

Distress and job satisfaction after robbery assaults: a longitudinal study

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Background	External/intrusive violence at work can result in psychological distress and can be an important risk to employee health and safety. However, the vast majority of workplace violence studies have employed cross-sectional and correlational research, designed to examine immediate reactions after being assaulted at work.
Aims	To explore whether exposure to robbery as a traumatic event may contribute to the onset of typical symptoms of psychological distress (anxiety depression, dysphoria and loss of confidence) and job dissatisfaction over time.
Methods	We collected data by using a two-wave panel design, in which employees working the days of bank robberies, in an Italian bank, filled in a questionnaire between 48 h and 1 week after the robbery (T1) and 2 months after the robbery (T2). We performed structural equation models to evaluate the fit of different models to our data.
Results	There were 513 participants at T1 (58% women) and 175 (34%) participants at T2 (62% women). There was a simultaneous association in which psychological distress leads to job dissatisfaction both following robbery and 2 months later.
Conclusions	Our findings support a synchronous effects model and suggest that interventions after suffering physical assaults, apart from helping employees to recover their health, should consider restoring their trust and confidence in the organization. This study contributes to understanding the dynamic relationships between a robbery at work and its outcomes over time, by addressing several methodological deficiencies in previous longitudinal studies.
Key words	Stress; stress management; well-being; work; workplace hazard.

Introduction

Workplace violence can take various forms (from abusive language to physical assault and homicide) and can be initiated by different actors (from employees to members of the public) [1,2]. Although not the most frequent form of workplace aggression and violence, non-fatal workplace assaults are usually perpetrated by organizational outsiders [3] and can be particularly threatening for employee health and well-being [4,5].

Literature review of longitudinal studies focusing on violence from outsiders, revealed only a handful of studies that explored the long-term consequences of being assaulted at work [4]. For example, Hogg *et al.* [6] found

that workplace violence predicts fatigue at work, after controlling for key covariates in a 5-year follow-up cohort study of a representative sample of the Danish workforce. Regarding health consequences of being assaulted at work, Fisher and Jacoby [7] found that the assaulted group showed higher psychological distress than the focal-local control group at the initial assessment, in a prospective study of bus drivers in London. Indeed, 5 of the 22 assaulted bus drivers (23%) had post-traumatic stress disorder (PTSD) symptoms at the first interview, which took place within 6 months of the assault. At 18 months' follow-up, the number of bus drivers with a PTSD diagnosis decreased from 5 to 2 (13% of 15 bus drivers at the second interview).

Similarly, Wykes and Whittington [8] found that assaulted psychiatric nurses reported poorer mental health (5% (2/39) met diagnostic criteria for PTSD) than nurses in the focal-local control group. More recently, Richter and Berger [9] replicated Wykes and Whittington's study with similar results: 17% (8/46) of psychiatric nurses met the criteria for PTSD diagnosis after the incident (physical assault). Three of these assaulted nurses still exhibited PTSD symptoms at 2- and 6-month follow-up.

In addition, Rogers and Kelloway [10] found that fear of future violence serves as a mechanism explaining the relationship between experiencing workplace violence (i.e. physical assaults) and health (psychological well-being and somatic complaints) in a sample of 194 bank tellers from a US company. Schat and Kelloway [11] replicated these findings later, in different work settings (i.e. the health care sector); however, as Richards [12] highlighted, among victims of bank robberies, symptoms of post-traumatic stress and mental health problems manifest immediately following the robbery (and they reduced significantly over time). In that sense, the average duration of bank robberies in Italy revolves around 3 min, and on average there is a robbery every 15–20 bank offices and every 2 days [13]. Furthermore, the thought of further violence may influence the workers' evaluation of their working environment, decreasing their job satisfaction [14]. Similarly, Lapierre *et al.* [15] conducted a meta-analysis on workplace aggression studies and suggested that victims of workplace aggression might blame their organization for allowing the violence to be perpetrated on them, prompting the development of negative feelings and emotions towards the organization (i.e. job dissatisfaction). Accordingly, research has shown that workplace aggression has detrimental consequences for employee well-being and workers' negative attitudes and behaviours towards their workplace [5]. In particular, Hershcovis and Barling [16] conducted a meta-analysis, in which they explored the consequences of workplace aggression and violence, depending on the perpetrator. They found a significant correlation between outsider aggression and relevant outcomes such as job satisfaction ($r_c = -0.14$).

Hence, we hypothesized that robbery victims might experience psychological distress, which, in turn, could

lead to reduced overall job satisfaction. Indeed, the meta-analysis of Faragher *et al.* [17], which included almost 500 studies, involving around 250 000 employees, showed a strong association of psychological well-being with job satisfaction. Moreover, Judge *et al.* [18] highlighted that there is some stability in workers' job satisfaction over time and across situations. This compelled us to hypothesize a simultaneous effect model over time, in which psychological distress is associated with job dissatisfaction 1 week after a robbery (T1) and 2 months later (T2) (see Figure 1).

The main purpose of this research was to analyse the association of exposure to robbery with psychological distress and job satisfaction, measured both a few days and 2 months after the robbery. In particular, we aimed to test whether exposure to the robbery as a traumatic event contributed to psychological distress and job dissatisfaction over time.

Methods

This study was part of a research project on psychosocial risks in a national bank with offices across Italy. The ethics committee of the University of Firenze gave its consent for conducting this research.

Data were collected between 2012 and 2013 as follows: when a robbery in a bank office occurred, it was notified to the bank's health and safety department, whose staff went to the specific bank office accompanied by a researcher for collecting data between 48 h and 1 week after the robbery (T1). Both victims and observers of robberies completed a questionnaire during work, in a room provided by the bank and in the presence of a researcher who informed each participant of the purpose of the study. Participation in the study was voluntary and although both anonymity and confidentiality were guaranteed, participants provided their working identification number to link their responses at two points in time. Thus, employees that participated at T1 were invited to participate again in the same questionnaire 2 months later (T2). The time lag of 2 months was chosen because literature has shown that chronic stress might develop during this time frame [19].

Regarding the content of the questionnaire, the Italian version of the 12-item General Health Questionnaire

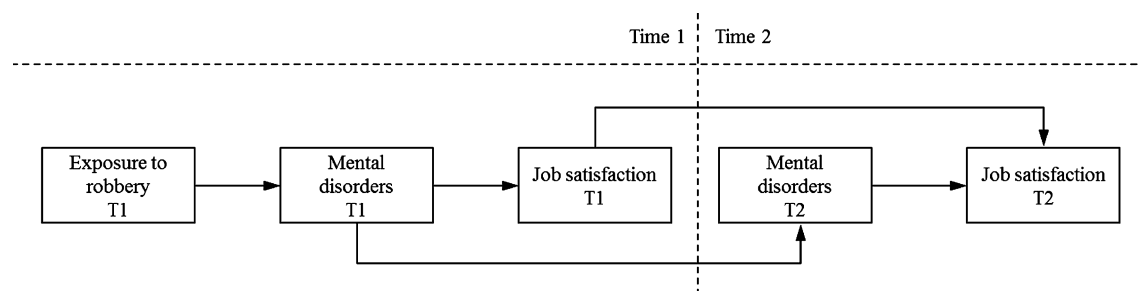


Figure 1. Conceptual model.

scoring method 0–3 was used to assess psychological distress [20,21]. This well-known questionnaire gives a total score ranging from 0 to 36 points, in which a higher score indicates a worse degree of mental disorder. In the present study, Cronbach's alpha for this scale was 0.84 at Time 1 and 0.88 at Time 2 (see also [22] for detailed current validity of this scale in the Italian context). Job satisfaction was assessed using a single item measuring overall satisfaction (*How satisfied have you been with your work?*). This single item had shown sufficient validity and correlated positively with more comprehensive measures of theoretically related constructs [13,15,17]. The responses were obtained on a 10-point scale in which a higher score indicates a higher job satisfaction. A single item tailored for this research was used to assess if the victim was directly exposed to the robbery or whether they were only a bystander.

In order to examine the hypothesized paths in our theoretical model, we performed structural equation models (SEMs) with the maximum likelihood estimation procedure of MPlus, version 6.1 [23]. SEM offers the advantages of (i) controlling for measurement errors when the relationships among variables are analysed and (ii) comparing the goodness-of-fit of the hypothesized model with that of alternative models [23]. Because the ratio of sample size to the number of model parameters did not meet the standard requirements and because the study's main objective was verifying structural paths rather than validating the measurement model, we used the single-indicator approach in testing the hypothesized structural model.

To evaluate the model fit, we considered model chi-square (the higher the values the worse the model's correspondence to the data) and the following fit indexes: the standardized root mean square residual (SRMR), for which values of <0.08 are favourable; the root mean square error of approximation (RMSEA), which should be <0.08 and the comparative fit index (CFI), for which values of 0.90 or greater are recommended. Additionally, the Akaike's information criterion (AIC) and the Bayesian information criterion (BIC) were used to compare models with the same degrees of freedom (the smaller the value, the better the model fit) [23].

Results

The initial sample (T1) consisted of 513 workers with a mean age of 41.4 years old ($SD = 9.8$) and of who 58% (299) were women. At T2 there were 175 participants (34% of the participants at T1) of who 62% (108) were women. An independent samples t -test showed no significant differences for mental disorder and job satisfaction by sex at either time.

Table 1 reports descriptive statistics and zero-order correlations of the study variables. Prior to testing hypotheses, we conducted an independent samples t -test to assess whether there were significant differences in mental disorders and job satisfaction (T1 and T2) between the participants exposed to the robbery and those who observed the robbery (i.e. bystanders). There were no significant differences in either mental disorders at T1 or job satisfaction at T1 and T2. However, a significant difference in the level of mental disorder at T1 ($T_{[305.31]} = 4.84$, $P < 0.01$) was found between those exposed to the robbery or victims (scores in mental disorders: mean = 11.70, $SD = 5.67$) and those bystanders who observed the robbery ($M = 9.48$, $SD = 3.46$), such that victims exhibited a higher level of mental disorder than bystanders. Overall, these findings can be expected, considering that exposure to robbery was hypothesized to directly influence mental disorder at T1 and to indirectly affect mental disorders at T2 and job satisfaction at T1 and T2. It was therefore meaningful to empirically test the hypothesized model.

We therefore tested our proposed structural model (Model 1) and compared it with alternative models. The hypothesized model displayed a good fit to the data ($\chi^2(5) = 3.64$, CFI = 1.00, RMSEA = 0.00, SRMR = 0.02, AIC = 1581, BIC = 1648). Additionally, all specified paths were significant, which provides support to our hypotheses.

To assess whether Model 1 was the best representation of the data, we further compared its fit to that of other competing models. First, Models 2 and 3 allowed verifying whether the indirect influence of independent variables on dependent variables was fully or partially explained by mediating variables. Specifically, in Model 2, we included additional paths from exposure to robbery to

Table 1. Descriptive statistics and correlations

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Age	41.22	1.41	—						
2. Gender	—	—	−0.28**	—					
3. Exposure to robbery	—	—	0.01	0.11*	—				
4. T1 mental disorders	11.19	5.42	0.02	0.04	−0.19**	—			
5. T1 job satisfaction	6.26	2.04	−0.01	0.01	0.03	0.24**	—		
6. T2 mental disorders	10.19	5.27	0.12	−0.05	−0.10	−0.18**	0.49**	—	
7. T2 job satisfaction	6.00	2.02	0.00	0.06	−0.09	0.48**	−0.15*	−0.12	—

$n = 175$.

* $P < 0.05$; ** $P < 0.01$.

T2 mental disorders and to T1 and T2 job satisfaction, in order to assess whether mental disorders partially or fully mediated these paths. Likewise, in Model 3, an additional path from T1 mental disorder to T2 job satisfaction was added to assess whether T1 job satisfaction fully or partially mediated this link. Second, because job satisfaction and mental disorders were measured at the same time, a reversed relationship could also be expected between the two variables. Accordingly, we specified Model 4 to assess whether a reversed pattern of relationships between the two variables, at both T1 and T2, was a better representation of the data than the hypothesized pattern.

The fit of Models 2 and 3 was not significantly better than that of the hypothesized model. Moreover, none of the additional direct paths was significant: exposure to robbery → T2 mental disorders, $\beta = 0.03$, *ns*; exposure to robbery → T1 job satisfaction, $\beta = -0.10$, *ns*; exposure to robbery → T2 job satisfaction, $\beta = 0.07$, *ns*; T1 mental disorders → T2 job satisfaction, $\beta = 0.05$, *ns*. These results suggest that the fully mediated model (Model 1) was a better representation to the data than the partially mediated models (Models 2 and 3). Additionally, the fit of Model 4 was worse than that of Model 1. Accordingly, Model 1 was retained as the best-fitting and most parsimonious model, which is in accordance with our hypothesis. Completely standardized path coefficients for this model are depicted in Figure 2.

Finally, to further estimate the indirect relationships among our study variables, we conducted the joint significant test, which has been shown to provide an optimal balance of statistical power and type I error [23]. We also provided confidence intervals (95%) to determine the significance of the indirect effect. Results indicated that all the indirect effects were statistically significant (see Figure 2 notes).

Discussion

This study found that exposure to bank robberies affected early experiences of psychological distress and job satisfaction (T1) and that these experiences had long-term effects on psychological distress and job satisfaction (T2). To the authors' knowledge, this is the first study that examined

the consequences of physical violence on job satisfaction over time in the banking sector. Although several stress theories have attempted to explain the consequences of being exposed to external violence on employee well-being, its association with job satisfaction remained unclear. Our model showed that direct exposure to robbery (rather than being a bystander) increased the incidence of reported mental health problems. This result fits with the research literature [14]. Our results also showed that a synchronous effects model fit best with the data when compared to alternative theoretical models. Thus, there is a simultaneous association, in which psychological distress leads to job dissatisfaction both following a robbery (T1) and 2 months later (T2) (see Model 1).

According to transactional stress theories, victims of robbery might experience psychological distress, which might reduce their overall job satisfaction. Indeed, research has shown that both the cognitive appraisal of the situation and its associated emotions go hand-in-hand. For example, Di Giacinto *et al.* [24] suggested that fear conditioning is the crucial factor that determines the development of PTSD symptoms in victims of a bank robbery.

Despite these compelling results, this study has some potential limitations that should be addressed in future research. Although several studies have confirmed the strong association of PTSD with poorer mental health and with psychological problems, such as depression and anxiety [25], PTSD was not addressed in this study as a potential outcome of being exposed to bank robbery. Similarly, future studies should try to rule out third variable explanations, by including other variables and controlling potential confounders [26]. In addition, although the two-wave panel design diminishes the risk for problems related to common method variance [27], future studies should include information from other sources rather than rely solely on self-reports, as well as examine cross-lagged relations between psychological distress and job satisfaction after applying multi-wave designs [28]. Furthermore, our study assessed psychological distress and job satisfaction only after the occurrence of a robbery, thereby neglecting prior levels of these psychological states. Thus, in order to more thoroughly analyse and

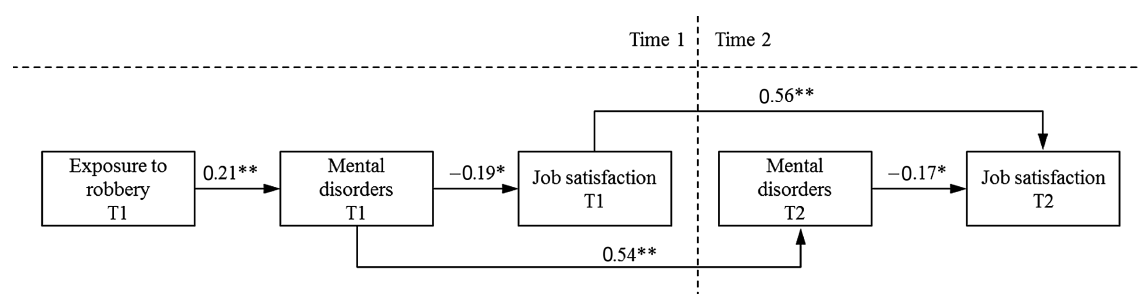


Figure 2. Completely standardized path coefficients for Model 1. * $P < 0.05$; ** $P < 0.01$. Summary of indirect effects: exposure to robbery → mental disorders (T1) → job satisfaction (T2) (indirect effect = -0.04 , $P < 0.05$; 95% CI -0.07 , -0.01); exposure to robbery → mental disorders (T1) → mental disorders (T2) (indirect effect = 0.11 , $P < 0.01$; 95% CI 0.07 , 0.15); mental disorders (T1) → job satisfaction (T1) → job satisfaction (T2) (indirect effect = -0.11 , $P < 0.05$; 95% CI -0.18 , -0.03); mental disorders (T1) → mental disorders (T2) → job satisfaction (T2) (indirect effect = -0.09 , $P < 0.05$; 95% CI -0.16 , -0.03).

interpret the impact of exposure to robbery on psychological distress and job satisfaction, future studies should assess these states before the violent incident takes place and should also include control groups.

While the present investigation was focused on the robberies in the banking sector, it is worth mentioning that robberies are progressively expanding in other domains, especially in the Italian context. This suggests that primary interventions aimed at addressing crime are needed but also that future studies are warranted to further assess the detrimental influence of exposure to robberies in different industry sectors in order to contribute to the external validity of the present research findings.

Finally, while our study advanced knowledge on the effects of exposure to robberies on employee psychological health, the consequences of such events are still relatively underexplored. Hence, future studies might address how exposure to robberies affects relevant affective, motivational and attitudinal states, such as organizational commitment, work engagement and intention to leave. Likewise, behavioural work-related outcomes of exposure to robberies could be examined in future research. Such outcomes may include work performance, organizational citizenship behaviours and proactive conducts (i.e. creative and innovative behaviours).

Acknowledging these limitations, this study also contributes to understanding the dynamic relationships between experiencing robbery at work and its outcomes. Previous studies have shown that the main risk factors for PTSD after a traumatic event are lack of social support (including poor leadership) and avoidance of further stressors close to the index event [29,30]. Therefore, this should be addressed from a preventive approach by introducing primary measures such as a proper risk assessment strategy that includes psychological risk. It should also consider human resources initiatives for enhancing social and group support, i.e. certain protective factors, such as organizational support or positive relational experiences, which have the power to mitigate the detrimental effects of exposures to robberies [12]. In addition, in this study, we pointed out that job satisfaction can also be seriously affected by exposure to violence. Consequently, secondary interventions should also take into consideration measures aimed to restore employees' trust and confidence in the organization as well as to improve the job satisfaction of the victims, such as job enrichment programs or job satisfaction training.

In summary, this study expands previous research by addressing several methodological and design deficiencies in previous longitudinal studies. From a theoretical point of view, the simultaneous association of psychological distress and job satisfaction support transactional stress theories, while from a point of view of the clinicians or policymakers, the current research has also highlighted the need to include both preventive measures aimed at reducing the risk of being assaulted at work and

secondary measures aimed at providing social support and restoring job satisfaction.

Key points

- This study tested the longitudinal association between psychological distress and job satisfaction in victims of bank robbery.
- Exposure to robbery affected psychological distress and job satisfaction at two time points, and there was a synchronous relationship between distress and satisfaction over time.
- Elucidating these long-term consequences of bank robberies is crucial to formulate preventive measures and tailored treatment and rehabilitative interventions for victims.

Conflicts of interest

None declared.

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Going through the motions

The measurement of deep body temperature in pilots is necessary to determine the thermal load arising from a combination of environmental factors, workload and clothing insulation, mitigated by cabin and personal conditioning systems. In the USA, this was usually achieved by measuring rectal temperatures. Royal Air Force (RAF) pilots are generally less amenable. At the RAF Institute of Aviation Medicine, we had been using ear canal temperatures (T_{ac}) but the risk of mishap caused by dislodging the probe whilst flying at high speed and low level was significant.

One of our technicians therefore developed a radio-pill, based on the one invented by Prof. Heinz Wolff to measure intestinal pressures. To investigate how the measurements from this pill compared with those from the ear canal, oesophagus and rectum, I devised an experiment to drive deep body temperatures up and down as fast as possible. After being suitably instrumented, the subject entered a bath at 42°C until T_{ac} reached 38.5°C. He then leapt into a bath filled with water at 10°C and remained there until T_{ac} reached 35°C before returning to the hot bath.

These were the days before ethics committees and we relied on a process of reciprocal consent: 'I'll be a subject in your unpleasant experiment if you'll be a subject in mine.' Common practice was for the experimental leader to carry out the pilot study. The first question

that crossed our minds was the impact on blood pressure. In my pilot run, my systolic and diastolic pressures peaked transiently at >300/200 mmHg just after entering the cold bath. We were all young, fit and healthy so, as there were other things to concentrate on, we did not measure blood pressure in the actual experiment.

The experience was as unpleasant as expected. What we did not expect, however, was that four of the six experimental subjects described a feeling of intense disorientation, of tumbling forwards, just after entering the cold bath. One brave soul repeated the experience in the dark and we obtained an infrared film of his vertical nystagmus. He was the only subject not to swear on entering the cold water but he did shout 'Ow' repeatedly. We later explained the phenomenon as a result of reinforcing convection currents being generated in the vertical semicircular canals, the currents in the horizontal canals cancelling each other out.

In terms of the primary purpose of the experiment, the temperature and the rate of change of temperature measured in the gastrointestinal tract was about half-way between the measurements in the oesophagus and rectum. The really unpleasant bit was retrieving the pills afterwards for recalibration.

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