0.24	0.55	0.63	–
10.	Mental health complaints T1	2.75	0.76	0.27	0.22	0.29	0.30	0.31	0.32	−0.17	−0.25	−0.20
11.	Mental health complaints T2	2.73	0.77	0.27	0.29	0.32	0.29	0.32	0.33	−0.14	−0.26	−0.16
12.	Mental health complaints T3	2.73	0.77	0.26	0.26	0.34	0.26	0.33	0.39	−0.18	−0.29	−0.23
13.	Physical health complaints T1	2.30	0.81	0.30	0.28	0.26	0.29	0.32	0.31	−0.12	−0.19	−0.17
14.	Physical health complaints T2	2.26	0.78	0.31	0.30	0.28	0.28	0.33	0.30	−0.12	−0.20	−0.17
15.	Physical health complaints T3	2.29	0.80	0.33	0.32	0.30	0.22	0.31	0.29	−0.18	−0.26	−0.22
16.	Need for recovery T1	2.53	0.82	0.34	0.28	0.30	0.39	0.40	0.35	−0.07	−0.18	−0.16
17.	Need for recovery T2	2.51	0.86	0.28	0.29	0.29	0.35	0.40	0.34	−0.10	−0.25	−0.18
18.	Need for recovery T3	2.54	0.85	0.33	0.33	0.35	0.38	0.44	0.46	−0.13	−0.25	−0.18

		10	11	12	13	14	15	16	17	18
10.	Mental health complaints T1	–								
11.	Mental health complaints T2	0.67	–							
12.	Mental health complaints T3	0.65	0.70	–						

(Continues)

TABLE 1 (Continued)

		10	11	12	13	14	15	16	17	18
13.	Physical health complaints T1	0.47	0.37	0.38	–					
14.	Physical health complaints T2	0.43	0.38	0.38	0.90	–				
15.	Physical health complaints T3	0.37	0.38	0.43	0.75	0.79	–			
16.	Need for recovery T1	0.56	0.51	0.47	0.49	0.43	0.37	–		
17.	Need for recovery T2	0.53	0.63	0.51	0.44	0.47	0.41	0.76	–	
18.	Need for recovery T3	0.49	0.56	0.59	0.43	0.41	0.45	0.73	0.77	–

Correlations <0.10 are nonsignificant; correlations>0.10 but <0.14 are significant at $p < .05$; correlations>0.14 but <0.18 are significant at $p < .01$; correlations >0.18 are significant at $p \leq .001$.

we could relate these growth parameters to each other in a path model. Using a path model, we then included the relationship between the initial level of PC breach and the initial level of ERI, and (when applicable) the direct relationship between the slope of PC breach and the slope of ERI. We also included the relationship between the initial level of ERI and the initial level of mental and physical health complaints and a need for recovery, and (when applicable) the direct relationship between the slope of ERI and the slope of mental and physical health complaints, and a need for recovery. We also included an interaction effect between (a) the initial level of PCB and the initial level of control when predicting the initial level of ERI; (b) the initial level of ERI and the initial level of control when predicting the initial level of mental and physical health complaints, and a need for recovery; (c) an interaction effect between the slope of PCB and the slope of control when predicting the slope of ERI (when applicable); and (d) an interaction effect between the slope of ERI and the slope of control when predicting the slope of mental and physical health complaints, and a need for recovery (when applicable). Rather than using the simple slopes method, we relied on the Johnson-Neyman technique (Preacher et al., 2006) to graphically represent these multilevel moderation relationships. Finally, we included the indirect effect of the initial level of PC breach on the initial level of mental and physical health complaints, and a need for recovery via the initial level of ERI, as well as (when applicable) the indirect effect of the slope of PC breach on the slope of mental and physical health complaints, and a need for recovery via the slope of ERI. We drew 10,000 bootstrap samples to generate 95% bias-corrected confidence intervals (95% CIbc) around the indirect effects.

RESULTS

Preliminary analyses: descriptive statistics and confirmatory factor analysis

Table 1 shows the means, standard deviations, and inter-correlations for our focal variables at each of the three measurement points.

We evaluated construct validity through a series of confirmatory factor analyses (CFAs) by comparing the theoretical model to an alternative five (Alternative Model A), four (Alternative Model B), two (Alternative Model C), and one (Alternative Model D) factor model. The CFA results revealed that the theoretical model fit the data well (see Table 2, which also outlines the alternative models), with each item loading significantly and in the expected direction onto its respective latent factors at all three points in time. Alternative Models A-D all fitted significantly worse to the data than the theoretical model at Time 1 ($\Delta\chi^2(5) = 79.12$, $p < .001$; $\Delta\chi^2(9) = 481.89$, $p < .001$; $\Delta\chi^2(14) = 766.73$, $p < .001$; $\Delta\chi^2(15) = 1714.87$, $p < .001$, respectively), Time 2 ($\Delta\chi^2(5) = 143.68$, $p < .001$; $\Delta\chi^2(9) = 478.14$, $p < .001$; $\Delta\chi^2(14) = 874.68$, $p < .001$; $\Delta\chi^2(15) = 1797.30$, $p < .001$, respectively), and Time 3 ($\Delta\chi^2(5) = 175.17$, $p < .001$; $\Delta\chi^2(9) = 473.43$, $p < .001$; $\Delta\chi^2(14) = 684.48$, $p < .001$; $\Delta\chi^2(15) = 1746.44$, $p < .001$, respectively). Hence, the theoretical model guided our hypothesis testing.

Complexity of the univariate LGCM

When comparing the different LGCM models, we found that a model with an intercept and slope fit the data better than a model with an intercept only for PC breach ($\Delta\chi2(3) = 20.46$, $p < .001$; RMSEA = 0.03; CFI = 1.00; TLI = 0.99; SRMR = 0.01), ERI ($\Delta\chi2(3) = 9.42$, $p = .02$; RMSEA = 0.00; CFI = 1.00; TLI = 1.00; SRMR = 0.01), and physical health complaints ($\Delta\chi2(3) = 17.53$, $p < .001$; RMSEA = 0.09; CFI = 0.99; TLI = 0.99; SRMR = 0.01), suggesting *linear change* over time. However, we found that a

TABLE 2 CFA results for theory-based and alternative measurement models

Model	χ^2 (df)	RMSEA	CFI	TLI	SRMR
T1					
Theoretical model	531.51 (215)	0.06	0.91	0.90	0.05
Alternative model A	610.63 (220)	0.07	0.89	0.88	0.06
Alternative model B	1013.40 (224)	0.10	0.78	0.76	0.07
Alternative model C	1298.24 (229)	0.11	0.71	0.68	0.09
Alternative model D	2246.38 (230)	0.15	0.45	0.39	0.12
T2					
Theoretical model	457.40 (215)	0.05	0.94	0.93	0.05
Alternative model A	601.08 (220)	0.07	0.90	0.89	0.07
Alternative model B	935.54 (224)	0.09	0.82	0.79	0.07
Alternative model C	1332.08 (229)	0.11	0.71	0.68	0.09
Alternative model D	2254.70 (230)	0.15	0.47	0.42	0.13
T3					
Theoretical model	454.81 (215)	0.05	0.94	0.92	0.05
Alternative model A	629.98 (220)	0.07	0.89	0.87	0.07
Alternative model B	928.24 (224)	0.09	0.81	0.79	0.07
Alternative model C	1139.29 (229)	0.11	0.70	0.67	0.09
Alternative model D	2201.25 (230)	0.15	0.47	0.41	0.12

Theoretical model: PC breach, ERI, perceived control, mental health complaints, physical health complaints, and need for recovery each load onto a separate latent factor. Alternative model A: PC breach and ERI load onto one latent factor; perceived control, mental health complaints, physical health complaints, and need for recovery each load onto a separate latent factor. Alternative model B: Mental health complaints, physical health complaints, and need for recovery load onto one latent factor; PC breach, ERI, and perceived control each load onto a separate latent factor. Alternative model C: PC breach, ERI, and perceived control load onto one latent factor; mental health complaints, physical health complaints, and need load onto one latent factor. Alternative model D: PC breach, ERI, perceived control, mental health complaints, physical health complaints, and need for recovery load onto a single-latent factor.

model with an intercept only fit the data better than a model with an intercept and slope for mental health complaints ($\Delta\chi2(3) = 2.57$, $p = .46$; RMSEA = 0.00; CFI = 1.00; TLI = 1.00; SRMR = 0.05), a need for recovery ($\Delta\chi2(3) = 4.93$, $p = .18$; RMSEA = 0.03; CFI = 0.99; TLI = 0.99; SRMR = 0.05), and perceived control ($\Delta\chi2(3) = 3.40$, $p = .33$; RMSEA = 0.06; CFI = 0.99; TLI = 0.99; SRMR = 0.05), *suggesting stability* over time. Before proceeding with presenting our results, it is important to note that, as a consequence of our univariate LGCM results, we cannot test hypotheses related to change in mental health complaints (i.e. H2b, H3b, and H5b), change in a need for recovery (i.e. H2f, H3f, and H5f), and change in perceived control (i.e. H5b, H5d, and H5f).

Inferential standardized results

Hypothesized model without interaction effects

We found that the initial level of PC breach was positively related to the initial level of ERI (*estimate* = 0.659; SE = 0.030; $p < .001$; supporting H1a). We also found that the slope of PC breach was positively related to the slope of ERI (*estimate* = 0.373; SE = 0.055; $p < .001$; supporting

H1b), whereas the initial level of PC breach was not significantly related to the slope of ERI (*estimate* = −0.106; SE = 0.059; $p = .071$). Next, we found that the initial level of ERI was positively related to the initial level of mental health complaints (*estimate* = 0.377; SE = 0.048; $p < .001$; supporting H2a), physical health complaints (*estimate* = 0.333; SE = 0.052; $p < .001$; supporting H2c), and a need for recovery (*estimate* = 0.467; SE = 0.041; $p < .001$; supporting H2e). However, we did not find a significant association between the slope of ERI and the slope of physical health complaints (*estimate* = 0.053; SE = 0.040; $p = .180$; not supporting H2d); on the contrary, the initial level of ERI was negatively related to the slope of physical health complaints (*estimate* = −0.140; SE = 0.051; $p = .007$). Finally, we found a positive indirect effect from the initial level of PC breach to the initial level of mental health complaints (*estimate* = 0.232; SE = 0.035; 95% CIbc [0.163; 0.300]; supporting H3a), physical health complaints (*estimate* = 0.283; SE = 0.050; 95% CIbc [0.185; 0.381]; supporting H3c), and a need for recovery (*estimate* = 0.342; SE = 0.039; 95% CIbc [0.266; 0.419]; supporting H3e) via the initial level of ERI, whereas we did not find a significant indirect effect of the slope of PC breach on the slope of physical health complaints (*estimate* = 0.043; SE = 0.032; 95% CIbc [−0.020; 0.107]; not supporting H3d) via the slope of ERI.

Hypothesized model with interaction effects

We found that the initial level of perceived control did not moderate the relationship between the initial level of PC breach and the initial level of ERI (*estimate* = −0.056; SE = 0.159; $p = .726$; not supporting H4a), whereas the initial level of perceived control did moderate the relationship between the initial level of PC breach and the slope of ERI (*estimate* = −0.446; SE = 0.221; $p = .044$; supporting H4b). The simple slopes of this relationship were significant outside the 0.58 and 0.89 region, implying that the effect of the initial level of PC breach on the slope of ERI was significant for initial level of perceived control as of the lowest possible observed value of 1.00 (an increasingly negative relationship exists as values of initial level of perceived control move further away from 1.00; see Figure 2).

Moreover, we found that the initial level of perceived control did not moderate the relationship between the initial level of ERI and the initial level of mental health complaints (*estimate* = −0.143; SE = 0.271; $p = .597$; not supporting H5a), physical health complaints (*estimate* = −0.122; SE = 0.316; $p = .699$; not supporting H5c), and a need for recovery (*estimate* = −0.305; SE = 0.200; $p = .127$; not supporting H5c). See also Online Supplementary materials for a Table S1 with our results.

Competing model testing

To bolster confidence in the proposed directionality of our model, we also tested two competing models: (a) growth parameters of ERI predicted growth parameters of mental and physical health complaints and a need for recovery via growth parameters of PC breach (Alternative Model 1) and (b) growth parameters of mental and physical health complaints and a need for recovery predicted growth parameters of ERI via growth parameters of PC breach (Alternative Model 2). Because several fit statistics did not achieve their desired cut-offs, we found that the hypothesized path model fit the data better than Alternative Model 1 (RMSEA = 0.14; CFI = 0.89; TLI = 0.77; SRMR = 0.08) and Alternative Model 2 (RMSEA = 0.16; CFI = 0.75; TLI = 0.50; SRMR = 0.08), implying that the hypothesized model was superior.

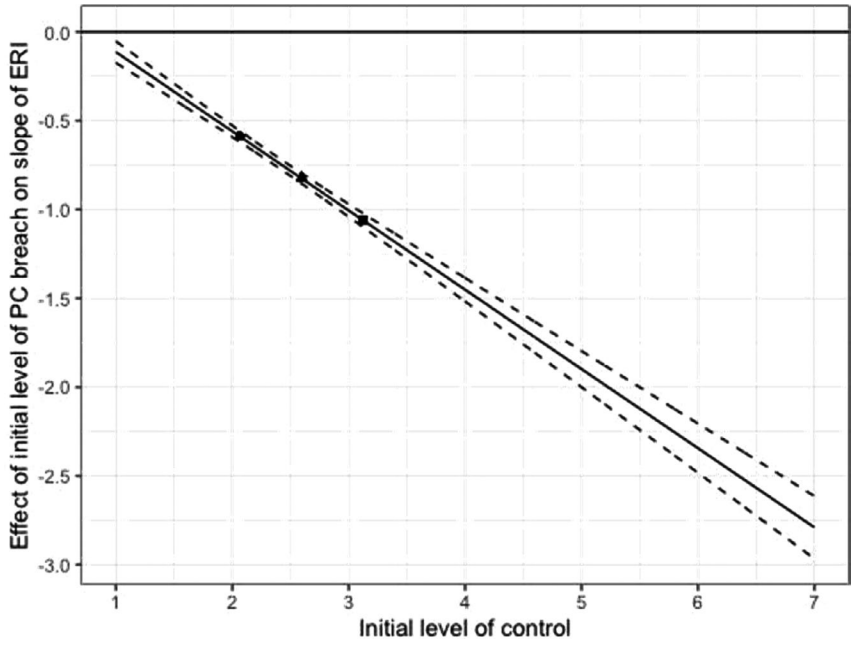

FIGURE 2 Johnson–Neyman plot for the moderating role of initial levels of control in the relationship between the initial level of PC breach and the slope of ERI. Note that the first symbol (circle) corresponds to low levels of initial level of control (−1 SD), the second symbol (triangle) corresponds to mean levels of initial level of control (mean), and the third symbol (square) corresponds to initial level of control (+1 SD). In the Johnson–Neyman plot, the relationship between the initial level of PC breach and the slope of ERI is significant for any value of initial levels of control.

DISCUSSION

Employees' experiences of strain can emanate from various sources (Wilson et al., 2004). We extend the employee health and well-being literature by looking beyond the work role as a key precursor to stress. Instead, we focus on how the wider employee–employer social exchange relationship, and the imbalance that PC breach can generate within it, affects worker health and well-being. We specifically examined the role of ERI as a mediating mechanism between PC breach and mental and physical health complaints and a need for recovery at one point in time, as well as over time. Our results partially support the notion that PC breach leads to reduced employee health and well-being via perceptions of ERI. We found that: (a) initial status and change in PC breach is positively related to initial status and change in ERI; (b) initial status and change in ERI is positively related to initial status of mental and physical health complaints and initial status of need for recovery; (c) initial status and change in ERI mediated the positive relationship between initial status and change of PC breach, initial status of mental and physical health complaints, and initial status of need for recovery; and (d) the initial status of perceived control moderated (attenuated) the positive relationship between initial status of PC breach and change in ERI. The findings support the mediation chain but via stable associations only. This finding could be explained by the fact that in order to predict change in health outcomes, we may need other predictors or a different timeframe. We discuss these issues in our *Limitations and Future Research Directions* section.

Overall, our findings inform broader employee health and well-being research when demonstrating that social exchange relationships are an important context for understanding worker health and well-being. PCs capture the subjective perceptions of the employee–employer exchange across a potentially wide range of reciprocal obligations. Our work adds weight to arguments that the degree of PC fulfillment—beyond more proximal job-related characteristics, work-related policies, or other more general work experiences (see Conway and Briner, 2009)—exert an important influence on employee health and well-being. However, our key contribution is to theoretically and empirically unpack *why* employees' perceptions of the "state" of their employment exchange, captured through perceptions of PC breach, lead to a loss of employee health and well-being.

We show that unpacking this relationship requires leveraging and integrating multiple theories; by drawing on ERI research and explaining our relationship chain through both Social Exchange (Blau, 1964) and Conservation of Resources (Hobfoll, 2001) theories, we offer a detailed understanding of why PC breach adversely affects employee health and well-being. While PC research can focus on either Social Exchange or Conservation of Resources theory to explore the contract's functioning, our work suggests that both sets of theories help to better unpack the consequences of PC breach, in both how our relationships exist at one point in time and how they develop over time. That is, perceptions of PC breach indicate a lack of reciprocity in the exchange relationship, violating a critical norm of social exchange and, when experienced at high levels, triggers ERI perceptions. The resource depletion that ensues when efforts invested fail to be rewarded with appropriate resources in return generates mental and physical stress reactions and results in adverse health outcomes.

Our findings regarding the role of job control also extend and nuance various literatures, such as employee health and well-being, ERI, and stress and coping, that focus on this resource as an important contextual variable for attenuating worker stress. That is, while our positioning of perceived control over the work environment as a boundary condition did not moderate both paths of our mediation relationship, this finding remains highly informative. Initial levels of perceived control did exert a protective effect in the PC breach–ERI relationship, with higher levels of initial perceived control resulting in an increasingly negative relationship between initial levels of PC breach and the slope of ERI, slowing down the development of further ERI perceptions over time. Because we could not find the same moderation effect on the ERI–health outcomes relationship, our works add to our understanding of when and how particular personal resources may be activated and effective in reducing the negative effects of PC breach.

Following our earlier theorizing, we argue that individuals high in perceived control might utilize this resource to cope with perceptions of PC breach and reduce the likelihood of an imbalance being created (i.e. ERI perceptions developing). That is, the post-breach period is recognized as a time of intensive sensemaking (Bankins, 2015; Deng et al., 2018) during which individuals seek to activate coping strategies to cognitively re-appraise or take actions to remedy the PC breach (Bankins, 2015) and maintain a positive exchange balance. Therefore, it is likely that employees expend their personal resource of perceived control during sensemaking and action following a PC breach, and possibly in conjunction with employees' zones of breach tolerance (Schalk and Roe, 2007), this stems the creation of ERI perceptions. However, it may be that by the time ERI is perceived the personal resource of control has been expended in those attempts to remedy the PC breach, and as a consequence, no longer affords a protective effect. These findings nuance our understanding of which resources may be effective in ameliorating the otherwise negative effects of PC breach. These findings also extend the PC literature to demonstrate that even when employees ultimately perceive a PC breach to be acceptable, the process of sensemaking generates a "cost" (through employee effort expended) to doing this. Theoretically, this suggests PC breach research should not only assess the nature of the breach itself and employees' perceptions of its severity, but also the processes they use

(such as cognitive resources expended) to reach such conclusions (per Bankins, 2015; Parzefall & Coyle-Shapiro, 2011).

Limitations and future research directions

First, we collected self-reported data at the same time point, possibly inflating the association between the stressor (ERI and PC breach) and the ill-being and ill-health and raising concerns about common method variance (Podsakoff et al., 2012). However, some of our health and well-being indicators can only be measured through self-reports (e.g. need for recovery). Moreover, by analyzing our data using growth parameters in a path model, we reduced risks owing to common method bias and raised confidence that our observed associations are most likely not due to common method variance but instead reflect actual change.

Second, although we found evidence for the association between PC breach and mental and physical health complaints and a need for recovery via perceptions of ERI (via stable associations, not via change associations), future research could focus on the role of these mental health indicators as an antecedent of physical health complaints in a research design with additional waves of data collection. This is important as perceptions of PC breach were argued to affect employees through increased stress (via ERI perceptions), which is arguably more closely tied to mental, rather than physical, health (for meta-analytical support, see Robbins et al., 2012).

Finally, while our findings demonstrate that perceived control exerts some ameliorative effect on the breach–ERI relationship, other personal or organisational resources must be examined to specify which organisational resources or interventions can be most effectively deployed to stem the stress associated with perceptions of non-reciprocity.

Practical implications

We show that PC breach and ERI perceptions adversely impact employees' health and well-being. For employers, this adds further weight to arguments that failing to "uphold their side of the bargain" has clearly detrimental effects not only on indicators such as job satisfaction, but on employees' physical and mental health. Because our findings suggest that employees' personal resources, such as perceived control, may not be effective in attenuating the effects of ERI on health and well-being, activation of organisational resources and interventions becomes salient (Tomprou et al., 2015). For example, Bankins (2015) shows that when organisations fulfill other obligations, facilitate positive workplace social relationships, or genuinely indicate future obligation fulfillment, they can assist in remedying PC breach. In turn, this should minimize perceptions of ERI because the organisation is demonstrating attempts to "uphold their side of the bargain," thus redressing imbalance. It is also critical that organisations and their representatives be aware that disruptive events, such as significant organisational change or re-structuring, may particularly precipitate PC breach and ERI perceptions and employee feelings of resource loss. This means ongoing communication in such situations is important in order to offer organisational remedies, either current or future, for likely breaches in a timely way (see Bankins, 2019; Tomprou et al., 2015, for a narrative example). The provision of organisational resources may then reduce the otherwise negative relationship between perceptions of PC breach and employees' health and/or well-being outcomes.

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CONFLICT OF INTEREST

None of the authors have a conflict of interest.

ETHICAL STATEMENT

The study was approved by the appropriate institutional and/or national research ethics committee of the first author's university. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study (i.e. item-level variables, scale-level variables, dropout indicator variable, and demographic information) are openly available in Open Science Framework at https://doi.org/10.17605/OSF.IO/9QKVS (file name = DATAFILEOSF.sav).

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ENDNOTE

[1] We would like to thank an anonymous reviewer for suggesting this approach.

[2] We removed one item from this measure to keep the survey as short as possible to encourage completion. We selected items with the highest factor loadings on the PC breach factor and the lowest cross-loadings on other factors. In a pilot study among 192 Belgian employees, this truncated version of the measure correlates significantly ($r = .70$, $p < .001$) with the five-item measure.

[3] Although Siegrist (1996) developed a longer ERI scale, other researchers have successfully used adapted and shortened scales (e.g. Kivimäki et al., 2007; von dem Knesebeck & Siegrist, 2003), especially when confronted with space and time constraints.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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