

# Associations between job demands, perceptions of noise at work and the psychological contract

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**Abstract.** Despite the widespread interest in the effects of workload on behaviour, there has been little research on the effects of it on attitudes and values in the workplace and life generally. The aim of the present research was to examine associations between noise exposure (which increases workload) and components of the psychological contract (fairness; trust; organisational commitment; work satisfaction; motivation; organisational citizenship; and intention to stay/quit). 166 workers completed a survey measuring components of the psychological contract, perceptions of noise exposure and other job characteristics. Univariate analyses showed that higher noise exposure was associated with a more negative psychological contract. However, adjustment for other job characteristics, both negative (e.g. job demands) and positive (e.g. control and support), removed the significant effects of noise. These results confirm previous research suggesting that psychosocial stressors have greater behavioural effects than components of the physical working environment such as noise.

**Keywords:** psychological contract; noise; job demands; wellbeing

## 1 Introduction

### 1.1 Mental Workload

There has recently been renewed interest in models and applications of mental workload [1, 2, 3]. Mental workload has been investigated in many different ways [4, 5], and it has a long history in Experimental and Applied Psychology [6, 7]. It has been examined in laboratory studies [8, 9] and in the workplace [10, 11], and a variety of measures of workload have been put forward [12, 13, 14, 15, 16, 17]. These include subjective reports, measures of task parameters and physiological function. Self-assessment or subjective reports such as the NASA Task Load Index [18], the Workload Profile [19] and the Subjective Workload Assessment Technique [4] have been widely used. Even single items about perceptions of mental workload are now used, and these are often highly correlated with longer scales and can predict wellbeing and other outcomes. Other research has examined specific aspects of

workload, such as time pressure, and this approach formed the basis of the Karasek Job Demands scale, which has been found to predict safety and health outcomes of workers [20].

## **1.2. Effects of Noise on Performance**

One explanation of the negative effects of noise on performance is that the noise acts as an extra source of information that requires extra resources. These resources are then no longer available for the task being performed and performance is impaired [21, 22]. This view is supported by studies which have measured workload and shown that it is increased in noise [23, 24, 25, 26, 27]. In addition, the extra workload may lead to increased stress and, in the long term, chronic health problems. There has been little research on the effects of noise on attitudes and values in the workplace and life generally.. The present study examined the Psychological Contract which is the exchange relationship between the organization and employee.

## **1.3 The Psychological contract**

In the Psychological Contract the employee gives an obligation to the organization, and, in return, the organization will respond with some terms and agreement [28]. The Psychological Contract is seen as playing an important role in explaining changes in relationships between employees and their organization [29, 30, 31]. A 'Psychological Contract Breach' happens when employees feel that the organization does not support their well-being but is only safeguarding the interests of the organization. The employee might not be prepared to face change but may be required to deliver their best without rewards that are commensurate with the difficulties caused by the change. As a result, their well-being at the work place is disturbed and eventually could lead to various performance-related effects such as low work performance [32, 33], low engagement [34] and weak organizational citizenship behavior [35, 36, 37]. Both parties may suffer negative consequences with the organization no longer operating effectively and employees no longer having an interest in their work. When a breach of the Psychological Contract occurs, employees may exhibit negative emotional stress like anger, disappointment and betrayal and, finally, they may cease to work efficiently and may intend to quit the organization [38]. The model proposed by Guest [39] showed the attitudinal and behavioral effects related to changes in the Psychological Contract. In this model the background factors were both individual and organizational characteristics. When the Psychological Contract was working well this led to a state of "Fairness", "Trust" and "The delivery of the deal". Attitudinal consequences of the Psychological Contract include: organizational commitment, work satisfaction, good employment relations, good work-life balance and job security. The behavioral consequences include: high motivation/effort, organizational citizenship and intention to stay in the job rather than quit. Work effort can be defined as the amount of energy employees put in to work successfully [40]. Work effort is different from motivation and there is always some confusion between both of these definitions. In this case, motivation comes first and is the psychological state that pushes the employees to make an effort of any required behaviors [41].

## **1.4 Aims and Objectives**

The aim of the present study was to examine whether the perception of noise at work (a risk factor for increased workload) influenced Psychological Contract Fulfilment (perceptions of fairness, trust and fair treatment). Organizational commitment was the key attitudinal consequence measured. Affective commitment was another variable measured here and it refers to the emotional attachment between the employee and the organization. Effort and intention to quit were the behavioral consequences investigated. One could suggest that wellbeing outcomes should also have been examined. Recent research [42, 43, 44] has shown that changes in wellbeing attributed to the Psychological Contract can be better explained by other job characteristics or individual characteristics. Indeed, this is a common issue in occupational workload research, where effects attributed to workload turn out to be due to correlated attributes. For example, some of the effects of noise on accidents reflect the fact that job with high noise levels also involved dangerous machinery [45]. Negative job characteristics were, therefore, also measured, as were positive job characteristics which could plausibly account for high Psychological Contract Scores.

## **2 Method**

This study was carried out with the approval of the ethics committee, School of Psychology, Cardiff University and the informed consent of the volunteers.

### **2.1 The Survey**

An online survey was carried out using Qualtrics software.

### **2.2 Measuring Instruments**

In the present study fairness, trust, delivery of deals and overall Psychological Contract Fulfilment were measured using The Psychological Contract Fulfilment Scale developed by Guest and Conway [28]. The measurement assessed the extent to which the respondent felt the organization had kept its promises (7 items), treated them fairly (2 items) and how much they trusted the organization (4 items). Example items include “Has the organization fulfilled its promise or commitment to.... provide you with a reasonably secure job”, “Overall, do you feel you are fairly rewarded for the amount of effort you put into your job.” and “To what extent do you trust your immediate manager to look after your best interests.”

A main focus of the study was on the attitudinal and behavioural consequences of Psychological Contract Fulfilment. Affective organizational commitment was measured using the Affective, Normative and Continuance Commitment Scale [46]. In the present study, the Work Effort Scale developed by De Cooman et al. [47] was used. This scale consists of 10-items which measure three dimensions of work effort, namely intensity, direction and persistence. These dimensions were summed to give an overall work effort score. In this study, intention to quit/ leave was measured using the scale developed by Kuvaas [48]. This scale contains 5-items and asks general questions about intention to leave the current job.

### 2.3 Participants

The participants were 166 workers from the USA recruited using Mechanical Turk. Details of their demographics characteristics are shown in Table 1.

**Table 1:** Respondents' Demographic Profile

Variable	Response Category	Frequency	Percentage (%)
Age	20-30 years	54	32.5
	31-40 years	68	41.0
	41-50 years	21	12.7
	51-60 years	11	6.6
	61-70 years	12	7.2
Sex	Male	96	57.8
	Female	70	42.2
Marital status	Single	59	35.5
	Living with partner	29	17.5
	Married	67	40.4
	Separated	3	1.8
	Divorced	7	4.3
Education	Widowed	1	0.6
	Undergraduate	108	65.1
	Post-Graduate	51	30.7
	Doctorate	4	2.4
	Other	3	1.8
Work sector	Public	68	41.0
	Private	98	59.0
Full or part-time work	Full time	151	91.0
	Part-time	15	9.0
Work pattern	Fixed hours	116	69.9
	Flexi hours	37	22.3
	Shift work	13	7.8

### 3. RESULTS

Perceived noise exposure was dichotomised into those who were never exposed to noise at work and those who were. The descriptive statistics for the dependent variables are shown for these groups in Table 2.

**Table 2:** Descriptive statistics for the Psychological Contract measures

Variable	Noise Group	Mean	Std. Deviation	N
Promises	No Noise	20.83	5.41	103
	Noise	17.56	5.44	63
Fairness	No Noise	13.56	3.10	103
	Noise	12.46	3.06	63
Trust	No Noise	20.94	4.47	103
	Noise	18.86	4.86	63
Psychological Contract Global	No Noise	55.33	11.47	103
	Noise	48.87	11.97	63
Affective Commitment	No Noise	27.73	5.68	103
	Noise	25.92	5.71	63
Work Effort	No Noise	59.81	7.40	103
	Noise	57.40	10.03	63
Intention to Quit	No Noise	11.36	5.30	103
	Noise	14.22	6.00	63

The group means show that those exposed to noise reported lower scores for promises, fairness, trust and the global Psychological Contract measure. In addition, they reported lower affective commitment, lower effort and a greater intention to quit the job. A MANOVA showed that the overall effect of noise was statistically significant (Wilks Lambda = 0.909  $p < 0.05$ ) and individual ANOVAs showed that this was true for all the individual variables.

The next analysis examined whether this effect of noise remained significant when positive and negative job characteristics were included as covariates in the analyses. The factor scores for positive and negative job characteristics were included in these analyses. Positive job characteristics had an overall significant effect (Wilks Lambda = 0.605  $p < 0.001$ ) and also a significant effect for all the individual variables. The

same was true for negative job characteristics (Wilks Lambda = 0.713  $p < 0.001$ ). The overall effect of perceived noise exposure was no longer significant in this analysis (Wilks Lambda = 0.976  $p = 0.70$ ). There were no significant effects of noise in the analysis of the individual variables.

## **4 Discussion**

The aim of this research was to examine the association between perceived exposure to noise at work, which may represent increased mental workload, and values, attitudes and behaviors that are part of the Psychological Contract. Perceived noise was assessed by a single question that examined the frequency of exposure to background noise at work that interferes with concentration on the job. Aspects of the Psychological Contract were measured using well established scales. An important feature of the research was the measurement of other job characteristics that have been shown to be associated with Psychological Contract measures [42, 43, 44] and with reported noise exposure [49].

### **4.1 Effects of Noise**

The initial analyses suggested that exposure to noise at work led to a more negative attitude that influenced promises, perceived fairness and trust. Attitudinal consequences of this weaker Psychological Contract were also apparent as shown by the lower affective commitment scores. Behavioral consequences, as shown by reduced effort and a greater intention to quit, were also significant.

### **4.2 Controlling for Job Characteristics**

The second set of analyses included positive and negative job characteristics. These had significant effects on the Psychological Contract variables, both overall and at the individual variable level. In addition, the effects of noise were no longer significant when these other job characteristics were included in the analyses.

Overall, the results of the present study show that initial consideration of noise in isolation suggests a negative impact on all parts of the Psychological Contract. However, adjustment for other job characteristics shows that it is these, not noise, that influence the strength of the Psychological Contract. In this respect, this is another study showing that it is the nature of the work carried out in noise, rather than noise per se, that influences attitudes and behavior. Mental workload, in the form of job demands, had a negative effect on the Psychological Contract and this effect accounted for the smaller effects of another source of mental workload, namely exposure to background noise.

### **4.3 Limitations**

There are clear limitations associated with the present study. First, noise exposure would ideally be objectively measured. Secondly, workload should also be measured, preferably objectively but at the very least with subjective scales. It should be noted,

however, that objective measures are difficult with online survey methodology. Thirdly, it is important to know the tasks that are carried out in noise as this often determines whether impairments are observed or not. Finally, a longitudinal design, preferably with an intervention, would be much better than the cross-sectional analyses presented here.

## 5 Conclusion

There has been little previous research on the effects of mental workload on attitudes and values. The Psychological Contract is the exchange relationship between the organization and employee where the employee offers an obligation to the organization and the organization in return will appreciate this with positive terms and agreements. The objective of the present research was to examine associations between noise exposure (which increases workload) and aspects of the Psychological Contract: trust; fairness; organizational commitment; job satisfaction; organizational citizenship; motivation and effort; and intention to stay/quit. Workers from a variety of jobs completed a survey measuring components of the psychological contract, perceptions of noise exposure and other job characteristics (e.g. job demands, control and support). Univariate analyses showed that higher noise exposure was associated with a more negative psychological contract. However, adjustment for other job characteristics, both positive and negative, removed the significant effects of noise. These results confirm previous research suggesting that psychosocial stressors have greater behavioral effects than components of the physical stressors such as noise.

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