



## Investigating the psychological impact of bank robbery: A cohort study

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## ABSTRACT

Despite numerous annual bank robberies worldwide, research in the psychological sequelae of bank robberies is sparse and characterized by several limitations. To overcome these limitations we investigated the psychological impact of bank robbery in a cohort study by comparing general levels of traumatization and somatization in employees never exposed to robbery and employees exposed to robbery at different degrees and time-points, while controlling for selected risk factors of posttraumatic distress. Multivariate regression analyses showed that only the acute directly exposed robbery group which had a significantly higher score on general traumatization and somatization compared to the control group whilst controlling for other factors. In conclusion, bank robbery exposure appears to be especially associated with psychological distress in the acute phase and in victims present during the robbery. After the acute phase, other factors appear more important in predicting general traumatization and somatization in bank employees compared to exposure to robbery.

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## 1. Introduction

Despite numerous annual bank robberies worldwide, research into its psychological sequelae has been limited (Hansen & Elklit, 2011, 2013; Miller-Burke, Attridge, & Fass, 1999). In Denmark, the number of bank robberies has varied in the past ten years, ranging from 69 to 182. Current figures are relatively low (71 in 2012; the Danish Bankers Association, 2013). The decrease in the annual number of bank robberies is the result of several preventative actions taken against bank robbery; for example cashless bank branches, machines for cash depositing, surveillance, and cash recycling machines. The limited research into the psychological impact of bank robbery has shown that bank robberies are associated with both acute and long-term posttraumatic symptoms. However, all of the studies have been based on convenience samples, and only one study can be regarded as having a large sample ( $N = 303$ ) (Kamphuis & Emmelkamp, 1998). Moreover, only one cross-sectional study has included a control group of employees never exposed to robbery in which a higher degree of distress was found in the robbery group (Kamphuis & Emmelkamp, 1998). Across studies, no attempts were made to statistically control the existing differences between the groups. Thus, factors other than robbery exposure may explain the higher distress level found in the robbery group. Furthermore, proximity

to the robber, which is found to be positively associated with posttraumatic symptomatology, was not assessed (cf., Miller-Burke et al., 1999).

The aim of the current study was to clarify the psychological impact of robbery by investigating whether robbery exposure at different degrees is a significant risk factor of general traumatization (i.e., the emotional effects of trauma) and somatization; while controlling for the effect of selected risk factors at two time-points. The risk factors were selected based on previous bank robbery studies and studies of other types of nonsexual assault (Brewin, Andrews, & Valentine, 2000; Christiansen & Elklit, 2008; Hansen & Elklit, 2011, 2013; Kamphuis & Emmelkamp, 1998; Miller-Burke et al., 1999). The selection of risk factors was also informed by Ehlers and Clark's (2000) cognitive model of posttraumatic stress disorder (PTSD). The selected risk factors were younger age, female sex, prior traumatic exposure, life events, coping styles, perceived social support, and cognitions. Female sex, younger age, prior traumatic exposure, exposure to major life events, coping styles, and lack of social support have been found associated with increased posttraumatic distress following bank robbery as well as other types of non-sexual assault (Brewin et al., 2000; Christiansen & Elklit, 2008; Hansen & Elklit, 2011, 2013; Kamphuis & Emmelkamp, 1998; Miller-Burke et al., 1999). Different aspects of negative cognitive responses to traumatic exposure have been found to be predictive of posttraumatic symptoms following different forms of traumatic exposure including bank robbery (Hansen & Elklit, 2011, 2013; Karl, Rabe, Zöllner, Maercker, & Stopa, 2009; Kleim, Ehlers, & Glucksman, 2007; Nixon & Bryant, 2005). These cognitive responses not only concern negative

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appraisals of the trauma and its subsequent implications but also maladaptive thinking associated with panic (i.e., a heightened awareness of bodily sensations and the tendency to interpret these sensations catastrophically) (cf., Nixon & Bryant, 2005). Thus, in accordance with the previous research and a cognitive theory of PTSD, we treat negative posttraumatic cognitions as a risk factor of psychological distress in the present study and not as an outcome.

Based on the extant literature we hypothesized that a significantly higher degree of traumatization and somatization would be found in the robbery exposed groups compared to the never exposed control group whilst controlling for selected risk factors in both the studies. The groups were categorized into four groups by those who were (1) in the room during the robbery (i.e., the directly exposed robbery group); (2) those who were in adjoining rooms to where the robbery took place (i.e., the indirectly exposed robbery group); (3) those who were exposed to robbery more than one year ago (i.e., the robbery exposed control group); and (4) those who were never exposed to robbery (i.e., the never exposed control group). We expected that prior robbery exposure would significantly predict traumatization and somatization at both time-points whilst controlling for the effect of all the selected risk factors.

## 2. Method

The current study is the part of Danish questionnaire survey of the psychological impact of bank robberies including a control group study conducted in collaboration with the Danish Bankers Association, the National Bank of Denmark, and the University of Southern Denmark. All necessary permissions for conducting this study, according to Danish law, were obtained. Participation was voluntary. Please see Hansen and Elklit (2014) for further details on the study.

### 2.1. Measures

The questionnaires administered to the two samples (i.e., the robbery sample and the control group sample) were identical with the exception of questions directly related to robbery exposure. Only the questions relevant for this study are described in the following. Prior traumatic exposure was assessed by asking the participants whether they had experienced 14 different kinds of traumas. Traumatic exposure was grouped as interpersonal trauma, non-interpersonal trauma, and unspecified traumas as research shows that interpersonal traumas are more traumatizing (Forbes et al., 2012). The experience of recent life events was assessed in an open-ended questions. All reliability coefficients on the following scales were satisfactory (study 1 and study 2 = .71–.92) except detached coping, which was excluded from further analysis.

### 2.2. Trauma symptom checklist (TSC; Briere & Runtz, 1989)

A revised Danish version of the TSC total score (TSC; Briere & Runtz, 1989) was used as an indicator of general traumatization. The revised TSC comprises 26 items rated on a four-point Likert scale (1 = *never*, 4 = *always*) (Krog & Duel, 2003). The Danish TSC-26 is a valid and reliable measure of general posttraumatic stress symptoms (Krog & Duel, 2003).

### 2.3. Symptom checklist revised somatization subscale (SCL-90-R; Derogatis, 1994)

The total score of the somatization subscale of the Danish version of the SCL-90-R (Derogatis, 1994) was used as an indicator of somatization. The Danish SCL-90-R somatization subscale is a 12 item list of common somatic symptoms rated on a five-point Likert scale (0 = *not at all*, 4 = *extremely*) (Olsen, Mortensen, & Bech, 2004).

The SCL-somatization subscale is a valid and reliable measure of symptoms of somatization (Olsen et al., 2004).

### 2.4. Posttraumatic cognition inventory (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999)

Cognitions were assessed in relation to the robbery in the bank robbery sample and in relation to the stated stressful event in the control group sample using the PTCI (Foa et al., 1999). The PTCI is a 33 item self-report scale with three subscales assessing negative cognitions about self (NCS), negative cognitions about the world (NCW), and self-blame (SB) rated on a seven-point Likert Scale (1 = *totally disagree*, 7 = *totally agree*). The total scores of the three subscales were used as indicators of NCS, NSW, and self-blame, respectively. The original English version of the PTCI was translated into Danish by two independent translators, who were fluent in both Danish and English. The two translations were compared and combined into a single translation by the two translators (i.e., the committee approach; Simonsen & Elklit, 2008), which was then back-translated into English by a third translator. The third translator (or back-translator) was also fluent in both Danish and English. The back-translation was then compared to the original English items with a very high correspondence in relation to conveying the meaning. The PTCI demonstrated a valid and reliable measure of trauma-related cognitions (cf. Beck et al., 2004; Foa et al., 1999).

### 2.5. Anxiety sensitivity index (ASI; Reiss, Peterson, & McNally, 1986)

The total score of the Danish version of the ASI (Reiss et al., 1986) was used to assess proneness to panic reactions. The ASI is a 16-item questionnaire that measures the participants' belief about the harmfulness of anxiety symptoms on a five-point Likert scale (1 = *very little*, 5 = *very much*). Good test–retest reliability (.75) and construct validity have been reported (Reiss et al., 1986).

### 2.6. Coping styles questionnaire (CSQ; Roger, Jarvis, & Narajin, 1993)

Coping style was assessed in relation to how the participants generally deal with stressful events using a revised Danish version of the CSQ (Roger et al., 1993). The revised CSQ has 37 items and preserved the four primary coping components assessed by total scores on the four subscales: rational (problem-focused) coping, emotion-focused coping, avoidant coping, and detached coping rated on a four-point Likert scale (1 = *never*, to 4 = *always*) (Elklit, 1996). The Danish version of the CSQ has been shown to have good validity and reliability (Elklit, 1996).

### 2.7. Crisis support scale (CSS; Joseph, Andrews, Williams, & Yule, 1992)

Perceived social support was assessed in relation to the robbery in the bank robbery sample and the stated stressful event in the control group sample using the total score of the Danish version of the CSS (Joseph et al., 1992), which is comprised of seven items (Elklit, Pedersen, & Jind, 2001). The answers are rated on a seven-point Likert-type scale (1 = *never*, to 7 = *always* on the first six items, and 1 = *very unsatisfied*, to 7 = *very satisfied* on the last item). The Danish version of the CSS has been shown to have good reliability and validity (Elklit et al., 2001).

### 2.8. Measures used only in the bank robbery sample

#### 2.8.1. Acute stress disorder scale (ASDS; Bryant, Moulds, & Guthrie, 2000)

ASD severity was assessed at T1 using the Danish version of the ASDS (Bryant et al., 2000). The ASDS is a 19 item self-report scale

with four subscales assessing the four separate symptom clusters; dissociation, re-experiencing, avoidance, and arousal as specified by the DSM-IV rated on a five-point Likert scale (1 = *not at all*, 5 = *very much*). The ASD symptom clusters were met if the participants endorsed at least one re-experiencing symptom, one avoidance symptom, and one arousal symptom in addition to at least three dissociative symptoms, all indicated by item scores  $\geq 3$  on the ASDS. Previous studies using the Danish ASDS have used this procedure and have reported good reliability and validity (cf. Elklit & Christiansen, 2010; Hansen & Elklit, 2011).

## 2.9. Harvard trauma questionnaire part IV (HTQ; Mollica et al., 1992)

PTSD severity was assessed at T2 using the Danish version of the HTQ (Bach, 2003; Mollica et al., 1992). The HTQ is a 17 item self-report scale with three subscales assessing the three separate symptom clusters; intrusion, arousal, and avoidance as specified by the DSM-IV rated on a four-point Likert scale (1 = *not at all*, to 4 = *all the time*). The PTSD symptom clusters were met if the participants endorsed at least one intrusion symptom, three avoidance symptoms, and two arousal symptoms, all indicated by item scores  $\geq 3$ . The Danish version of the HTQ has been used in a wide range of Danish trauma populations with reports of good reliability and validity (cf. Bach, 2003; Elklit & Christiansen, 2010; Hansen & Elklit, 2013). Two separate samples were combined for the current study:

### 2.9.1. Sample 1 – bank robbery

The sample is based on a national cohort study of all Danish bank employees exposed to bank robbery from April 2010 to April 2011 ( $N=614$ ) identified through each individual bank. Each bank had appointed their own project manager who was in charge of handing out to and collecting the questionnaires from the robbery exposed employees and sending them back to the University of Southern Denmark. Four-hundred and fifty employees (73%) filled out the first questionnaire a week after the robbery (T1,  $M=9.89$  days,  $SD=6.30$ ) and out of these 371 (82%) filled out the second questionnaire six months after the robbery (T2,  $M=191.7$ ,  $SD=13.15$ ). A total of 91.3% ( $n=411$ ) of the participants were exposed to robberies, which involved the use of weapon. The majority of the participants were directly exposed ( $n=364$ , i.e., in the room, where the robbery took place), and the remaining participants were in adjoining rooms during the robbery (the indirectly exposed robbery group,  $n=86$ ). The estimated acute stress disorder (ASD) rate (T1;  $N=450$ ) was 11.8% and the estimated PTSD rate (T2;  $N=371$ ) was 6.2% according to the DSM-IV (APA, 1994) assessed by the ASDS (Bryant et al., 2000) and the HTQ (Mollica et al., 1992) (cf., Hansen & Elklit, 2013 for more details on this procedure). Subclinical ASD is defined as the presence of three out of the four symptom clusters and subclinical PTSD is defined as the presence of two out of the three symptom clusters as specified by the DSM-IV. Subclinical prevalence rates were 11.8–26.9% for ASD and 6.2–17.8% for PTSD. Four hundred and twenty-seven participants received psychological debriefing. The debriefing was conducted in a non-manualized manner and not as a part of the current study. There were no significant group differences in traumatization or somatization scores between the debriefed and non-debriefed participants exposed to robbery at either time-point (trauma symptom checklist (TSC), T1,  $t(448)=-.89$  (eta squared = .002), T2,  $t(369)=1.53$  (eta squared = .003), symptom checklist revised somatization subscale (SCL-somatization), T1,  $t(448)=.55$  (eta squared = .001), T2,  $t(369)=1.18$  (eta squared = .003), all  $ps > .05$ ). Furthermore, there was no significant group differences in traumatization (T1) or somatization (T1) scores in relation to the dropout between T1 ( $N=450$ ) and T2 ( $N=371$ , TSC,  $t$

(448) = .16,  $p = .873$  (eta squared = .002), and SCL-somatization,  $t(448) = 1.41$ ,  $p = .159$  (eta squared = .003), respectively).

### 2.9.2. Sample 2 – control group

After the national bank robbery study was conducted, a list of all Danish bank branches not exposed to robbery in the survey period (i.e., the last year) was formed in collaboration with all the existing Danish banks. One-hundred bank branches were randomly selected from the list using a simple permutation-program designed to select any requested numbers at random. A total of 573 bank employees filled out the questionnaire. The control group stated the most recently experienced stressful event when filling out scales demanding a specific situation. The most common events were illness in relatives or self, too high workload, unpleasant customer experiences, deaths in close relatives, and job relocations. A total of 378 had never been exposed to robbery (the control group never exposed) and 195 had been exposed to robbery more than one year ago (the robbery control group).

## 2.10. Data analyses

The percentages of missing values were low (.00–19.7%). Thus, the expectation-maximization algorithm, which has been demonstrated to be an effective method of dealing with missing data (Bunting, Adamson, & Mulhall, 2002), was used for the imputation of missing values. Multivariate regression analyses (MRA) were carried out using Mplus 6.1. MRA was utilized as it allows for several dependent variables (traumatization and somatization) to be jointly regressed on the selected risk factors. Thus, in contrast to separate regression analyses, multivariate regression assumes that the dependent variables (i.e., traumatization and somatization) are correlated. This approach facilitates a clearer comparison of estimates as all the parameters were estimated simultaneously. Finally, using multiple testing also reduce the probability of a Type 1 error. The dependent variables were treated as observed variables rather than latent variables as we were interested in prediction rather than model testing. More than half of the included variables were non-normally distributed (skewness values, study 1 = 1.52–2.02, study 2 = 1.60–2.02, kurtosis values, study 1 = 1.44–4.91, study 2 = 1.46–6.36). Robust maximum likelihood (MLR) was employed as it is the most appropriate estimator under conditions of non-normality (Satorra & Bentler, 1994). There were no problems with multicollinearity (study 1 highest  $r = .57$ , study 2, highest  $r = .69$ ).

## 3. Results

The sample descriptives are presented in Table 1 and Table 2. A total of 652 participants stated recent exposure to major life events. The changes mainly concerned death in the family, illness in relatives and self, moving home, job changes, parenthood, and divorce. Table 3 shows the regression coefficients for risk factors of traumatization and somatization in both the studies. The dummy coded robbery group variables represent a distinction between the comparison group (the control group never exposed) and the three other groups. Table 3 shows the regression coefficients for the dummy groups controlled for the effect of all the other selected risk factors (i.e., age, sex, prior traumatic exposure, life events, negative cognitions, anxiety sensitivity, coping styles, and social support) and the regression coefficients for the dummy groups not controlled for the effect of the selected risk factors (in the bottom of the table). In order to investigate whether the different instructions given to fill out the CSS and the PTCL in the two samples had affected the results, we re-ran all analyses without these variables. However, it had very little impact on the results. Emotional coping became a stronger and significant risk factor for both traumatization and

**Table 1**

Descriptive statistics of risk factors and dependent variables in both total samples and the different groups in study 1.

Study 1										
	Total sample (N = 1023)		Directly exposed (n = 364)		Indirectly exposed (n = 86)		Robbery control (n = 195)		Control never exposed (n = 378)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Female	62%	n = 632	64%	n = 231	50%	n = 43	63%	n = 123	62%	n = 236
Age	42.71	12.13	41.98	12.82	43.44	11.24	46.74	10.32	41.18	12.62
Life events	.49	.76	.55	.86	.63	.74	.36	.62	.47	.72
IP trauma	.90	.86	.95	.95	.94	.76	1.00	.86	.79	.80
N-IP trauma	.29	.54	.34	.54	.26	.49	.25	.54	.28	.56
UNSPE trauma	.28	.53	.32	.58	.33	.52	.36	.57	.21	.45
PTCI–NCS	34.34	14.49	33.21	14.78	28.93	10.27	37.20	16.83	35.19	15.62
PTCI–NCW	15.90	7.60	16.23	7.87	15.47	7.90	16.00	7.49	11.94	7.34
PTCI–SB	10.79	5.36	9.93	5.40	7.94	3.86	11.45	5.04	15.62	7.34
ASI	11.92	9.25	10.82	9.40	8.55	8.99	14.28	9.75	12.52	8.53
CSQ RAT	28.47	4.71	27.96	4.68	26.90	5.54	28.48	4.66	29.30	4.42
CSQ EMO	14.38	3.47	13.99	3.38	13.85	3.91	14.86	3.59	14.62	3.37
CSQ AVO	19.11	3.93	19.20	3.98	18.71	3.93	19.06	3.81	19.14	3.94
CSS	39.51	6.31	41.68	6.02	42.45	4.80	37.71	6.38	37.67	5.94
TSC	35.38	8.68	36.88	11.07	32.97	7.10	35.60	7.27	34.36	6.57
SCL–SOM	5.55	6.48	6.22	7.42	3.44	5.35	5.48	5.84	5.42	6.57

Note: IP trauma (interpersonal trauma = rape, violence, loss, sexual abuse, threatened with a weapon, war, shock over traumatic exposure happening for someone close to you, physical abuse, and childhood neglect), N-IP trauma (non-interpersonal trauma: fire, accident, and natural disaster), UNSPE trauma (unspecified trauma = other traumas, witnessing someone being in danger or injured), PTCI (posttraumatic cognition inventory), NCS (negative cognitions about self), NCW (negative cognitions about the world), SB (self-blame), ASI (anxiety sensitivity index), CSQ (coping style questionnaire), RAT (rational), EMO (emotional), AVO (avoidant), CSS (crisis support scale), TSC (trauma symptom checklist), SCL–SOM (symptom checklist, somatization).

somatization in both the studies. Similarly, anxiety sensitivity also became a stronger risk factor of both dependent variables and in both the studies. This was expected as negative cognitions are strongly related to both emotional coping and anxiety sensitivity. Thus, the PTCI and the CSS were retained in the analyses.

Traumatization made the largest contribution to the total variance explained by the models. Of several significant factors, the largest contributing factors for traumatization were direct exposure during the robbery (study 1) and emotional coping (study 2) and the largest contributing factors for somatization were life events (study 1) and the ASI (i.e., negative cognitions about bodily sensations, study 2) for somatization. The uncontrolled regression coefficients for the dummy coded groups showed that in study 1 the acute directly exposed group and the control robbery group

scored significantly higher on traumatization than the never exposed control group and that the indirectly exposed robbery group scored significantly lower on somatization and traumatization than the never exposed control group. In study 2 (six months later), the directly exposed group and the indirectly exposed group scored significantly lower than the never exposed control group on both traumatization and somatization, whereas the robbery control group scored significantly higher than the control group on traumatization. Furthermore, only one significant group difference was apparent after controlling for the other factors and only in study 1. The acute directly exposed robbery group scored significantly higher on both traumatization and somatization than the control group never exposed to robbery whilst controlled for the effect of the other factors.

**Table 2**

Descriptive statistics of risk factors and dependent variables in both total samples and the different groups in study 2.

Study 2 (T2)										
	Total sample (N = 944)		Directly exposed (n = 297)		Indirectly exposed (n = 74)		Robbery control (n = 195)		Control never exposed (n = 378)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Female	62%	n = 586	64%	n = 191	50%	n = 43	63%	n = 123	62%	n = 236
Age	42.69	12.29	41.85	12.71	43.15	11.49	46.74	.37	41.18	12.62
Life events	.47	.73	.53	.81	.59	.68	.35	.61	.47	.72
IP trauma	.89	.86	.92	.95	.97	.78	1.00	.86	.79	.80
N-IP trauma	.30	.55	.34	.55	.28	.51	.25	.54	.28	.56
UNSPE trauma	.28	.53	.33	.58	.32	.53	.36	.57	.21	.45
PTCI–NCS	33.84	13.92	31.29	12.80	28.28	8.86	37.21	16.83	35.19	13.27
PTCI–NCW	15.85	7.75	16.34	8.41	14.67	6.77	16.00	7.49	15.62	7.34
PTCI–SB	10.62	5.32	9.35	5.11	6.77	3.05	11.45	5.04	11.94	5.40
ASI	11.15	8.91	8.39	7.97	6.96	7.35	14.28	9.75	12.52	8.53
CSQ RAT	28.21	4.83	26.99	5.03	26.80	5.10	28.48	4.66	29.30	4.42
CSQ EMO	14.20	3.54	13.41	3.53	13.43	3.70	14.85	3.59	14.62	3.37
CSQ AVO	18.88	3.96	18.44	4.11	18.81	3.78	19.06	3.81	19.14	3.94
CSS	38.42	6.22	39.42	6.42	40.16	5.55	37.71	6.38	37.67	5.94
TSC	33.81	7.08	32.45	7.40	31.73	6.29	35.61	7.27	34.35	6.57
SCL–SOM	4.97	5.63	4.36	5.27	3.82	4.39	5.48	5.84	5.41	5.94

Note: IP trauma (interpersonal trauma = rape, violence, loss, sexual abuse, threatened with a weapon, war, shock over traumatic exposure happening for someone close to you, physical abuse, and childhood neglect), N-IP trauma (non-interpersonal trauma: fire, accident, and natural disaster), UNSPE trauma (unspecified trauma = other traumas, witnessing someone being in danger or injured), PTCI (posttraumatic cognition inventory), NCS (negative cognitions about self), NCW (negative cognitions about the world), SB (self-blame), ASI (anxiety sensitivity index), CSQ (coping style questionnaire), RAT (rational), EMO (emotional), AVO (avoidant), CSS (crisis support scale), TSC (trauma symptom checklist), SCL–SOM (symptom checklist, somatization).



**Table 3**  
Regression Coefficients ( $\beta$ ) for risk factor of traumatization and somatization.

	Study 1 (T1)				Study 2 (T2)			
	Traumatization		Somatization		Traumatization		Somatization	
	$\beta$	SE	$\beta$	SE	$\beta$	SE	$\beta$	SE
Age	-.05	.03	-.03	.03	.02	.02	-.02	.03
Sex	-.24***	.05	-.24***	.05	-.20***	.04	-.20***	.05
IP trauma	-.03	.03	-.01	.03	.00	.02	.05	.03
N-IP trauma	.05*	.03	.03	.03	.02	.02	.02	.03
USPE trauma	.05	.03	.04	.03	.03	.02	.09**	.03
Life events	-.09	.07	.37***	.09	.02	.02	.05	.03
PTCI-NCS	.28***	.05	.21***	.05	.20***	.05	.16**	.05
PTCI-NCW	.11**	.03	.02	.03	.09**	.03	-.01	.04
PTCI-SB	-.08*	.03	-.06*	.03	-.03	.03	-.06	.04
ASI	.24***	.03	.35***	.04	.20***	.03	.43***	.04
CSQ RAT	.04	.03	.03	.03	.01	.02	.04	.03
CSQ EMO	.21***	.04	.04	.04	.39***	.04	.08	.05
CSQ AVO	.01	.03	.06*	.03	-.02	.03	.04	.03
CSS	-.07*	.03	-.04	.03	-.10**	.03	-.06*	.03
Directly exposed <sup>a</sup>	.40***	.06	.21**	.06	.00	.06	.08	.07
Indirectly exposed <sup>a</sup>	.16	.10	-.01	.09	.02	.08	.08	.09
Robbed control <sup>a</sup>	.02	.06	-.08	.06	.06	.06	-.11	.07
R <sup>b</sup>	.49***	.03	.47***	.02	.59***	.03	.37**	.03
Uncontrolled <sup>b</sup>								
Directly exposed	(.29**)	(.07)	(.12)	(.08)	(-.27**)	(.08)	(-.19**)	(.08)
Indirectly exposed	(-.16*)	(.10)	(-.31**)	(.10)	(-.37**)	(.11)	(-.28*)	(.10)
Robbed control	(.14*)	(.07)	(.01)	(.08)	(.18*)	(.09)	(.01)	(.03)

Note: psychological distress (traumatization; trauma symptom checklist, somatization; symptom checklist-somatization subscale), IP trauma (interpersonal trauma), N-IP trauma (non-interpersonal trauma), UNSPE trauma (unspecified trauma), PTCI (posttraumatic cognition inventory), NCS (negative cognitions about self), NCW (negative cognitions about the world), SB (self-blame), ASI (anxiety sensitivity index), CSQ (coping style questionnaire), RAT (rational), EMO (emotional), AVO (avoidant), CSS (crisis support scale).

<sup>a</sup> The dummy coded robbery group variables represent a distinction between the comparison group (the control group never exposed) and the three other groups.

<sup>b</sup> Regression coefficients not controlled for the selected risk factors.

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$ .

#### 4. Discussion

The current study has sought to clarify the psychological impact of bank robbery by investigating whether robbery exposure at different degrees and time-points constitutes a significant risk factor of general traumatization and somatization; while controlling for the effect of all the selected risk factors (i.e., age, sex, prior traumatic exposure, life events, negative cognitions, anxiety sensitivity, coping styles, and social support).

As expected, the uncontrolled regression coefficients for the dummy coded groups showed that the acute directly exposed group (study 1) and the control robbery group (study 1 and study 2) scored significantly higher on traumatization than the never exposed control group. Surprisingly, the directly exposed robbery group scored significantly lower on traumatization and somatization than the never exposed control group in study 2. Furthermore, contrary to expected, the indirectly exposed robbery group scored significantly lower on somatization and traumatization than the never exposed control group in both the studies. Thus, the results from the uncontrolled regression coefficients indicate that robbery exposure is particularly associated with traumatization in the acute phase of the robbery and in victims present during the robbery, whereas at six months there seem to be a protective effect of exposure to robbery, but as further time passes robbery exposure may become a significant risk factor of traumatization again as indicated by the robbery control group. This protective effect may be due to a positive effect of the higher level of social support found in the robbery groups compared to the control groups, which may not have reached an effect in the acute phase. Of note, the two studies were conducted cross-sectionally, so we do not infer a longitudinal relationship between the variables.

As expected, the acute directly exposed robbery group had a significantly higher degree of traumatization and somatization compared to the control group never exposed and was a significant risk factor of traumatization and somatization whilst controlling for the other factors (study 1). Indeed, directly robbery exposure was the strongest risk factor of traumatization in study 1 (T1). However, contrary to our expectations and despite the uncontrolled regression coefficients showing several significant group differences in relation to traumatization and somatization in both the studies, there were no other significant group differences in study 1 and none in study 2 whilst controlling for the other factors.

Besides from direct exposure to robbery in the acute phase after the robbery (study 1), other factors than robbery exposure appear to be stronger risk factors of traumatization and somatization in bank employees. In particular, female sex, negative cognitions about self, and bodily sensations and emotional coping appear important given these factors were shown to be significant and among the strongest risk factors at both time-points and for both traumatization and somatization. The importance of cognitions is in accordance with the cognitive model of trauma response (Ehlers & Clark, 2000) and the newly introduced PTSD diagnosis in the DSM-5, where cognitions constitute a fourth symptom cluster (APA, 2013).

Furthermore, the significant group differences found in the uncontrolled regression analyses may also have disappeared when controlled for the effect of the other risk factors as the differences between the groups were small as indicated by the mean values. These small differences may be due to either a reduced level of distress following robbery exposure or an increased level of distress in the never exposed robbery group. Robbery exposure only being a significant risk factor in study 1 (whilst controlling for

the effect of the other factors) may be due to the fact that Danish bank employees are trained at handling robberies, receive more crisis aid, and social support which in turn may reduce the level of distress they experience following bank robbery. The control group never exposed to robbery is not trained at handling their stated stressful events, and they may not receive needed social support as indicated by their higher scores on negative cognitions and lower scores on social support compared to the robbery group. However, the high subclinical prevalence rates indicate that exposure to bank robbery is a traumatizing event. Thus, the lack of a difference between the groups is more likely to be attributed to an increased level of distress in the never exposed control group rather than reduced distress following bank robbery. Danish bank employees are at daily risk of exposure to and thus fear of robbery and they may also experience regular verbal abuse from angry customers as a consequence of the financial crisis. Furthermore, the experience of the stated stressful events may simply be as distressing as robbery exposure. Together this may explain why there are similar levels of traumatization and somatization in the groups – bank employees are simply at high risk of distress.

## 5. Limitations

The current study is subjected to several limitations. First, the results are based on two cross-sectional studies and interpretations about causality should therefore be done cautiously. Additionally, we were not able to control the effect of time in the robbery analyses except indirectly through the different groups. Second, the study was based on self-report measures resulting in potential response bias. Third, unfortunately it was only possible to randomize the control group sample at bank branch and not at participant level. Although, the response rate is likely high given each bank branch has an average of six employees and 573 participated from the 100 selected branches – selection bias cannot be ruled out. At the same time, the presence of the participants during the robbery in the control robbery group and the extent of received debriefing are unknown. However, the percentage of debriefed participants is likely to be very high as the Danish bank sector has a long tradition for offering every robbery exposed employee crisis aid. Fourth, unfortunately we were not able to assess whether any of the participants received any other treatment and so could not statistically control for such in our analysis. Nor did we assess the PTSD prevalence rate in the control group.

## 6. Conclusion

Despite its limitations the current study is the largest bank robbery study which has investigated the psychological impact of such at different time-points and degrees of exposure with the inclusion of a control group never exposed to robbery. Results show that exposure to bank robbery is especially associated with traumatization and somatization in the acute phase of the robbery and in victims present during the robbery. However, after the acute phase, negative cognitions about self and bodily sensations, in particular, seem more important in predicting the development of psychological distress. Overall, bank employees appear to be at a high risk of psychological distress.

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