

# Predictors of acute stress disorder in response to bank robbery

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**Background:** Research has shown that robberies in the workplace, in particular those in the bank sector are traumatising events for many employees. However, research in the acute sequelae of bank robberies is limited.

**Objective and design:** The present study explores the prevalence and predictors of acute stress disorder (ASD) in a questionnaire survey of bank employees following a bank robbery.

**Results:** Results show that 14.5% ( $n=22$ ) of participants ( $N=152$ ) suffered from probable ASD, which is similar to the ASD prevalence found in other interpersonal assault studies. In addition, a number of associations were found between ASD severity, gender, age, social support, previous trauma, and trauma severity. In the final hierarchical multiple regression model, which included 12 variables, 66% of the variance in ASD symptom level was accounted for by two peri-trauma variables (perceived helplessness and perceived life threat) and one post-trauma variable (perceived safety after the robbery).

**Conclusions:** The present study yielded some promising results with regards to the influential role of peri-traumatic and post-traumatic variables in predicting ASD after a bank robbery—in particular perceived safety. Although there may be different paths to developing ASD and PTSD, a common core feature may be perceived safety. Furthermore, the results also supported the inclusion of perceived helplessness in the A2 criterion of the *DSM-IV* ASD diagnosis.

Keywords: *Robbery; ASD; perceived safety; trauma; predictor*

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A robbery is defined as the threat of, or the use of violence, in order to gain another person's belongings or cash during a bank robbery (Gabor & Normandeau, 1989). A bank robbery often takes place at "gunpoint." When held at gunpoint, most people report feelings of life threat, helplessness, and intense horror. Thus, criterion A for Acute Stress Disorder (ASD) as specified by the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)* is likely to be met during a bank robbery (American Psychiatric Association, 1994). Unfortunately, the number of bank robberies is increasing in Denmark and most of the western world (The Danish Bankers Association, 2010; Gilioli, Campanini, Fichera, Punzi, & Gassitto, 2006). However, research in the psychological sequelae of bank robberies—particularly the acute post-traumatic symptomatology—is limited. Indeed, during the last decade, only a few studies have investigated the acute

psychological sequelae of robberies (Elklit, 2002; Ladwig et al., 2002; Richards, 2000). This is despite a plethora of research in the acute psychological sequelae of other assault types (Brewin, Andrews, Rose, & Kirk, 1999; Elklit & Brink, 2004; Grieger, Fullerton, Ursano, & Reeves, 2003; Kleim, Ehlers, & Clucksman, 2007). According to two meta-analyses (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003) several variables have been shown to predict post-traumatic symptomatology following trauma. However, the value of some of these predictors has been found to vary across trauma types. Thus, the variables involved in the development of post-traumatic symptomatology after a bank robbery may differ from those related to the development of post-traumatic symptomatology following other trauma types. The Brewin et al. (2000) and the Ozer et al. (2003) meta-analyses were mainly concerned with post-traumatic stress disorder (PTSD). However, due to

the close relationship between ASD and PTSD, promising predictors of PTSD may also be predictive of ASD (Bryant & Harvey, 2002).

Since the initial inclusion of ASD in the *DSM-IV*, several studies of interpersonal assault have shown ASD to have high predictive utility in relation to PTSD (50–68%) (Brewin et al., 1999; Elklit & Brink, 2004; Kleim et al., 2007). However, studies also show that approximately half of those who developed PTSD, did not previously meet the criteria for ASD in the initial month after the assault (Brewin et al., 1999; Elklit & Brink, 2004; Kleim et al., 2007). Despite this, ASD is the only diagnostic recognition, in *DSM-IV*, of early post-traumatic stress, and thus research in this area is important. Knowledge about the predictors of ASD may enable early identification of individuals at risk of developing more prolonged post-traumatic symptomatology and thus facilitate early treatment, thereby reducing the large costs associated with post-traumatic symptomatology (Litz & Maguen, 2007).

The aim of the present study was to explore the prevalence of ASD after a bank robbery and to assess a combination of variables not previously investigated in bank robbery victims. These predictors were mainly selected based on research examining risk factors of post-traumatic symptomatology after robbery and other forms of assault.

## ASD predictors

### *Pre-trauma variables*

Recent research in relation to the psychological sequelae of robberies in the workplace has highlighted some discrepancies in findings that propose that prior traumatic exposure, younger age, and female gender are risk factors for post-traumatic symptomatology (Elklit, 2002; Ladwig et al., 2002; Miller-Burke, Attridge, & Fass, 1999). For example, in contrast to Elklit (2002) and previous studies of robberies (Elklit, 1999; Kamphuis & Emmelkamp, 1998), Miller-Burke et al. (1999) found no significant associations between these pre-trauma variables and post-traumatic symptoms. However, Miller-Burke et al. (1999) only examined the effect of prior robberies experienced within the same year as that of the index robbery on PTSD symptoms measured between 1 and 12 months after bank robberies ( $N=141$ ). Elklit (2002) focused on a more wide range of potential traumatic exposure in relation to ASD assessed 5–23 days after shop robberies ( $N=65$ ). Ladwig et al. (2002) only investigated age and, like Miller-Burke et al. (1999), they did not find significant associations between age and the development of the *ICD-10* diagnosis of PTSD (F.43.1, WHO, 1994).

The Brewin et al. (2000) meta-analysis assessed these pre-trauma variables concluding that the effect sizes were

small. In accordance with this, Ozer et al. (2003), who also conducted a meta-analysis, concluded that studying the effect of pre-trauma variables did not improve the understanding of the development of PTSD. However, neither of these meta-analyses included robberies nor focused on acute post-traumatic symptomatology. Moreover, Ozer et al. (2003) highlighted that it is problematic that both meta-analyses included studies with heterogeneous constructs assessing prior traumatic exposure. In addition, all trauma types are not necessarily equal in their effect and there may be a difference between single and multiple exposures. This heterogeneity may be responsible for discrepancies in the results regarding prior traumas as risk factors for post-traumatic symptomatology. Furthermore, according to Yap and Devilly's (2004) review of social support in crime victimisation research, prior traumatic exposure can either strengthen or weaken the social network, and thus have an indirect effect on post-traumatic symptoms through social support.

The present study, therefore, examined the effect of both prior bank robberies and other traumatic exposures. In addition, the current study investigated other recently experienced major life changes that have been found to be associated with increased risk of post-traumatic symptomatology after a bank robbery (Elklit, 2002; Kamphuis & Emmelkamp, 1998).

### *Peri-trauma variables*

Different aspects of trauma severity have been associated with post-traumatic symptoms after robberies (Elklit, 2002; Ladwig et al., 2002; Miller-Burke et al., 1999) and other forms of interpersonal assault (Brewin et al., 2000; Ozer et al., 2003). In particular, perceived life threat has been found to be a strong predictor of post-traumatic symptomatology in a meta-analysis and in robbery studies (Elklit, 2002; Ladwig et al., 2002; Ozer et al., 2003). Indeed, Elklit (2002) and Ladwig et al. (2002) found perceived life threat to be positively associated with symptoms of ASD and the *ICD-10* F.43.2 adjustment disorder (WHO, 1994), respectively. Likewise, perceived life threat was found to be a significant predictor of ASD and PTSD after other forms of assault (Grieger et al., 2003; Kleim et al., 2007). Perceived helplessness and proximity to the robber have also both been found to be associated with post-traumatic symptoms following robbery (Elklit, 2002; Miller-Burke et al., 1999). The relationship between perceived helplessness and ASD is a particularly pertinent research topic given the proposed changes to the ASD criteria for the impending *DSM-5*. The current proposal recommends that the A2 criterion be removed from the ASD diagnostic criterion set, because of its lack of utility. However, this proposal is mainly based on research in relation to PTSD and not ASD (Bryant, Friedman, Spiegel, Ursano, & Strain, 2011).

### Post-trauma variables

Several studies have investigated the relationship between social support and the development of post-traumatic symptoms after various trauma types. In general, social support has been found to be protective of both psychological and physical health (Brewin et al., 2000; Ozer et al., 2003; Yap & Devilly, 2004). However, due to heterogeneity in social support measures there are difficulties in comparing results (Brewin et al., 2000; Ozer et al., 2003; Yap & Devilly, 2004). Indeed, the Brewin et al. (2000) meta-analysis found lack of social support to be associated with increased post-traumatic symptomatology without specifying the measurements of social support. Likewise, the Ozer et al. (2003) meta-analysis and the Yap and Devilly (2004) review found perceived social support to be protective of psychological and physical health in studies using different measurements of perceived social support.

Robbery studies investigating social support have also found different aspects of social support to be significantly related to post-traumatic symptoms (Elklit, 1999, 2002; Kamphuis & Emmelkamp, 1998; Miller-Burke et al., 1999; Richards, 2000). However, whereas Elklit (2002) found lack of perceived social support to be negatively associated with ASD, Richards (2000) found that social support was not significantly related to PTSD symptoms until 6 months after the robbery. Likewise, the Ozer et al. (2003) meta-analysis found that the strength of the association between perceived social support and PTSD increased over time.

The disparity in the research may be due to the great heterogeneity in the constructs used to measure social support. Several studies have shown that the quality of social support is decisive of whether social support protects against the development of post-traumatic symptomatology (Andrews, Brewin, & Rose, 2003; Elklit, 2002; Miller-Burke et al., 1999; Richards, 2000). Ambiguous support, critique, and feelings of guilt can mean that social support may constitute a burden for the victims and thus have a negative effect on their healing process (Yap & Devilly, 2004). The present study, therefore, examined both feeling let down, perceived positive social support, and social support satisfaction.

In addition to social support, perceived safety may serve as a protective factor against post-traumatic symptomatology. Ehlers and Clark's (2000) cognitive model of PTSD assumes that processing the traumatic event in a way that produces a sense of current threat, through appraisal of the trauma and/or its sequelae in combination with a disturbance in the autobiographical memory is at the core of PTSD. In accordance with Ehlers and Clark's model, perceived safety after the traumatic event has been found to be negatively associated with PTSD in robbery victims and witnesses to a high school stabbing (Elklit, 1999; Elklit & Kurdahl,

2007). To the best of our knowledge, studies have not examined the role of perceived safety in ASD after interpersonal assault, however, perceived safety has been found to be predictive of ASD in employees during sniper attacks (Grieger et al., 2003).

### The present study

The present study is the first to examine ASD and a number of associated variables in a convenience sample of bank employees following bank robberies. Due to the extant literature we hypothesised that ASD severity would be significantly and positively associated with younger age, female gender, prior traumatic exposures, prior robberies, major life changes, perceived life threat, perceived helplessness, proximity of the robber, and feeling let down by others. Furthermore, we expected perceived safety, perceived positive social support and social support satisfaction to be significantly and negatively associated with ASD severity. In addition, due to the existing research and theoretical background we expected perceived life threat during the robbery and perceived safety following the robbery to be strong predictors of ASD severity.

## Method

### Participants and procedure

The questionnaire was handed out to 199 bank employees, of 28 banks, exposed to bank robberies between September 2008 and March 2010. A total of 152 bank employees filled out the questionnaire (response rate: 76.4%). Participants were recruited through a network of crisis intervention specialists contracted with bank organisations in Denmark. The victims were orally informed of the purpose of the questionnaire and instructed to fill out the questionnaire between 48 hours to 1 week after the robbery. To assure that symptoms were assessed in relation to the most recent robbery rather than any prior robberies, the participants were informed orally and in writing to fill out the questionnaire in relation to the index robbery. Participation was voluntary and completely anonymous. About half of the participants (52.6%,  $n=80$ ) received psychological debriefing the same day or the day after the robbery. The debriefing was voluntary and conducted by different experienced psychologists in a non-manualised manner. The debriefing was offered by the banks and was not a part of the present study.

### Measures

The questionnaire, which was specifically designed for the present study, included questions related to demographic factors and contact with psychologists. Proximity to the robber was assessed by asking the participants if they had been present during the robbery with answers stated dichotomously (*yes* or *no*). Likewise, perceived helplessness

ness, fear of dying, and perceived life threat during the robbery were assessed dichotomously (*yes* or *no*) by asking the participants if they had experienced these during the robbery. Perceived safety was assessed on a 7-point Likert scale (1 = *no, not at all* to 7 = *yes, very much*) by asking the participants whether they feared for their own safety right after the robbery. The scores on perceived safety are reversed in the analyses to simplify the results.

Prior traumatic exposure was assessed by asking the participants whether they had experienced 14 different kinds of traumas applied in the US National Comorbidity Survey (Kessler et al., 1995) with a separate scoring of prior robberies and robbery attempts. Robbery attempts were included because they are found to have the same psychological consequences as completed robberies (Elklit, 1999). Major life changes were assessed in open-ended questions where the participants stated any major life changes they had experienced during the past 12 months. The number of experienced changes was summated.

ASD severity was assessed using the Acute Stress Disorder Scale (ASDS; Bryant, Moulds, & Guthrie, 2000). The ASDS was developed to identify ASD and predict PTSD based on 19 items assessing the four ASD symptom clusters (dissociation, re-experiencing, arousal, and avoidance) in *DSM-IV*. The answers are scored on a 5-point Likert-type (1 = *not at all*, to 5 = *very much*) with item scores  $\geq 3$  indicating symptom presence. The Cronbach's alpha values in the present study range from .82–.92 on the subscales and .96 on the total score, which falls well within the acceptable range (Coolican, 2004).

ASD was assessed the following way. As our study was based on bank employees who experienced, witnessed, or was confronted with a bank robbery, we assumed that the objective stressor criterion A1 in *DSM-IV* was met, whether the employees were at work during the robbery or not, because a bank robbery involves actual or threatened death or serious injury, or a threat to the physical integrity of self or others. Some of the participants not present during the robbery may not have experienced a threat to their own lives or physical integrity. However, they were confronted with it in relation to their colleagues. The A2 stressor criterion was met if the employees reported fear of dying or helplessness during the robbery. The estimated ASD diagnosis was met if an individual endorsed at least one re-experiencing, one avoidance, and one arousal item with scores  $\geq 3$  in addition to three dissociative items with a score  $\geq 3$ .

Perceived social support after the robbery was assessed using the Crisis Support Scale (CSS; Joseph, Andrews, Williams, & Yule, 1992), which is comprised of seven items. In accordance to previous studies (Andrews et al., 2003) the summated score of the first five items is used as a measure of positive support, item six is used as a single measure of negative support (feeling let down), while item

seven is used as a single measure of overall satisfaction with received social support. The answers are rated on a 7-point Likert-type scale (1 = *never*, to 7 = *always*). The CSS has been shown to have good reliability and validity (Elklit, Pedersen, & Jind, 2001). The Cronbach's alpha value in the present study was .68 on the perceived positive social support subscale and the mean inter-item correlation coefficient was .36, which falls within the acceptable range (Briggs & Cheek, 1986; Coolican, 2004).

## Results

Prior to data analysis the data was screened for errors. The percentage of missing values was small (2.1–4.2%). Thus, the Expectation Maximisation algorithm, which has been demonstrated to be an effective method of dealing with missing data (Bunting, Adamson, & Mulhall, 2002) was used to impute missing data.

### Descriptive

#### Pre-trauma variables

Table 1 shows the number and percentage of females in the sample, the mean, the SD, and the range for age, prior traumatic exposure, major life changes, and prior robberies.

Thirty-nine participants (25.7%) had not been exposed to any prior traumas, whereas 63 participants (41.4%) had been exposed to one prior trauma. The remaining participants had been exposed to between two and six previous traumas ( $n=50$ ). The most common type of prior traumatic exposure was the loss of close relatives ( $n=77$ ) followed by being threatened with a weapon ( $n=41$ ), accidents ( $n=23$ ), witnessing a trauma ( $n=12$ ), shock over someone close being in life threatening situation ( $n=15$ ), fire ( $n=11$ ), assault/violence ( $n=8$ ), disaster ( $n=2$ ), war ( $n=1$ ), rape ( $n=1$ ), and physical abuse ( $n=1$ ). With regards to experiencing major life changes during the past year, 80 participants (52.6%) did not report any, whereas 47 participants (30.9%) had experienced one to two, and the remaining 25 participants (16.5%) two to four major life changes. The changes mainly concerned moving home, job changes, illness, and death in the family.

The relatively high percentage of participants who reported having been threatened with a weapon was reflected in the frequency of prior robberies shown in Table 1. Fifty-nine participants (38.8%) reported that they had not experienced any robberies prior to the present one. Twenty-nine participants (19.1%) had experienced one prior robbery, and the rest of the employees had experienced two ( $n=19$ ), three ( $n=14$ ), four ( $n=11$ ), five ( $n=10$ ), or 6 to 12 prior robberies ( $n=10$ ).



**Table 1.** Sample characteristics of pre-, peri-, and post-trauma variables and significance tests of differences between the ASD and the non-ASD group

	Total sample (N = 152)	Non-ASD (n = 130)	ASD (n = 22)	Independent-samples <i>t</i> -test/ $\chi^2$	<i>p</i>
<i>Pre-trauma variables</i>					
Age	<i>M</i> = 43.83 <i>SD</i> = 11.32 <i>R</i> = 22–64	<i>M</i> = 44.08 ( <i>SD</i> = 11.20)	<i>M</i> = 42.46 ( <i>SD</i> = 12.19)	<i>t</i> (148) = .66	.514
Female	66.4% ( <i>n</i> = 101)	62.3% ( <i>n</i> = 81)	90.9% ( <i>n</i> = 20)	$\chi^2$ (1,152) = 5.68	.017
Prior robberies	<i>M</i> = 1.86 <i>SD</i> = 2.32 <i>R</i> = 0–12	<i>M</i> = 1.82 ( <i>SD</i> = 2.32)	<i>M</i> = 2.09 ( <i>SD</i> = 2.35)	<i>t</i> (150) = .50	.618
Life changes	<i>M</i> = .70 <i>SD</i> = .89 <i>R</i> = 0–4	<i>M</i> = .62 ( <i>SD</i> = .87)	<i>M</i> = 1.14 ( <i>SD</i> = 0.94)	<i>t</i> (150) = 2.54	.012
Prior traumatic exposure	<i>M</i> = 1.31 <i>SD</i> = 1.21 <i>R</i> = 0–6	<i>M</i> = 1.24 ( <i>SD</i> = 1.23)	<i>M</i> = 1.73 ( <i>SD</i> = 1.03)	<i>t</i> (150) = 1.77	.079
<i>Peri-trauma variables</i>					
Present during robbery (proximity to the robber)	68.4% ( <i>n</i> = 104)	66.2% ( <i>n</i> = 86)	81.8% ( <i>n</i> = 18)	$\chi^2$ (1,152) = 1.47	.225
Perceived helplessness (yes)	37.5% ( <i>n</i> = 57)	27.7% ( <i>n</i> = 36)	95.5% ( <i>n</i> = 21)	$\chi^2$ (1,152) = 34.03	.000
Perceived life threat (yes)	16.4% ( <i>n</i> = 25)	14.6% ( <i>n</i> = 19)	27.3% ( <i>n</i> = 6)	$\chi^2$ (1,152) = 1.37	.208
<i>Post-trauma variables</i>					
CSS POS	<i>M</i> = 31.03 <i>SD</i> = 4.60 <i>R</i> = 10–35	<i>M</i> = 31.43 ( <i>SD</i> = 4.53)	<i>M</i> = 28.68 ( <i>SD</i> = 4.40)	<i>t</i> (150) = 2.64	.009
CSS NEG	<i>M</i> = 1.69 <i>SD</i> = 1.45 <i>R</i> = 1–7	<i>M</i> = 1.54 ( <i>SD</i> = 1.28)	<i>M</i> = 2.59 ( <i>SD</i> = 1.99)	<i>t</i> (24) = 2.40	.025
CSS SATISFAC	<i>M</i> = 6.51 <i>SD</i> = .94 <i>R</i> = 1–7	<i>M</i> = 6.62 ( <i>SD</i> = .91)	<i>M</i> = 5.91 ( <i>SD</i> = 0.92)	<i>t</i> (150) = 3.36	.001
Perceived safety	<i>M</i> = 5.52 <i>SD</i> = 1.85 <i>R</i> = 1–7	<i>M</i> = 5.95 ( <i>SD</i> = 1.50)	<i>M</i> = 3.00 ( <i>SD</i> = 1.69)	<i>t</i> (150) = 8.36	.000

Abbreviations: *M*, mean; *SD*, standard deviation; *R*, range; CSS, Crisis Support Scale; CSS POS, positive social support; CSS NEG, feelings of being let down; CSS SATISFAC, social support satisfaction; ASD, acute stress disorder.

### Peri-trauma variables

Table 1 shows the number and percentage of participants, who were present during the robbery, and who experienced helplessness and a threat to their lives. During the robbery 133 participants (87.5%) were at work and 104 participants (68.4%) were present during the robbery, whereas the rest were in adjoining rooms or outside the banks at meetings. Only six participants (3.9%) feared that they were going to die during the robbery and, therefore, fear of dying was excluded from further analyses.

### Post-trauma variables

Table 1 shows the mean scores, *SD*, and range on the CSS positive social support, “feeling let down,” “social support satisfaction,” and perceived safety. The CSS scores indicated a high degree of perceived positive social support and support satisfaction and a low degree of feeling let down. The mean reversed score on the perceived safety right after the robbery indicated that the participants had high perceived safety.

### ASD symptom level and prevalence

Table 2 shows the sample characteristics of the ASDS scores, ASD symptom clusters, and estimated ASD. Table 2 shows that an estimated 14.5% of the participants (*n* = 22) met the diagnostic criteria for ASD according to *DSM-IV* measured by the ASDS and the presence of the A2 stressor criterion.

Table 1 shows tests of significant differences between the ASD group and the non-ASD group. A one-way between-groups analysis of variance was conducted to explore the difference between the participants’ presence during the robbery and scores on the ASDS. Participants were divided into three subgroups according to their presence (Group 1: not at work [*n* = 19]; Group 2: at work but not present [*n* = 29]; Group 3: in the room, where the robbery took place [*n* = 104]). There was no significant statistical difference between the three groups, *F*(2,149) 2.18, *p* = .116. Likewise, there were no significant differences between the three groups and estimated ASD prevalence (Group 1—ASD prevalence = 5.3% [*n* = 1];

**Table 2.** ASDS scores, ASD symptom clusters, and estimated ASD

	Range	Mean	SD
<i>The ASDS scores</i>			
ASDS total	19–86	36.01	15.65
ASDS dissociation	5–23	9.26	4.48
ASDS re-experiencing	4–20	7.78	3.70
ASDS avoidance	4–20	6.24	3.10
ASDS arousal	6–30	12.76	6.03
	Percentage	N	
<i>ASD symptom clusters</i>			
A2 criterion	38.8	59	
Three dissociative symptoms	23.7	36	
One avoidance symptom	32.2	49	
One arousal symptom	59.2	90	
One re-experiencing symptom	46.1	70	
ASD diagnosis excl. A2	17.8	27	
ASD diagnosis incl. A2	14.5	22	

Abbreviations: ASDS, Acute Stress Disorder Scale; ASD, Acute stress disorder; A2 criterion, experienced helplessness and/or fear of dying during the robbery; ASD diagnosis, three dissociative, one avoidance, one arousal, and one re-experiencing symptoms.

Group 2—ASD prevalence = 10.3% [ $n = 3$ ]; Group 3—ASD prevalence = 17.3% [ $n = 18$ ],  $\chi^2(2,152) = 2.38$ ,  $p = .402$ . The participants were, therefore, treated as one homogeneous group.

There were no significant differences between the debriefed and non-debriefed participants in relation to ASD status,  $\chi^2(1,152) = 3.28$ ,  $p = .07$ . However, the debriefed participants had significantly higher scores on the ASDS ( $M = 40.38$ ,  $SD = 13.48$ ) compared to the non-debriefed participants ( $M = 31.17$ ,  $SD = 13.48$ ),  $t(149) = 3.82$ ,  $p < .001$ . This difference is likely to be an indication of a tendency in very affected participants to take part in the voluntary debriefing, rather than an indication of a harmful effect of debriefing. Distinguishing between the debriefed and non-debriefed participants in any further analysis would, therefore, make little sense and may even bias the results.

### Predictors of ASD

Preliminary analyses were performed prior to testing the model for predicting ASD. The mutual relationships of the independent variables were investigated in correlation analyses and in relation to the ASDS total score. Subsequently, a hierarchical multiple regression analysis was conducted to assess the predictive value of the independent variables on the ASDS total score.

### Correlation analyses

Table 3 shows correlation analyses between the pre-trauma, peri-trauma, post-trauma variables, and the ASDS total score. The strength of the associations is assessed according to Cohen's guidelines (Cohen, 1988).

Female gender, prior traumatic exposures, and major life changes were associated with increased ASDS total scores. However, the associations were small ( $r = .23-.25$ ,  $p \leq .01-.05$ ). Age and prior robberies were not significantly associated with the ASDS total score. The three peri-trauma variables and ASD severity were significantly and positively associated. However, these associations were small to medium ( $r = .16-.49$ ,  $p \leq .01-.05$ ). Likewise, we found significant associations between all the post-trauma variables and ASD symptoms. The associations, however, were mainly small (CSS positive social support and satisfaction,  $r = -.24$  to  $.28$ ,  $p \leq .01$ , feelings of being let down,  $r = .28$ ,  $p \leq .01$ ), with the exception of perceived safety ( $r = -.78$ ,  $p \leq .01$ ).

### Regression analysis

The distribution of ASDS scores was a close approximation to a normal distribution and thus did not give cause for concern in conducting the regression analysis. Furthermore, there were no problems with multicollinearity (all tolerance values  $> .10$ ; all VIF values  $< 10$ ).

Table 4 shows the hierarchical regression model of the 12 predictors of ASD severity with the ASDS total score as the dependent variable.

The demographic variables, gender and age, were entered into the model at the first step, with only gender being significant and explaining 6% of the variance in ASD severity. At step two, the pre-trauma variables (prior traumatic exposures, prior robberies, and life changes) were entered into the model. The only significant variables were now age, gender, and prior traumatic exposures accounting for 14% of the variance in ASD severity. At step three, the variables directly related to the robbery were entered (proximity to the robber, helplessness, and perceived life threat). The model now accounted for 36% of the variance in ASD severity with only perceived helplessness, and perceived life threat being significant. At the final step of the model, the three subscales of the CSS and perceived safety were entered. The final model accounted for 66% of the variance in ASD severity with only perceived helplessness, perceived life threat, and perceived safety remaining significant.

## Discussion

### ASD prevalence

The estimated ASD prevalence of 14.5% found in the present study is lower than the ASD prevalence of

**Table 3.** Correlations between pre-, peri-, post-trauma variables and the acute stress disorder scale total, Pearson's *r*

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Female	–											
2. Age	.26**	–										
3. Prior robbery	.20*	.47**	–									
4. Prior trauma exposure	–.08	.12	.13	–								
5. Life change	.26**	–.15	.15	.15	–							
6. Proximity to the robber	.09	.07	–.07	.07	–.12	–						
7. Helplessness	.18*	–.11	.08	.16*	.19*	.21*	–					
8. Perceived life threat	–.06	–.05	–.08	.08	–.13	.30**	.06	–				
9. CSS POS	–.05	.06	.04	–.17*	–.15	–.06	–.12	–.01	–			
10. CSS NEG	.13	–.04	–.01	.26**	.18*	.08	.07	–.02	–.32**	–		
11. CSS SATISFAC	–.13	.10	–.13	–.16	–.17*	–.10	–.13	–.11	.60**	–.52**	–	
12. Perceived safety	–.24**	.06	–.09	–.14	–.21**	–.05	–.37**	–.22**	.24**	–.34**	.34**	–
13. ASDS total	.23**	–.07	.12	.23**	.25**	.16*	.49**	.29**	–.24**	.28**	–.28**	–.78**

Abbreviations: ASDS, Acute Stress Disorder Scale; CSS, Crisis Support Scale; CSS POS, positive social support; CSS NEG, feelings of being let down; CSS SATISFAC, social support satisfaction; *N* = 152; age (*n* = 150). Note: \**p* = <.05, \*\**p* = <.01, two-tailed.

17–24% found in studies of other forms of assault (Brewin et al., 1999; Elklit & Brink, 2004; Kleim et al., 2007). Experiencing a bank robbery may be less traumatising than other types of assault because the violence is instrumental in achieving money and not personally directed towards the employees. Elklit's (2002) study of robbery victims reported a higher ASD prevalence of 25% than the present study. However, Elklit's (2002) study included 65 employees at different types of shops, whereas the present study includes more than twice this amount and includes bank robbery victims. Elklit (2002) also applied a combination of the Harvard Trauma Questionnaire and the Trauma Symptom Checklist to measure ASD, whereas we applied a more reliable measure of ASD; the ASDS (Bryant et al., 2000).

The low prevalence of probable ASD in the present study may also be due to the use of *DSM-IV* criteria in diagnosing ASD from the ASDS rather than Bryant's et al. (2000) cut-off scores. According to Bryant et al. (2000) the optimal cut-off scores for diagnosing ASD from the ASDS is scores  $\geq 9$  on the dissociation subscale total and  $\geq 28$  on the total scores for re-experiencing, avoidance, and arousal. Applying the cut-off scores results in a higher prevalence of ASD than the diagnostic criteria, because it allows for a possible ASD diagnosis without the presence of all symptom clusters. In the present study the prevalence of ASD with the use of Bryant's et al. (2000) cut-off scores is 28.9% (*n* = 44) compared to the lower ASD prevalence of 14.5% (*n* = 22) using the diagnostic criteria. The large difference indicates a need of further research validating the cut-off scores recommended by Bryant et al. (2000) across different trauma populations. Especially if treatment offers are based on the ASD diagnosis.

### Predictors of ASD

#### Pre-trauma variables

As expected from previous robbery studies, the pre-trauma variables were significantly associated with ASD severity to varying degrees. However, none of the pre-trauma variables could significantly account for any variance in ASD severity when post-traumatic variables were controlled for. These results are in accordance with Brewin's et al. (2000) and Ozer's et al. (2003) meta-analyses, which found the predictive value of pre-trauma variables small.

Even though the results indicate only small gender differences in ASD severity, the relationship between gender and ASD may be more complex than this suggests. According to Christiansen and Elklit's (2008) study of assault and accident victims there may be different pathways to developing post-traumatic symptoms in men and women. Moreover, significant gender differences in perceived safety may account for the lack of a larger gender difference in ASD severity in the present study.

Contrary to our expectations, only prior trauma exposure and major life changes were significantly and positively associated with ASD severity, whereas age and prior robberies were not (Elklit, 1999; Kamphuis & Emmelkamp, 1998). Prior traumatic exposure predicted ASD severity, but only until the post-trauma variables were controlled for. The most common trauma type, except from prior bank robberies was, however, loss of close relatives, which could have affected the results. In most cases, bank robberies and the loss of a close relative may not be as traumatising an event as physical or sexual assault (Frans, Rimmö, Åberg, & Frederikson, 2005). Prior traumatic exposure, particularly previous robberies

**Table 4.** Hierarchical multiple regression analysis predicting acute stress disorder symptoms in bank robbery victims

Variable	B	SE	$\beta$	<i>t</i>	<i>p</i>
(Constant) Step 1 <sup>a</sup>	38.62	5.00		7.73	.000
Age	-.19	.11	-.14	-1.71	.090
Gender	8.84	2.71	.27	3.26	.001
(Constant) Step 2 <sup>b</sup>	36.04	5.37		6.71	.000
Age	-2.29	.13	-.21	-2.22	.028
Gender	8.42	2.78	.26	3.03	.003
Prior robberies	.79	.60	.12	1.33	.186
Life changes	1.79	1.49	.10	1.20	.233
Prior traumatic exposure	3.16	1.02	.24	3.08	.002
(Constant) Step 3 <sup>c</sup>	26.55	4.91		5.40	.000
Age	-.13	.11	-.10	-1.16	.249
Gender	5.53	2.47	.17	2.24	.027
Prior robberies	.59	.53	.09	1.12	.264
Life changes	2.21	1.32	.13	1.68	.096
Prior traumatic exposure	1.80	.91	.14	1.99	.049
Proximity to robber	.02	2.42	.00	.01	.995
Perceived helplessness	12.35	2.31	.38	5.35	.000
Perceived life threat	11.83	2.94	.28	4.02	.000
(Constant) Step 4 <sup>d</sup>	58.00	8.29		7.00	.000
Age	-.09	.09	-.07	-1.08	.284
Gender	1.54	1.83	.05	.84	.403
Prior robberies	.55	.40	.08	1.38	.170
Life changes	1.04	.96	.06	1.08	.282
Prior traumatic exposure	1.02	.68	.08	1.50	.137
Proximity to robber	1.99	1.77	.06	1.12	.263
Perceived helplessness	6.27	1.77	.19	3.54	.001
Perceived life threat	5.68	2.25	.14	2.53	.013
CSS POS	-.24	.21	-.07	-1.13	.262
CSS NEG	.39	.65	.04	.59	.555
CSS SATISFAC	1.40	1.17	.08	1.20	.233
Perceived safety	-5.29	.50	-.62	-10.61	.000

Abbreviations: 1 = women; 0 = male; *N* = 152, age (*n* = 150); CSS, Crisis Support Scale; CSS POS, positive social support; CSS NEG, feelings of being let down; CSS SATISFAC, social support satisfaction.

Note: <sup>a</sup>Step 1:  $F(2,147) = 5.72$ ,  $p = .004$ , adj.  $R^2 = .06$ ,  $F = 5.72$ ,  $p = .004$ .

<sup>b</sup>Step 2:  $F^{\text{change}}(3,144) = 5.61$ ,  $p = .001$ , adj.  $R^2 = .14$ ,  $F = 5.87$ ,  $p = .000$ .

<sup>c</sup>Step 3:  $F^{\text{change}}(3,141) = 16.95$ ,  $p = .000$ , adj.  $R^2 = .36$ ,  $F = 11.24$ ,  $p = .000$ .

<sup>d</sup>Step 4:  $F^{\text{change}}(4,137) = 33.10$ ,  $p = .000$ , adj.  $R^2 = .66$ ,  $F = 25.35$ ,  $p = .000$ .

does not appear to create a progressively lower threshold for the development of ASD. Instead, it is possible that some bank robbery victims get used to being exposed to robberies, and that prior robberies, therefore, may have a stress inoculation effect. Furthermore, it seems unlikely that prior traumatic exposures have had an indirect effect on post-traumatic symptoms through perceived social

support as suggested by Yap and Devilly (2004) because perceived social support did not predict ASD severity.

#### Peri-trauma variables

As expected from previous research (Brewin et al., 2000; Elklit, 1999; Ladwig et al., 2002; Ozer et al., 2003), the different aspects of trauma severity investigated in the present study were significantly associated with increased ASD severity. However, only perceived helplessness and life threat were significantly associated with ASD severity, when all the other variables were controlled for. The finding that perceived helplessness was moderately associated with ASD severity supports the inclusion of the A2 criterion within the impending *DSM-5* ASD diagnosis.

Proximity to the robber was significantly and positively associated with ASD severity, but this variable could not predict ASD severity when the pre-trauma and the other peri-trauma factors were controlled for. Other robbery studies have also shown a tendency of traumatisation in victims not at work during the robbery (Dyregrov, Kristoffersen, & Müller, 1991; Miller-Burke et al., 1999). This may be an indication of strong social bonds and identification with colleagues. Banks are often small workplaces with few employees, all of whom have close social relations with each other, which means that traumatic events affect the whole workplace regardless of whether or not all employees are present during the robbery (Richards, 2001). However, proximity to the robber was significantly associated with both perceived helplessness and life threat and may thus indirectly contribute to the risk of developing ASD.

#### Post-trauma variables

As expected from previous research (Elklit, 1999; Elklit & Kurdahl, 2007; Grieger et al., 2003), low perceived safety was significantly and largely associated with increased ASD severity. The large correlation between ASD severity and perceived safety does not seem to indicate similarity between ASDS items and the perceived safety item, because perceived safety concerns the sense of current threat, whereas ASD concerns traumatisation. The large correlation between ASD severity and perceived safety instead seems to be an indication of the possibility that the sense of current threat also plays a crucial role in the development of ASD as proposed by Ehlers and Clark (2000) in relation to PTSD. In addition, perceived safety predicted ASD severity in the final regression model. Thus, the greater the sense of current threat, in terms of fear for their own safety after the robbery, the higher their scores were on the ASDS. Furthermore, perceived safety was the largest predictor of ASD severity in the present study ( $\beta = -.62$ ,  $p = .000$ ) indicating that Ehlers and Clark's (2000) cognitive model of PTSD may also apply to ASD.



In contrast to perceived sense of safety, all associations between the three aspects of social support and ASD severity were small and none were significant when all other variables were controlled for. This is, however, in contrast to Elklit's (2002) study of robbery victims that found social support to be predictive of ASD. The contradictory results may be due to earlier mentioned differences in samples and ASD measurement, or the fact that Elklit (2002) used single item measures from the CSS. However, it is possible that the strength of the relationship between social support and post-traumatic symptoms increase over time as found in Richards (2000) study of robbery victims. The lack of a large association between social support and ASD severity in the present study may also be attributable to the use of the CSS—especially in assessing negative social support with only one item—feeling let down. This single item may not be sensitive enough to measure the wide range of negative support that victims of bank robbery may encounter from others.

### Limitations

The present study has several limitations. First, the present study is cross-sectional and is, therefore, subject to all the limitations connected to cross-sectional studies. For instance, although unlikely, it remains possible that the index robbery may have acted as a reminder of prior robberies, which have led to the report of prior experienced symptoms. Furthermore, prior traumatic exposure and major life changes were only indexed as events and thus the severity of the distress connected to them is unknown. The ASD diagnosis was based on a self-report measure; the ASDS, rather than a clinical interview, and thus the estimated ASD prevalence may be biased. Even though the ASDS was scored according to the *DSM-IV* rather than the use of cut-off scores, the function criterion F, the exclusion criterion H, and the stressor criterion A2 were not fully assessed, which may have further biased the estimated ASD prevalence. In addition, the results are based on voluntary participation in a convenience sample of bank robbery victims associated with a particular crisis aid service. This creates problems with validity and reliability due to the lack of randomisation and a control group of employees not exposed to a bank robbery. At the same time, perceived safety was measured by a single item, which may not have been sensitive enough to measure the sense of current threat that the participants experienced after the robbery. About half of the bank robbery victims received psychological debriefing, which may have affected the employees' recovery process either negatively or positively. Furthermore, additional research emphasises the importance of several variables in predicting post-traumatic symptoms, which we were not able to assess or control for, for

example, peri-traumatic panic and post-traumatic cognitions (Bryant, 2003; Kleim et al., 2007).

### Conclusion

The present study has investigated a number of predictors of ASD in trying to identify and understand the psychological mechanisms involved in the complex relationships between the experience of a robbery and the development of ASD and identified a number of variables that appear to be important to the development of ASD. Despite its limitations, the present study shows that bank robberies can be traumatising, and that an estimated 14.5% of the participants suffered from ASD according to *DSM-IV*. The estimated prevalence of ASD nearly doubled (28.9%) when using Bryant et al.'s (2000) recommended cut-off scores, indicating that employing cut-scores may result in an overestimation of ASD following a bank robbery. The results also highlight a need for further validation of the ASDS across different trauma populations. In the final regression model two peri-trauma variables (perceived helplessness and perceived life threat) and one post-trauma variable (perceived safety after the robbery) was able to explain 66% of the variance in ASD severity. These results indicate that an awareness of these three variables in the acute phase after the experience of a bank robbery may be helpful in identifying individuals at risk of developing ASD, whereas pre-trauma variables seem less important. The results support the utility and, therefore, the inclusion of perceived helplessness in the ASD diagnosis rather than the recommended removal in the current *DSM-5* proposal. Perceived safety was the largest predictor of ASD severity, which is in accordance with Ehlers and Clark's (2000) cognitive model of PTSD and thus points to the possibility of the model also applying to ASD. Even though perceived safety was measured by a single item, the results indicate that perceived safety may also be a core feature in developing ASD as well as PTSD. Future research, similar to the current study, will need to shed more light on the role of current threat in the development of post-traumatic symptomatology.

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There is no conflict of interest in the present study for any of the authors

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