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Chapter 3

WHO DEVELOPS POSTTRAUMATIC STRESS SYMPTOMS FOLLOWING A BANK ROBBERY? A NATIONAL COHORT STUDY

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ABSTRACT

Each year, numerous bank robberies take place worldwide. Even so, only few studies have investigated the psychological sequelae of bank robbery and little is known about the risk factors associated with the development of posttraumatic stress disorder (PTSD) following this potentially traumatic event. Knowledge about risk factors related to PTSD may allow for preventive measures to be taken against the development of PTSD and reduce the large cost associated with the disorder. Furthermore, the few existing studies are characterized by several limitations such as the use of small convenience or self-selecting samples. To overcome these limitations, we investigated the estimated prevalence rate of acute stress disorder (ASD) and PTSD and predictors of PTSD severity in a Danish cohort study of all bank employees exposed to robbery during one year (N = 614). A total of 450 employees (73 %) filled out the first questionnaire a week after the robbery (T1). Of these, 371 employees (82 %) filled out the second questionnaire six months

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after the robbery (T2). Results showed that 11.1% of the participants suffered from ASD (T1) and 6.2 % suffered from PTSD (T2). The results of a hierarchical regression analysis showed that 51 % of the variance in PTSD severity could be explained with only peritraumatic dissociation, ASD severity, and negative cognitions about self being significant predictors. However, interpretation of the role of peritraumatic dissociation in the regression model was hampered by a statistical artifact (negative suppression). The strongest predictors of PTSD severity were ASD severity followed by negative cognitions about self. This indicates that victims with high levels of ASD are at increased risk of developing PTSD following bank robbery. Thus, screening for PTSD following bank robbery should focus on ASD severity. In accordance with a cognitive model of PTSD and the DSM-5, the results show that posttraumatic negative cognitions about self also seem to play a pivotal role in the development of PTSD following bank robbery. This indicates that it may be possible to develop preventive cognitive interventions targeted at bank employees that focus on changing negative cognitions about self.

Each year, numerous bank robberies take place worldwide (the Danish Bankers Association, 2013; Gilioli, Campanini, Fichera, Punzi, & Gassitto, 2006). The exact number of annual Danish bank robberies have varied the past 15 years (69-222) and fortunately the number is currently low (71 in 2012; the Danish Bankers Association, 2013). However, there are numerous victims per robbery as victims can be both employees, customers, random passing people, security guards, police officers or other types of rescue personal. This chapter focuses solely on the psychological impact of bank robbery on the employees, who are often the primary victims of the bank robbery. During a bank robbery the employees are often threatened at gun point to hand over the cash. Most people report feelings of life threat, helplessness and intense horror, when they are held at gun point (Elklit, 2002). Even so, only few studies have investigated the psychological sequelae of bank robbery and little is known about the risk factors associated with the development of posttraumatic stress disorder (PTSD) following this potentially traumatic event (Hansen & Elklit; 2011; 2013; Kamphuis & Emmelkamp, 1998; Ladwig et al., 2002; Miller-Burke, Attridge, & Fass, 1999). The limited research shows that bank robberies are potentially traumatizing events associated with both immediate and long-term posttraumatic symptoms. However, the existing bank robbery studies have all been based on convenience samples which have identified participants through crisis aid services or a particular bank service. Furthermore, most of the samples have been relatively small (*N*= 53-152).

Indeed, only one study can be regarded as having a large sample (*N* = 303; Kamphuis & Emmelkamp, 1998). This creates problems with the validity and reliability of the results as it is difficult to ensure that the results are representative and generalizable when they are based on rather small and self-selected samples. Additionally, only one study has investigated the prevalence rates of acute stress disorder (ASD) and PTSD as specified by the American Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; APA, 2000). We previously estimated that 14.5 % of bank employees suffered from an acute stress disorder (ASD) diagnosis and that 6.8 % of employees suffered from a PTSD diagnosis in an earlier convenience study of bank robbery victims (Hansen & Elklit, 2011; 2013). Studies of other forms of robbery and nonsexual assault have found higher prevalence rates of both ASD (17-25%) and PTSD (20-30%; Brewin, Andrews, Rose, & Kirk, 1999; Elklit, 1999; 2002; Elklit & Brink, 2004; Kleim, Ehlers, & Clucksman, 2007).

The DSM-IV-TR (APA, 2000) defines ASD and PTSD as diagnoses that follows experiencing, witnessing, or being confronted with an event that involves death, physical injury, or a threat to the physical integrity of self or others (criterion A1), in which the individual reacts with feelings of fear, helplessness, or intense horror (criterion A2). The diagnostic criteria for both diagnoses state a requirement of symptoms of intrusion/re-experiencing, avoidance, and arousal. Symptoms of intrusion/re-experiencing concern that the traumatic event is somehow re-experienced for instance through thoughts, dreams, or flashback episodes. The avoidance criterion concerns efforts to avoid stimuli associated with the traumatic event for instance thoughts, feelings, activities, places or people associated with the traumatic event. Symptoms of arousal concern for instance sleep difficulties, hypervigilance, poor concentration, and irritability. Also, both diagnoses require functional impairment. The main differences between the diagnostic criteria for PTSD and ASD are the duration of the symptoms and the dissociation symptom cluster in the ASD diagnosis (see the later section on peritraumatic dissociation for definition). ASD describes acute posttraumatic symptoms (two days to one month) following traumatic exposure, whereas PTSD describes long-term posttraumatic symptoms (more than a month) following traumatic exposure. The ASD diagnosis requires that the individual has at least three of five described dissociative symptoms, which the PTSD diagnosis does not. Beyond the time criterion and the dissociation criterion, several additional differences need to be mentioned. As pointed out by Bryant and Harvey (1997) only the PTSD diagnosis requires that intrusion (i.e. re-experiencing in the ASD diagnosis) involves or cause distress. At the same time, the PTSD

diagnosis requires the presence of at least three symptoms of avoidance and two symptoms of arousal, whereas the ASD diagnosis only states a diffuse requirement of marked arousal and avoidance. The costs of PTSD as well as ASD are not only related to the individual, but the workplace, family and society are also affected. Thus, PTSD is associated with a large range of costs such as for instance costs associated with reduced quality of life, functional incapacities, sick leave, work termination, reduced productivity, and increased need of health care and social support (Gilioli et al., 2006).

Despite exposure to bank robberies being a potential traumatic event associated with the development of posttraumatic symptoms, only a few studies have investigated risk factors for posttraumatic symptoms in order to identify victims at risk of developing PTSD (Hansen & Elklit, 2011; 2013; Kamphuis & Emmelkamp, 1998; Ladwig et al., 2002; Miller-Burke et al., 1999). Knowledge about risk factors for the development of PTSD may facilitate early treatment and preventive interventions, which may hinder or minimize the development of PTSD and its associated costs (Litz & Maguen, 2007). There is a plethora of research investigating risk factors associated with posttraumatic symptomatology after a long range of other forms of traumatic exposure, which has resulted in the identification of several risk factors for posttraumatic symptomatology (Brewin, Andrews, & Valentine, 2000; Ozer, Best, Lipsey, & Weiss, 2003). These factors can be grouped temporally according to the time of the traumatic exposure as pre-trauma, peri-trauma and post-trauma factors (Ladwig et al., 2002). Pre-trauma factors are factors present before the traumatic exposure, peri-trauma factors are factors appearing during the traumatic exposure, and post-trauma factors are factors, which present themselves after the traumatic exposure. Furthermore, research indicates that multiple factors rather than single factors may play a part in determining the psychological impact of traumatic exposure; including bank robbery (Brewin et al., 2000; Hansen & Elklit, 2011; 2013; Kamphuis & Emmelkamp, 1998; Miller-Burke et al., 1999; Ozer et al., 2003). At the same time, two large meta-analyses of risk factors for posttraumatic symptomatology indicate that there is variation in risk factors across trauma types (Brewin et al., 2000; Ozer, et al., 2003). Thus, the identified risk factors for posttraumatic symptomatology following different forms of traumatic exposure may not constitute risk factors for posttraumatic symptoms following bank robbery and vice versa.

To summarize, there is a great need of studies seeking to clarify the psychological impact of bank robbery and risk factors associated with PTSD following bank robbery. In particularly, we need to know how many

employees suffer from ASD and PTSD and how we can identify those at risk of developing PTSD in order to facilitate early treatment and reduce the suffering and large costs associated with PTSD. To overcome the limitations of the previous research in bank robberies, we investigate the psychological impact of bank robbery one week (ASD) and six months (PTSD) after the robbery and predictors of PTSD severity in a national cohort study of bank employees exposed to bank robbery. In the following next three sections "pre-trauma risk factors", "peri-trauma risk factors", and post-trauma risk factors", this chapter resembles a review of research concerning the predictors of PTSD selected for the current study. Afterwards, this chapter takes more form of an empirical study investigating the prevalence rates of ASD and PTSD following bank robbery and the prediction of PTSD severity.

PRE-TRAUMA RISK FACTORS

Research on the psychological impact of bank robberies and other forms of robberies at work has shown discrepancies regarding whether or not the pre-trauma variables; younger age, female sex, and prior traumatic exposure are significant risk factors for posttraumatic symptomatology (Elklit, 2002; Hansen & Elklit, 2011; 2013; Ladwig et al., 2002; Miller-Burke et al., 1999). This is in accordance with the Brewin et al. (2000) meta-analysis of risk factors for PTSD showing that age, sex, and prior traumatic exposure are generally significant risk factors for PTSD but only with small effect sizes. However, age does not seem to emerge as a significant risk factor associated with posttraumatic symptomatology following bank robbery (Hansen & Elklit, 2011; 2013; Ladwig et al., 2002; Miller-Burke et al., 1999). At the same time, female sex is found to be associated with increased posttraumatic symptoms in some robbery studies (Elklit, 2002; Hansen & Elklit, 2011; 2013) but not in others (Miller-Burke et al., 1999). Similarly, there are discrepancies in robbery studies regarding whether different forms of prior traumatic exposure are significantly associated with increased posttraumatic symptoms or not (Hansen & Elklit, 2011; 2013; Miller-Burke et al., 1999). The discrepancies may be due to differences in which types of prior traumatic exposure that are measured, as all trauma types are not necessarily equal in their effect (Ozer et al., 2003). Furthermore, according to Brewin et al. (2000) it is possible that the effect of these pre-trauma risk factors on the development of PTSD may be distal rather than proximal. Thus, the effect of these pre-trauma factors may have an indirect effect on the development of posttraumatic symptoms through later

factors associated with the trauma. In addition, recent exposure to major life events has been found associated with increased posttraumatic symptomatology after robberies (Elklit, 2002; Hansen & Elklit, 2011; Kamphuis & Emmelkamp, 1998).

According to cognitive models of responses to traumatic exposure, the individual's appraisal of traumatic exposure and their capacity to respond to that experience is essential to how they will adapt to the trauma (Ehlers & Clark, 2000). Research indicates that these cognitive responses not only include posttraumatic cognitions (see later section on posttraumatic cognitions) but also maladaptive thinking associated with panic (cf., Nixon & Bryant, 2005). Indeed, anxiety sensitivity has been found highly associated with posttraumatic symptoms (Bryant & Panasetis, 2001; Taylor, Koch, & McNally, 1992). Thus, the current study also investigates the association between proneness to panic reactions (anxiety sensitivity, i.e., a heighted awareness of bodily sensations and the tendency to interpret these sensations catastrophically) and posttraumatic symptoms. This association has not previously been investigated following bank robbery.

Furthermore, neuroticism has also been found to be significantly and positively associated with posttraumatic symptomatology following a wide range of traumatic exposure (Alexander & Wells, 1991; Breslau & Schultz, 2013; Christiansen & Elklit, 2008; Parlow, Jorm, & Christensen, 2006). Indeed, neuroticism is said to measure vulnerability to the development of psychiatric disorders (Breslau & Schultz, 2013). Neuroticism is defined by Costa and McCrae (1987 p. 301) as "a broad dimension of individual differences in the tendency to experience negative, distressing emotions and to possess associated behavioral and cognitive traits". The neuroticism dimension is defined by personality traits such as fearfulness, social anxiety, low self-esteem, irritability, poor inhibition of impulses, and helplessness. Neuroticism has previously been investigated in relation to bank robbery but not as a risk factor for posttraumatic symptomatology (Kamphuis & Emmelkamp, 1998).

PERI-TRAUMA RISK FACTORS

Several different aspects of trauma severity have been found associated with the development of posttraumatic symptoms after bank robbery (Hansen & Elklit, 2011; 2013; Ladwig et al., 2002; Miller-Burke et al., 1999) and other forms of traumatic exposure (Brewin et al., 2000; Ozer et al., 2003). Perceived life threat during the trauma is one aspect of trauma severity which has been

found associated with the development of posttraumatic symptoms after bank robberies as well as other forms of traumatic exposure (Hansen & Elklit, 2011; 2013; Kleim et al., 2007; Ladwig et al., 2002; Miller –Burke et al., 1999; Ozer et al., 2003). Proximity to the robbery has also been associated with the development of posttraumatic symptoms following bank robbery (Hansen & Elklit, 2011; 2013; Miller-Burke et al., 1999). Furthermore, perceived helplessness, fear or horror, and/or fear of dying (the DSM-IV-TR A2 criterion) have also been found to be associated with the development of posttraumatic symptoms following bank robbery and other forms of nonsexual assault (cf. Brewin, Andrews & Rose, 2000; Hansen & Elklit, 2011; 2013). However, recently the utility of the A2 criterion has been questioned as it seems to have limited capacity to predict PTSD following traumatic exposure (Friedman, Resick, Bryant & Brewin, 2010). Thus, in the newly released DSM-5 the A2 criterion has been removed from both the ASD and the PTSD diagnoses (APA, 2013). However, the A2 criterion may still have utility in relation to predicting PTSD following bank robbery as there may be variation in risk factors across trauma types.

Research is beginning to show increasingly promising results for tonic immobility, peritraumatic panic, and peritraumatic dissociation as risk factors for developing PTSD following different forms of traumatic exposure (Bryant, Brooks, Silove, Creamer, O'Donnell, & McFarlane, 2011; Marx, Forsyth, Gallup, Fusé, & Lexington, 2008; Ozer et al., 2003). Tonic immobility is conceptualized as an evolutionary survival strategy and is considered to be the last defense in a series of defense reflexes (i.e. freeze, flight, fight, and tonic immobility) against entrapment by a predator, when it is no longer possible to escape or resist (Gallup, 1977; Marx et al., 2008). More specifically, tonic immobility is characterized by involuntary immobility, analgesia, and unresponsiveness to external simulation. Recent research indicates that tonic immobility occurs in people in mortal danger and under physical restraint (or perceived immobility to escape; Heidt, Marx, & Forsyth, 2005; Kunst, Winkel & Bogaerts, 2011; Marx et al., 2008; Rocha-Rego et al., 2009; Volchan et al., 2011). Furthermore, tonic immobility has been found associated with increased PTSD symptomatology after different forms of traumatic exposure including nonsexual assault (Heidt et al., 2005; Kunst et al., 2011; Marx et al., 2008; Rocha-Rego et al., 2009; Volchan et al., 2011). Several possible explanations for the relationship between tonic immobility and the development of PTSD have been put forward for instance that tonic immobility and PTSD are the by-products of the same physiological changes or that tonic immobility hinders more adaptive defensive responses during and

after the traumatic exposure (Marx et al., 2008). However, it is unclear which precise mechanism lies behind the relationship between tonic immobility and the development of PTSD (Marx et al., 2008). At the same time, tonic immobility has not previously been investigated following bank robbery.

The occurrence of panic during traumatic exposure (i.e., peritraumatic panic) is very common (Bryant et al., 2011). Shortness of breath, choking, sweating, nausea, chest pain, dizziness, and fear of losing control are examples of symptoms of panic. Research indicates that more than half of all trauma survivors report at least four symptoms of panic during a traumatic exposure, which is the required number to meet the diagnostic criteria for a panic attack according to the DSM-IV (APA, 1994; Bryant & Panasetis, 2001). Peritraumatic panic may be related to the development of PTSD, as panic may result in a more distressing experience or may condition trauma related cues that can trigger subsequent anxiety (Bryant & Panasetis, 2001; Falsetti, Resnick, Dansky, Lydiard, & Kilpatrick, 1995). Indeed, peritraumatic panic has been found associated with the development of posttraumatic symptoms following different forms of traumatic exposure (Bryant et al., 2011; Bryant & Panasetis, 2001; Nixon & Bryant, 2003; Rocha-Rego et al., 2009). However, the relationship between posttraumatic symptoms and panic has not previously been investigated following bank robbery.

Peritraumatic dissociation refers to changes in consciousness during traumatic exposure. In the DSM-IV peritraumatic dissociation is defined as a subjective feeling of emotional numbness, detachment from others, reduced responsiveness to one's surroundings, depersonalization, and derealization during the traumatic exposure (APA, 1994). Peritraumatic dissociation is assumed to be associated with PTSD, because it prevents adequate processing and thus adequate integration of the traumatic recollections (Breh & Seidler, 2007). Indeed, peritraumatic dissociation is common during traumatic exposure and has been found a risk factor of PTSD following a wide range of traumatic exposure (Breh & Seidler, 2007; Bryant, 2009; Ozer et al., 2003) including one study of bank robbery (Ladwig et al., 2002). Indeed, Ozer et al.'s (2003) meta-analysis found that peritraumatic dissociation emerged as the strongest risk factor (weighted overall effect size r = .35) out of seven investigated risk factors. Furthermore, Breh and Seidler's meta-analysis (2007) of prospective studies of peritraumatic dissociation and PTSD largely replicated the results of the Ozer et al. (2003) meta-analysis (weighted overall effect size r = .34). However, a recent review of methodologically sound prospective studies of the predictive value of peritraumatic dissociation indicates that peritraumatic dissociation is not an independent predictor of

PTSD (van der Velden & Wittmann, 2008). The relationship between peritraumatic dissociation and PTSD becomes non-significant when controlling for other factors such as ASD (van der Velden & Wittmann, 2008). The relationship between peritraumatic dissociation and posttraumatic stress symptoms following bank robbery has only previously been investigated in relation to the ICD-10 acute stress reaction and PTSD (WHO, 1992) but not in relation to ASD and PTSD as specified by the DSM-IV-TR.

POST-TRAUMA RISK FACTORS

The Acute Stress Disorder (ASD) diagnosis was introduced into the DSM-IV with a twofold purpose. The first purpose was to recognize posttraumatic stress occurring within the first month after traumatic exposure and the second purpose was to identify victims at risk of developing PTSD (APA, 1994). Several studies have investigated the predictive power of different aspects of the ASD diagnosis on PTSD (Bryant, 2011). According to Bryant's (2011) systematic review, the ASD diagnosis has limited capacity to predict PTSD. However, Bryant's (2011) review only included two studies of nonsexual assault (Brewin et al., 1999; Elklit & Brink, 2004) that both indicated that ASD predicts PTSD better following nonsexual assault than other forms of traumatic exposure.

At the same time, we previously found that ASD severity rather than the ASD diagnosis seems to be a strong predictor of PTSD severity following bank robbery (Hansen & Elklit, 2013). The strong relationship between ASD severity and PTSD severity was supported by ASD severity being the strongest predictor of PTSD severity (explaining 40 % of the variance in PTSD severity). ASD severity therefore appears to be a strong risk factor for posttraumatic symptoms following bank robbery.

As mentioned the Ehlers and Clark's (2000) cognitive model of trauma response state the individual's appraisal of the traumatic exposure and their capacity to respond to it is essential to how they will adapt to the trauma. Catastrophic or negative perceptions about the trauma, its implications, and the individual's own capacity to handle the trauma can lead to a sense of current threat which can contribute to the development of PTSD. The negative perception prevents the individual from processing corrective information, which could help the individual recognize that the threat has passed. Indeed, negative cognitive responses to traumatic exposure have been found important in the prediction of posttraumatic symptoms following different types of

traumatic exposure (Bryant, 2003; Karl, Rabe, Zöllner, Maercker, & Stopa, 2009; Nixon & Bryant; 2005). Low perceived safety (a form of cognition) has also been found predictive of both ASD and PTSD following bank robbery (Hansen & Elklit, 2011; 2013).

Several studies indicate that cognitive models are better predictors of PTSD than either ASD or empirically derived variables such as peritraumatic dissociation (Karl et al., 2009; Kleim et al., 2007). Furthermore, as mentioned previously research also indicates that these cognitive responses concern maladaptive thinking associated with panic. Thus, we investigate negative cognitions about self, megative cognitions about the world, self-blame, and negative cognitions about bodily sensations as risk factors of PTSD. These negative cognitions have not previously been investigated following bank robbery.

Social support has been found associated with the development of posttraumatic symptoms after a wide range of traumatic exposure; including bank robbery (cf. Brewin et al., 2000; Miller-Burke et al., 1999; Ozer et al., 2003; Yap & Devilly, 2004). Social support can be defined in many ways, but the concept usually refers to positive aspects of social interaction (Holeva, Tarrier & Wells, 2001). Research indicates that whether or not social support constitutes a protective factor for posttraumatic symptoms depends on the quality of and the satisfaction with the social support rather than the simply the availability of social support (Andrews, Brewin & Rose, 2003; Elklit & Brink, 2004; Miller-Burke et al., 1999). Receiving social support can be a burden on the victims if it is ambiguous, criticizing or, guilt invoking support (Buunk & Hoorens, 1992; Yap & Devilly, 2004). Robbery studies have also found that positive aspects of social support are protective against the development of posttraumatic symptoms, and that negative aspects of social support are risk factors for posttraumatic symptoms (Elklit, 2002; Hansen & Elklit, 2011; 2013; Miller-Burke et. al., 1999; Richards, 2000). Thus, we investigate perceived positive social support, perceived negative social support, and social support satisfaction.

Finally, decades of research have established the importance of coping when dealing with a stressful or traumatic event. Indeed, research has found coping associated with the development of posttraumatic symptoms following a wide range of traumatic exposure including bank robbery (Agaibi & Wilson, 2005; Bödvarsdóttir & Elklit, 2004; Kamphuis & Emmelkamp, 1998; Schnider, Elhai, & Gray, 2007). Coping is often defined according to Lazarus and Folkmann's (1984) theory on stress as cognitive and behavioral efforts to manage situational demands that are appraised as exceeding the resources of

the individual (Monat & Lazarus, 1991). Many different coping styles have been identified, but they can often be grouped as either positive (e.g. rational or problem-focused coping) or negative coping (e.g. avoidant or emotion-focused coping) as positive coping styles are usually found protective against the development of PTSD, whereas negative coping styles are found to constitute risk factors for PTSD (Bödvarsdóttir & Elklit, 2004; Kamphuis & Emmelkamp, 1998; Schnider et al., 2007).

THE CURRENT STUDY

The aim of the current study is two-fold. The first aim is to investigate the psychological impact of bank robbery by estimating the ASD and PTSD prevalence rates. The second aim is to investigate the above stated predictors for PTSD severity following bank robbery. This combination of predictors has not previously been investigated following bank robbery or any other type of traumatic exposure. Due to the extant literature we hypothesize:

- The prevalence rates of ASD and PTSD are consistent with our previous bank robbery study and lower than the prevalence rates found following other forms of non-sexual assault.
- The pre-trauma variables (younger age, female sex, prior traumatic exposure, prior robberies, major life events, anxiety sensitivity, and neuroticism) are all associated with increased PTSD severity.
- The peri-trauma variables (proximity to the robbery, perceived life threat, perceived helplessness, intense horror, tonic immobility, peritraumatic panic, and peritraumatic dissociation are all associated with increased PTSD severity.
- ASD severity, negative cognitions about self, negative cognitions about the world, self-blame, perceived negative social support, avoidant and emotion-focused coping are associated with increased PTSD severity, whereas perceived positive social support, social support satisfaction, and rational coping are associated with decreased PTSD severity.
- Furthermore, based on previous research, we expect that ASD severity and negative cognitions are particular strong predictors of PTSD severity.

METHOD

Procedure and Participants

The current study is part of a large national study of the psychological impact of bank robberies committed in Denmark from April 2010 to April 2011. The study was conducted in collaboration between the Danish Bankers Association, the National Bank of Denmark, all Danish Banks, and the University of Southern Denmark. During this period, 614 bank employees were exposed to robbery. A total of 450 employees (73 %) filled out the first questionnaire a week after the robbery (T1, M = 9.89 days, SD = 6.30).Of these, 371 employees (82 %) filled out the second questionnaire six months after the robbery (T2, M = 191.7, SD = 13.15).The majority of the participants (n = 297, 80.1 %) were in the room during the robbery (i.e. directly exposed), and the remaining participants were in adjoining rooms (i.e. indirectly exposed, n = 74, 19.9 %). As argued by Hansen and Elklit (2011), the stressor criterion A1 of the DSM-IV-TR diagnostic criteria for ASD and PTSD is met during a bank robbery regardless of the presence of the participants, because a bank robbery involves actual or threatened death or serious injury or a threat to the physical integrity of self or others (i.e. colleagues). The majority of the participants (96 %, n = 356) received psychological debriefing, which was conducted in a non-manualized manner by different psychologists and not as a part of the current study. There was no significant difference between the debriefed and non-debriefed group in relation to ASD severity or PTSD severity (measured by the Acute Stress Disorder Scale, Bryant, Moulds & Guthrie, 2000, and the Harvard Trauma Questionnaire, Mollica et al., 1992, t (369) = .57, p = .571 and t (369) = .16, p = .874, respectively). Thus, the participants were treated as a homogeneous group. The participants were informed of the purpose of the survey both orally and in writing and instructed to fill out the questionnaires in relation to the index robbery. Participation was voluntary and all necessary permissions for conducting questionnaire surveys, according to Danish Law, were obtained. Furthermore, the study was approved by the PhD review board appointed by the University of Southern Denmark.

Measures

The questionnaire assessed demographic factors and the following variables related to the current study. All of the following described predictors

were assessed at T1 and PTSD severity was assessed at T2. Proximity to the robbery was assessed by asking the participants if they had been present in the room during the robbery with answers stated dichotomously (*yes* or *no*). The experience of perceived helplessness, fear of dying, and perceived life threat during the robbery were assessed dichotomously (*yes* or *no*). Prior traumatic exposure was assessed by asking the participants whether they had experienced any of 14 different kinds of traumas applied in the U.S. National Comorbidity Survey (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) with a separate scoring of prior bank robberies. Major life changes were assessed in open-ended questions asking the participants if they had experienced any during the past 12 months. The number of experienced changes was summated.

The Danish version of the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) was used to assess proneness to panic reactions (i.e. negative cognitions about bodily sensations). The ASI is a 16-item self-report questionnaire that measures the participants' belief about the harmfulness of anxiety symptoms on a 5-point Likert type scale (1= *very little* to 5= *very much*). Good test–retest reliability (.75) and construct validity have been reported (Reiss et al., 1986). The reliability coefficient in the current study was satisfactory (Cronbach's α =.89).

Neuroticism was assessed using the Danish version of the neuroticism subscale of the NEO Personality Inventory-revised (NEO PI-R; Costa & McCrae, 2004) short version. The NEO PI-R neuroticism subscale comprises 12 items assessed on a 5-point Likert type scale (0 = *strongly disagree* to 4= *strongly agree*). The NEO PI-R has shown to have good psychometric properties including good reliability (cf. Costa & McCrae, 2004; Rossier, Meyer de Stadelhofen, & Berthoud, 2004) for the neuroticism subscale. The reliability coefficient in the current study was satisfactory (Cronbach's α =.87).

Tonic immobility was assessed using a Danish version of the Tonic Immobility Scale (TIS; Heidt et al., 2005). The TIS originally comprised 10 items assessed on a 7-point Likert Scale type (a low score indicates no tonic immobility and a high score indicates high tonic immobility). However, some of these items assess dissociative and panic-like responses. In order to avoid item overlap between the Physical Reaction Scale, the Peritraumatic Dissociation Questionnaire, and the TIS as the goal is to compare the different predictors of PTSD severity, we only assessed the motor aspects of tonic immobility. Other studies have used the same procedure (Kunst et al., 2011; Rocha-Rego et al., 2009). The four items were: "*froze or felt paralyzed during*

the event, "unable to move even though not restrained during the event", "unable to call out or scream during the event", and "unable to escape during the event". Two independent forward-translations into Danish were carried out using the original English version of the TIS. The two versions were carefully reviewed and edited into a final Danish version. The Danish version of the TIS was then back-translated by a different translator and compared with the original English version. Previous studies report good internal consistency Cronbach's α = .88 (cf. Kunst et al., 2011).The reliability coefficient in the current study was satisfactory (Cronbach's α = .85).

Peritraumatic panic was assessed using a modified Danish version of the Physical Reactions Scale (PRS, Falsetti & Resnick, 1992). The PRS is a 16-item self-report questionnaire that measures how severely the participants experienced DSM-IV panic symptoms during the robbery on a 6-point Likert type scale (*0= not at all* to 5= *extremely*). Two independent forward-translations into Danish were carried out using the original English version of the PRS. The two versions were carefully reviewed and edited into a final Danish version. The Danish version of the PRS was then back-translated by a different translator and compared with the original English version. There are currently no psychometric data on the PRS. The reliability coefficient in the current study was satisfactory (Cronbach's α = .91).

Peritraumatic dissociation was assessed using a Danish version of the Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar, Weiss, & Metzler, 1997). The PDEQ comprises 10 items reflecting dissociative responses rated on a 5-point Likert type scale (*0= not at all* to 5= *extremely true*) during the robbery. Two independent forward-translations into Danish were carried out using the original English version of the PDEQ. The two versions were carefully reviewed and edited into a final Danish version. The Danish version of the PDEQ was then back-translated by a different translator and compared with the original English version. The PDEQ has shown satisfactory internal consistency, test-retest reliability (.72), and string convergent reliability (cf. Birmes et al., 2005; Kunst et al., 2011). The reliability coefficient in the current study was satisfactory (Cronbach's α = .87).

ASD severity was assessed using the Danish version of the Acute Stress Disorder Scale (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-TR. Answers are rated on a 5-point Likert type scale (1 = *not at all* to 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, with reliability coefficients of .85 -.96 (cf. Armour, Elklit, & Shevlin, 2011; Elklit & Christiansen, 2010; Hansen & Elklit, 2011) for the total scale. The reliability coefficient in the current study was satisfactory (Cronbach's α = .93).

Posttraumatic cognitions were assessed using a Danish version of the Posttraumatic Cognition Inventory (PTCI; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999). The PTCI is a 33 item self-report scale with three subscales assessing negative cognitions about self, negative cognitions about the world, and self-blame rated on a 7-point Likert Scale (1 = *totally disagree* to 7 = *totally agree*). Scale scores are formed for the three subscales. Two independent forward-translations into Danish were carried out using the original English version of the PTCI. The two versions were carefully reviewed and edited into a final Danish version. The Danish version of the PTCI was then back-translated by a different translator and compared with the original English version. The PTCI has demonstrated high convergent validity with other trauma-related cognition scales and good sensitivity and specificity in relation to correctly identifying PTSD diagnostic status (cf. Beck, Coffey, Palyo, Gudmundsdottir, Miller, & Colder., 2004; Foa et al., 1999). The reliability coefficients in the current study were satisfactory on all subscales (Cronbach's α = .70-.92). Perceived social support after the robbery was assessed using the Danish version of the Crisis Support Scale (CSS; Joseph, Andrews, Williams, & Yule, 1992) which is comprised of seven items. In accordance with 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 Danish version of the CSS has been shown to have good reliability and validity (Elklit, Pedersen, & Jind, 2001). The reliability coefficient on the perceived positive support was unsatisfactory in the current study (Cronbach's α = .59). However, the mean inter-item correlation coefficient (.27) was within the acceptable range (Briggs & Cheek, 1986). Coping style was assessed in relation to how the participants generally deal with stressful events using a revised Danish version of the Coping Styles Questionnaire (CSQ; Roger, Jarvis, & Narajian, 1993). The revised CSQ has 37 items and preserved the

four primary coping components: rational (problem-focused) coping, emotion-focused coping, avoidant coping, and detached coping rated on a 4-point Likert scale (1= *never* to 4= *always*; Elklit, 1996). Concordance between the four subscales in the original and revised version is high (67-84%). The four subscales have shown good test-retest reliability (.74-.85; Elklit, 1996). The reliability coefficients in the current study were satisfactory for all subscales (rational Cronbach's α = .79, emotion-focused Cronbach's α = .84, avoidant Cronbach's α = .72,) except for the detached coping subscale (Cronbach's α = .58, interitem correlation mean = .19), which was subsequently excluded from further analysis.

PTSD severity was assessed using the Danish version of the Harvard Trauma Questionnaire part IV (HTQ; 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-TR 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). The reliability coefficient in the current study was satisfactory (Cronbach's α = .92).

Data Analysis

Prior to data analysis the data was screened for errors. The percentage of missing values was small (.00-3.2 %). Thus, the missing data was imputed with the Expectation Maximization (EM) algorithm. The EM algorithm is a demonstrated effective method of dealing with missing data (Bunting, Adamson, & Mulhall, 2002). Preliminary analyses were performed prior to testing the model for predicting PTSD severity. The mutual relationships of the predictor variables (the independent factors) and PTSD severity (the dependent factor; the HTQ total score) were investigated in correlation analyses. The distribution of HTQ 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). Subsequently, a hierarchical multiple regression analysis was conducted to

assess the predictive value of the independent variables on the HTQ total score.

RESULTS

Descriptives

The sample descriptives of all the predictor variables and PTSD severity are shown in table 1. The ASD prevalence rate was 11.1 % (*n* = 41), and the PTSD prevalence rate was 6.2 % (*n* = 23).We define subclinical ASD as the presence of three out of the four symptom clusters and subclinical PTSD as the presence of two out of the three symptom clusters as specified by the DSM-IV-TR. The subclinical ASD prevalence rates ranged from 11.1 % to 26.7 % (ASD without dissociation = 26.7 % (*n* = 99), ASD without avoidance = 14.0 % (*n* =52), ASD without re-experiencing = 11.6 % (*n* = 43), and ASD without arousal = 11.1 % (*n* =41)). The subclinical PTSD prevalence rates ranged from 6.2 % to 18.1 % (PTSD without avoidance = 18.1 % (*n* = 67), PTSD without intrusion = 6.7 % (*n* = 25), and PTSD without arousal = 6.2 % (*n* = 23)).

A total of 83 participants (22.4 %) had not been exposed to any prior traumas, whereas 129 participants (34.8 %) had been exposed to one prior trauma. The remaining participants had been exposed to between two to seven previous traumas (*n* = 158) and one participant had been exposed to ten previous traumas. The most common type of prior traumatic exposure was loss (*n* = 198) followed by being threatened with a weapon (*n* = 66), accidents (*n* = 69), witnessing someone being in danger or injured (*n* =45), fire (*n* =45), violence (*n* = 41), shock over traumatic exposure happening to someone close to you (*n* =25), disaster (*n* = 9), sexual abuse (*n* = 6), rape (*n* = 3), childhood neglect (*n* = 3), physical abuse (*n* = 2), and war (*n* = 2).

A total of 224 participants (60.4 %) did not report any exposure to major life events during the past year, whereas 138 participants (37.2 %) had experienced one or two, and the remaining nine participants (2.4 %) reported three to four life events. The most common types of life events were: death in the family (*n* = 55), job change (n = 39), illness in the family (n = 36), moving home (*n* = 22), burglary (*n* = 17), and divorce (*n* = 15). The majority of the participants had previously been exposed to bank robbery (*n* = 235, 63.3 %) as indicated by the relatively high percentage of exposure to threats with a weapon. Ninety-two participants had been exposed to one prior robbery (24.8 %), 49 participants had been exposed to two robberies (13.2 %), and the rest

had been exposed to 3-10 previous robberies. Furthermore, one participant had experienced 14 robberies. Only 12 participants (3.2 %) feared that they were going to die during the robbery. Thus, fear of dying was excluded from further analyses.

Table 1. Sample characteristics of all predictor variables, and PTSD severity (N = 371)

Pre-trauma variables			
Age	*M* = 42.11	*SD* = 12.47	*R* = 20-65
Female	61.5 %	(*n* = 228)	
Prior robberies	*M* =1.63	*SD* = 2.01	*R* = 0-14
Prior traumatic exposure	*M* = 0.54	*SD* = 0.00	*R* = 0-4
Life events	*M* = 0.54	*SD* = 0.79	*R* = 0-4
ASI	*M* = 10.11	*SD* =8.75	*R* = 0-39
Neuroticisme	*M* = 12.16	*SD* =7.93	*R* = 0-41
Peri-trauma variables			
Directly exposed (yes)	80.1 %	(*n* = 297)	
Perceived life threat (yes)	14.0 %	(*n* = 52)	
Perceived helplessness (yes)	37.2 %	(*n* = 138)	
Intense horror (yes)	34.5 %	(*n* = 128)	
TIS	*M* = 7.42	*SD* = 6.86	*R* = 0-24
PRS	*M* = 9.78	*SD* = 6.00	*R* = 0-62
PDEQ	*M* = 17.12	*SD* = 7.26	*R* = 10-45
Post-trauma variables			
ASDS	*M* =34.84	*SD* =13.16	*R* = 9-86
PTCI NCS	*M* =1.53	*SD* = 0.63	*R* = 21-104
PTCI NCW	*M* =2.31	*SD* = 1.12	*R* = 7-43
PTCI SB	*M* = 1.86	*SD* = 1.00	*R* = 5-27
CSS POS	*M* = 29.55	*SD* = 4.76	*R* = 13-35
CSS NEG	*M* = 2.02	*SD* = 1.74	*R* = 1-7
CSS SATIS	*M* = 6.40	*SD* = 1.17	*R* = 1-7
CSQ RAT	*M* = 27.68	*SD* = 4.85	*R* = 15-42
CSQ EMO	*M* = 14.06	*SD* = 3.55	*R* = 10-30
CSQ AVO	*M* = 19.09	*SD* = 3.97	*R* = 10-32
Dependent variable			
HTQ	*M* = 25.12	*SD* = 7.94	*R* = 16-62

Note. PTSD (posttraumatic stress disorder), *M* (mean), *SD* (standard deviation), *R* (range), age (*n* = 370), ASI (Anxiety Sensitivity Index), TIS (Tonic Immobility Scale), PRS (Physical Reaction Scale), PDEQ (Peritraumatic Dissociation Scale), ASDS (Acute Stress Disorder Scale), PTCI (Posttraumatic Cognition Inventory), NCS (negative cognitions about self), NCW (negative cognitions about the world), SB (self-blame), CSS (Crisis Support Scale), POS (positive), NEG (negative), SATIS (satisfaction), CSQ (Coping Style Questionnaire), RAT (rational), EMO (emotional), AVO (avoidant), and HTQ (Harvard Trauma Questionnaire).

Predicting PTSD Severity

Table 2 shows the correlation matrix between the pre-trauma, peri-trauma, post-trauma predictor variables, and the HTQ total score. Of the pre-trauma variables female sex, anxiety sensitivity, and neuroticism were significantly associated with an increased HTQ total score (*rs* = .26-.45, *all ps* < .01). Age, prior bank robberies, prior traumatic exposures, and major life events were not significantly associated with the HTQ total score. All the peri-trauma variables with the exception of proximity to the robbery was significantly associated with an increased HTQ total score (*rs* = .28-.51, *all ps* < .01). The ASDS total score, avoidant coping, emotion-focused coping, negative social support, negative cognitions about self, negative cognitions about the world, and self-blame were all significantly associated with an increased score on the HTQ (*rs* = .22 -.64, *all ps* <.01). Furthermore, perceived social support was significantly associated with a decreased score on the HTQ (r = -.14, p < .01), whereas rational coping and social support satisfaction were not significantly associated with the HTQ total score.

Table 3 shows a hierarchical multiple regression analysis of the prediction of the HTQ total score from the pre-trauma, peri-trauma, and post-trauma predictor variables. The pre-trauma variables were entered into the model at the first step. The only significant factors were female sex, anxiety sensitivity and neuroticism. These factors accounted for approximately 28 % of the variance in the HTQ total score. At step two, the peritraumatic variables were entered. The model now accounted for 37 % of the variance explained in the HTQ total score with only prior bank robberies, anxiety sensitivity, neuroticism, and peritraumatic panic being significant factors. At the final step of the model, the posttraumatic variables were entered. The final model accounted for 51 % of the variance in the HTQ total score with only peritraumatic dissociation, ASDS total score, and negative cognitions about self remaining significant. The overall largest predictor of PTSD severity (i.e. the HTQ total score) was the ASDS total score (β = .45, p < .001). Thus, we investigated how much of the variance in the HTQ total score that could be explained alone by the ASDS total score. A linear regression analysis (not shown here) showed that the ASDS total score alone accounted for 41 % of the variance in the HTQ total score (adj. R^2=.41, F (1,369) = 258.74, p< .001). Thus, the inclusions of the 23 other predictor variables only improved the model by 10 %. Negative cognitions about self were the second largest predictor of PTSD severity (β = .21, p < .001).

Table 2. Correlations between pre-, peri-, post-trauma predictor variables and the HTQ total score (Pearson's r)

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Age	-																							
Sex	-.09	-																						
Prior robberies	.36 **	.02	-																					
Prior traumas	.08	-.03	.14 **	-																				
Life events	-.17 **	-.10	-.01	.16 **	-																			
ASI	-.04	-.09	.00	-.04	.08	-																		
Neuro	-.17	-.29 **	-.11 *	.03	.13 **	.34 **	-																	
Proximity	-.04	-.12 *	-.11 *	.01	-.03	.08	.04	-																
Life threat	.13 *	-.12 *	.02	-.02	.03	.16 **	.15 **	.18 **	-															
Helpless-ness	-.12 *	-.19 *	-.07	-.01	-.03	.27 **	.23 **	.09	.19 **	-														
Horror	-.03	-.30 **	-.09	-.08	.05	.28 **	.26 **	.12 **	.25 **	.44 **	-													
TIS	-.09	-.23 **	-.13	-.04	.03	.34 **	.31 **	.29 **	.27 **	.48 **	.41 **	-												
PRS	-.09	-.31 **	.04	-.04	.12 *	.48 **	.37 **	.18 **	.37 **	.48 **	.52 **	.52 **	-											
PDEQ	-.09	-.26 **	-.10	.08	.04	.37 **	.32 **	.18 **	.27 **	.43 **	.37 **	.49 **	.64 **	-										
ASDS	-.13 *	-.30 **	-.03	-.05	.15 **	.48 **	.36 **	.09	.26 **	.45 **	.48 **	.46 **	.67 **	.68 **	-									
PTCI NCS	-.12 *	-.22 **	-.07	.05	.10	.42 **	.58 **	.11 *	.27 **	.29 **	.26 **	.37 **	.49 **	.44 **	.58 **	-								
PTCI NCW	-.06	-.17 **	-.04	.01	.08	.38 **	.42 **	.01	.27 **	.24 **	.23 **	.29 **	.43 **	.37 **	.53 **	.63 **	-							
PTCI SB	-.07	.07	-.09	-.05	.08	.20 **	.11 *	.16 **	.20 **	-.07	.01	.01	.17 **	.12 *	.23 **	.38 **	.36 **	-						
CSS POS	.10 *	-.12 *	.07	.01	-.02	-.12 *	-.15 **	-.03	.01	-.06	-.04	-.11 *	-.08	-.13 *	-.18 **	-.26 **	-.15 **	-.10*	-					
CSS NEG	-.06	-.12	-.04	.00	.13 *	.16 **	.19 **	.06	.01	.19 **	.15 **	.15 **	.29 **	.15 **	.27 **	.26 **	.22 **	.07	-.26 **	-				
CSS SATIS	.07	.05	.05	-.05	-.02	-.11 *	-.13 *	.04	-.04	-.07	-.06	-.09	-.06	-.04	-.17 **	-.16 *	-.10	-.02	-.29 **	-.23 **	-			
CSQ RAT	.09	.07	.01	.00	-.07	.00	-.28 **	.07	-.07	-.05	-.06	-.05	-.00	.04	.05	-.16 **	-.02	.03	.07	-.00	.09	-		
CSQ EMO	-.12 *	-.30 **	-.07	.10	.12 *	.39 **	.71 **	-.00	.09	.17 **	.18 **	.26 **	.34 **	.27 **	.36 **	.66 **	.47 **	.17 **	-.14 **	.22 **	-.18 **	-.24 **	-	
CSQ AVO	.07	-.23 **	.00	-.08	.02	.19 **	.29 **	.02	.17 **	.17 **	.20 **	.21 **	.28 **	.31 **	.33 **	.33 **	.30 **	.09	.00	.15 **	-.02	.16 **	.31 **	-
HTQ	-.07	-.26 **	.03	.02	.07	.38 **	.45 **	.08	.28 **	.36 **	.36 **	.38 **	.51 **	.41 **	.64 **	.61 **	.50 **	.22 **	-.14 **	.22 **	-.10	-.07	.47 **	.29 **

Note. 1=men, 0= women, PTSD (posttraumatic stress disorder), *M* (mean), *SD* (standard deviation), *R* (range), age (n = 370), Neuro (neuroticism), proximity (proximity to the robbery), ASI (Anxiety Sensitivity Index), TIS (Tonic Immobility Scale), PRS (Physical Reaction Scale), PDEQ (Peritraumatic Dissociation Scale), ASDS (Acute Stress Disorder Scale), PTCI (Posttraumatic Cognition Inventory), NCS (negative cognitions about self), NCW (negative cognitions about the world), SB (self-blame), CSS (Crisis Support Scale), POS (positive), NEG (negative), SATIS (satisfaction), CSQ (Coping Style Questionnaire), RAT (rational), EMO (emotional), and AVO (avoidant).

* p= ≤ .05, ** p= ≤ .01.

Table 3. Hierarchical Multiple Regression Analysis Predicting the HTQ total score

	Step1 (β)	Step2 (β)	Step3 (β)
Pre-trauma variables			
Age	-.05	-.05	-.01
Gender	-.15**	-.06	-.02
Prior robberies	.08	.10*	.06
Prior traumatic exposure	.01	.02	.04
Life changes	-.02	-.02	-.06
ASI	.26***	.11*	.00
Neuroticism	.32***	.25***	.10
Peri-trauma variables			
Proximity to the robbery		-.02	.00
Perceived life threat		.09	.07
Perceived helplessness		-.07	.05
Perceived horror		.05	.02
TIS		.05	.03
PRS		.22***	.06
PDEQ		.05	-.15**
Post-trauma variables			
ASDS			.45***
PTCI NCS			.21**
PTCI NSW			.04
PTCI SB			.01
CSS POS			.04
CSS NEG			.01
CSS SATIS			.05
CSQ RAT			.00
CSQ EMO			.09
CSQ AVO			.01
adj. R^2	.28***	.37***	.51***
F(df)	F (7,362) = 21.19	F^{change}(7,355) = 8.62	F^{change} (10,345) = 11.38

Note. 1=men, 0= women, HTQ (Harvard Trauma Questionnaire), *M* (mean), *SD* (standard deviation), *R* (range), age (*n* = 370), ASI (Anxiety Sensitivity Index), TIS (Tonic Immobility Scale), PRS (Physical Reaction Scale), PDEQ (Peritraumatic Dissociation Scale), ASDS (Acute Stress Disorder Scale), PTCI (Posttraumatic Cognition Inventory), NCS (negative cognitions about self), NCW (negative cognitions about the world), SB (self-blame), CSS (Crisis Support Scale), POS (positive), NEG (negative), SATIS (satisfaction), CSQ (Coping Style Questionnaire), RAT (rational), EMO (emotional), and AVO (avoidant).

* $p \leq .05$, ** $p \leq .01$,*** $p \leq .001$.

Thus, we investigated how much of the variance in the HTQ total score could be explained alone by negative cognitions about self. A linear regression analysis (not shown here) showed that negative cognitions about self alone accounted for 37 % of the variance in the HTQ total score (adj. R^2=.37, F (1,369) = 216.64, p< .001). Thus, the inclusions of the 23 other predictor variables only improved the model by 14 %.

DISCUSSION

The current study investigated the psychological impact of bank robbery on the employees by estimating the prevalence rates of both acute (i.e. ASD) and long-term post-traumatic stress symptoms (i.e. PTSD) in a cohort study of all Danish bank employees exposed to robbery during one year. At the same time, the current study also investigated several predictor variables grouped as pre-trauma, peri-trauma, and post-trauma predictors of PTSD severity. This knowledge can be used to facilitate preventive and early intervention which may hinder or minimize the development of PTSD and reduce the suffering and economic costs associated with PTSD.

Estimated ASD and PTSD Prevalence Rates

The prevalence rates of ASD (11.1 %) and PTSD (6.2 %) found in the current study are comparable to the prevalence rates found in our previous bank robbery study (ASD = 14.4 % and PTSD = 6.8 %; Hansen & Elklit, 2011; 2013). Thus, as expected, the rates are lower than those reported following other forms of robbery and nonsexual assault (ASD =17-25 % and PTSD = 20-30%; Brewin et al., 1999; Elklit, 1999; 2002; Elklit & Brink, 2004, Kleim et al., 2007). There are several possible explanations to why the reported prevalence rates of ASD and PTSD are lower following bank robbery than following other types of nonsexual assault. It has previously been argued that bank robberies may be less traumatizing than other forms of assault as violence during a bank robbery is often instrumental (i.e. directed toward achieving money) and not personal (i.e. directed toward the employees; Hansen & Elklit, 2013). However, the high subclinical prevalence rates of ASD and PTSD found in the current study indicate that it seems unlikely that exposure to bank robbery is simply less traumatizing than exposure to other forms of nonsexual assault. As argued by Hansen and Elklit (2013), bank

employees are a special trauma population in relation to meeting the avoidance criteria. Bank employees have difficulty scoring high on avoidance as they have difficulty avoiding confrontations with the traumatic place, talking and thinking about the robbery as they usually return to work, talk to colleagues, participate in debriefing etc. This is also evident in the current study as both prevalence rates increase with the removal of the avoidance criterion (ASD without avoidance = 14.0 %, PTSD without avoidance= 18.1 %). Finally, the low and decreasing prevalence rates (11.1 % ASD to 6.2 % PTSD) could reflect normal remission or a positive effect of debriefing or social support.

Predictors of PTSD Severity

Pre-Trauma Predictor Variables

Contrary to our expectations, age, prior robberies, prior traumatic exposures, and exposure to major life events were not significantly associated with PTSD severity as measured by the HTQ total score. The results are somewhat in accordance with the Brewin et al. (2000) meta-analysis of risk factors for PTSD finding that the effects of age and prior traumatic exposure are small. Additionally, age, prior robberies, prior traumatic exposure, and exposure to major life events do not seem to have had a distal effect on PTSD severity either; as the bivariate correlations between these pre-trauma predictor variables and the other predictor variables were primarily non-significant or weak. It is possible that prior traumatic exposure and exposure to major life events may simply not be significant predictor of PTSD severity; as the most common forms of traumatic exposure and life events were robbery and loss of a close relative. As mentioned earlier, all types of traumatic exposure are not necessarily equal in their effect (Ozer et al., 2003). For instance exposure to sexual assault seems to be more traumatizing than experiencing loss or exposure to bank robbery (Frans, Rimmö, Åberg, & Frederikson, 2005). Thus, as we previously argued it appears that some bank robbery victims get used to being exposed to robberies and that prior robberies therefore may have a stress inoculation effect in these individuals (Hansen & Elklit, 2011). However, it is also possible that prior robbery exposure increases the risk of developing PTSD in some individuals, but not in others, and that these mixed results produce a non-significant relationships between prior exposure to bank robberies and PTSD severity.

As expected, female sex, anxiety sensitivity (i.e. negative cognitions about bodily sensations), and neuroticism were significantly associated with PTSD

severity. Furthermore, all three factors were significant predictors of PTSD severity when controlled for the effect of the other pre-trauma predictor variables. However, the bivariate correlations were only weak to moderate and anxiety sensitivity and neuroticism did not significantly predict PTSD severity when controlled for the effect of post-trauma factors. Sex stopped being a significant predictor already when controlled for the effect of the peri-trauma factors. The relationship between sex and PTSD is likely to be much more complex than what the current study suggests. According to Christiansen and Elklit (2012) there are sex differences in several risk factors associated with the development of PTSD. Thus, sex may have an indirect influence on the development of PTSD, which is mediated by other factors risk factors. Both anxiety sensitivity and neuroticism were significantly and moderately to strongly associated with negative cognitions about self (*rs* = .42-.58, *ps* < .01) and the ASDS total score (*rs* = .36-48, *ps* < .01), both significant predictors of PTSD severity at the final step of the regression analysis. This suggests that anxiety sensitivity and neuroticism did not contribute anything unique when these two posttraumatic variables were introduced. Thus, negative cognitions about bodily sensations seem less important than negative cognitions about self in the genesis of PTSD. This is in accordance with research showing that negative cognitions about self seem to have a more pronounced role in the development of PTSD than other forms of negative cognitions (Karl et al., 2009; O'Donnell, Elliott, Wolfgang, & Creamer, 2007). Furthermore, it is possible that neuroticism was only a significant predictor of PTSD in the first place due to the cognitive element in neuroticism or that the effect of neuroticisme on PTSD is mediated by negative cognitions about self.

Peri-Trauma Predictor Variables

As expected perceived life threat, perceived helplessness, intense horror, tonic immobility, peritraumatic panic, and peritraumatic dissociation were all positively associated with PTSD severity. The associations were mainly moderate (*all rs* =.28-.51), and only peritraumatic dissociation was a significant predictor of PTSD severity when controlled for the effect of the other predictor variables. However, it is not possible to assess whether or not peritraumatic dissociation is truly a significant predictor of PTSD severity in the current study. The bivariate correlation between peritraumatic dissociation and PTSD severity indicates that peritraumatic dissociation is a predictor of PTSD, which is in accordance with previous research (Breh & Seidler, 2007; Ozer et al., 2003). However, in the complete model, PDEQ served as a negative suppressor variable (Conger, 1974) for another variable, as indicated

by further analyses (not shown here) most probably ASD. That is, it removed variance of the variable ASD irrelevant for the prediction of PTSD severity. By this statistical suppression effect, the regression weight becomes opposite in sigh to what is to be expected. As shown in table 2, the bivariate correlation of PDEQ and PTSD was .41. Thus, it is not possible to be sure whether or not peritraumatic dissociation is a significant predictor of PTSD in the current study due to the suppressor effect. However, the relationship between peritraumatic dissociation and PTSD seems rather complex and dependent of ASD in the current study as shown in the van der Velden and Wittmann (2008) review.

In accordance with previous bank robbery studies and studies of other forms of traumatic exposure (Hansen & Elklit, 2013; Kleim et al., 1999; Miller-Burke et al., 1999; Ozer et al., 2003); perceived life threat, perceived helplessness and intense horror were bivariately significantly associated with increased PTSD severity. However, none of these three variables predicted PTSD severity when controlling for the effect of the other predictor variables. Perceived life threat, perceived helplessness, and intense horror correlated significantly with ASD severity and negative cognitions about self, both of which were significant predictors of PTSD severity when all other factors were controlled for. Thus, perceived life threat, perceived helplessness, and horror could have had an indirect effect on PTSD through either or both of these two other factors. However, it is more likely that perceived life threat is simply not a particularly strong risk factor of PTSD severity in the current study as indicated by the weak association between perceived life threat and PTSD severity (r =.28) and the fact that only 14 % of the participants (n= 52) reported perceived life threat. The results regarding perceived helplessness and horror are in accordance with our previous bank robbery study (Hansen & Elklit, 2013), the Friedman et al. (2010) review of the diagnostic criteria for the DSM-IV-R PTSD diagnosis and the newly introduced PTSD diagnosis in the DSM-5 (APA, 2013). We previously found that perceived helplessness was moderately associated with PTSD severity but not a significant predictor of PTSD severity when the effect of other predictor variables was controlled for (Hansen & Elklit, 2013). Furthermore, according to Friedman et al.'s (2010) review, the A2 criterion has limited capacity to predict PTSD and does not improve diagnostic accuracy, as research shows that some people develop PTSD without an initial A2 response. Thus, the A2 criterion has been removed from the PTSD diagnostic criteria in the DSM-5 (APA, 2013). The A2 criterion also seems to have limited utility in the prediction of PTSD severity following bank robbery.

In accordance with previous research, tonic immobility and peritraumatic panic were significantly and moderately associated with PTSD severity (Bryant et al., 2011; Bryant & Panasetis, 2001; Heidt et al., 2005; Kunst et al., 2011; Marx et al., 2008; Nixon & Bryant, 2003; Rocha-Rego et al., 2009). However, tonic immobility and peritraumatic panic were not significant predictors of PTSD severity, when the effect of the other variables was controlled for. Tonic immobility and peritraumatic panic were moderately and significantly associated with increased ASD severity and negative cognitions about self. Thus, tonic immobility and peritraumatic panic might still have had an indirect effect on the development of PTSD severity through either or both of these factors. The indirect effect of peritraumatic panic is especially likely to have occurred through ASD severity, as the association between peritraumatic panic and ASD severity was particularly strong. The association between peritraumatic panic and peritraumatic dissociation was also strong and peritraumatic dissociation has been found to mediate the effect of panic on PTSD (Bryant et al., 2011). Although, it is not possible to assess whether or not peritraumatic dissociation is a significant predictor of PTSD severity in the current study, the effect of peritraumatic panic does not seem to be affected by peritraumatic dissociation in the current study, as peritraumatic panic was a significant predictor of PTSD severity when controlled for peritraumatic dissociation. In relation to tonic immobility the Kunst et al. (2011) study also found that tonic immobility was not a significant risk factor for PTSD following assault when controlled for other peritraumatic factors. At the same time, it has been argued that the impact of tonic immobility on PTSD could depend on a third factor for instance self-blame (cf. Heidt et al., 2005; Kunst et al., 2007). Thus, tonic immobility may only be strongly associated with PTSD if it leads to self-blame. This is not the case in the current study as tonic immobility did not correlate significantly with self-blame. Additionally, it is important to mention that tonic immobility following bank robbery may not be of the same clinical relevance as it seems to be following other forms of assault (cf. Heidt et al., 2005; Kunst et al., 2011). During a bank robbery the employees are often threatened to stand still, however, this does not equal not being able to move.

Post-Trauma Predictor Variables

As expected, ASD severity, negative cognitions about self, negative cognitions about the world, and self-blame were significantly associated with increased PTSD severity. Furthermore, ASD severity was the largest predictor of PTSD severity when the other predictor variables were controlled for. An

additional regression analysis showed that ASD severity alone explained 41 % of the variance of PTSD severity and adding the other predictor variables to the model only increased the amount of PTSD severity accounted for by 10 %. In other words, ASD severity plays a pivotal role in the prediction of PTSD following bank robbery. This is in contrast to previous studies showing that theoretically derived cognitive factors seem to be better predictors of PTSD than ASD (Kleim et al., 2007). Although, the ASD diagnosis may have limited utility in the prediction of PTSD diagnosis (Bryant, 2011), the results indicate that ASD severity seem to a strong predictor of PTSD severity following bank robbery. This may indicate that although there are different diagnostic criteria for ASD and PTSD, it is possible that ASD severity is an early indication of PTSD severity. This is in accordance with studies showing that early posttraumatic symptoms are a strong predictor of later posttraumatic symptoms (cf. Brewin et al., 1999; Hansen & Elklit, 2013; O'Donnell et al., 2007). A special focus on the employees' ASD severity levels in the acute phrase of the robbery may help to identify many victims at risk of developing PTSD. We therefore recommend the use of the ASDS to screen for PTSD in the acute phrase following bank robbery exposure. Cognitive factors and in particular negative cognitions about self also seem to play a pronounced role in the development of PTSD severity following bank robbery. Thus, the results of our study are in accordance with the O'Donnell et al. (2007) study, which also found that posttraumatic cognitions make a unique contribution to explaining the development of posttraumatic symptoms over and above that of early posttraumatic symptoms. However, this was only in relation to negative cognitions about self in the current study.

Negative cognitions about self were the second largest predictor of PTSD severity in the multiple regression analysis. Furthermore, an additional regression analysis showed that negative cognitions about self alone explained 37 % of the variance of PTSD severity, thus adding the other predictor variables to the model only increased the amount of PTSD severity accounted for by 14 %. However, negative cognitions about the world and self-blame were not significant predictor of PTSD severity when the effect of the predictor variables was controlled for. The association between negative cognitions about the world and PTSD severity was strong, but the association between PTSD severity and self-blame was only weak. Negative cognitions about the world were strongly associated with both negative cognitions about self and ASD severity, which may explain why negative cognitions about the world was not a predictor of PTSD severity despite the strong association. In other words, negative cognitions about the world do not seem to add anything

unique on its own when controlled for negative cognitions about self and ASD severity. Furthermore, self-blame has been found to be both positively, negatively and not associated with PTSD severity following different types of traumatic exposure (Blain, Galovski, Elwood, & Meriac, 2012; Karl et al., 2009; O'Donnell et al., 2007). The discrepancies in the results may be due to self-blame becoming protective when it is linked to increased sense of control (i.e. behavioral self-blame) rather than to self-esteem (i.e. characterlogical self-blame; Blain et al., 2012; Karl et al., 2009). Thus, in the current study it is possible that self-blame is only weakly associated with PTSD severity as it is may be a protective factor for some of the employees, a risk factor for other employees or/and not significantly associated with PTSD severity in others. Instead, the employees' negative cognitions about self seem particularly important to the development of PTSD. Negative cognitions about self are also found to have a more pronounced role than negative cognitions about self and self-blame in the development of PTSD following other forms of traumatic exposure (Blain et al., 2012; Karl et al. 2009; O'Donnell et al., 2007). Furthermore, we only investigated acute posttraumatic cognitions. However, research shows that negative cognitions about self become even more influential than negative cognitions about the world in the development of PTSD over time (O'Donnell et al., 2007). Thus, an internally driven sense of threat (i.e. negative cognitions about self) seems to be a more power full mechanism in the development of PTSD than an external sense of threat (i.e. negative cognitions about the world) following bank robbery as found in the O'Donnell et al. (2007) study of posttraumatic appraisals in the development of posttraumatic stress symptoms in injury survivors. Even though a bank robbery is caused by human desperation, an external sense of threat seems less important than the internal. This suggests that it may be possible to take preventive actions against the development of PTSD following bank robbery by focusing on changing the way that employees think about themselves and their capacity to response to bank robbery. The importance of cognitions in the development of PTSD following bank robbery is not only in accordance with the Ehlers and Clark (2000) cognitive model of trauma response, but also the recently introduced PTSD diagnosis in the DSM-5; where negative cognitions constitute a forth symptom cluster (APA, 2013).

Contrary to our expectations, not all of the investigated measures of social support and coping were significantly associated with PTSD severity. Positive social support was significantly associated with decreased PTSD severity and negative social support, avoidant coping, and emotion-focused coping were significantly associated with increased PTSD severity. However, none of these

post-trauma variables could predict PTSD severity when the other predictor variables were controlled for. Furthermore, rational coping and social support satisfaction were not significantly associated with PTSD severity. Rational coping has also been found unassociated with PTSD following other forms of traumatic exposure (Bödvarsdóttir & Elklit, 2004), which may suggest that it is not so much the absence of rational problem-focused coping that is associated with PTSD but rather the presence of more maladaptive coping styles. The different measures of social support may not be so strongly associated with PTSD severity in the current study because social support was measured one week after the robbery. The association between social support and posttraumatic symptoms has been shown to increase over time (Richards, 2000; Ozer et al., 2003). Thus, it is possible that social support will become a stronger predictor of PTSD severity following bank robbery over time. Furthermore, the lack of a stronger association between the different types of social support and PTSD severity may be due to the use of the CSS to measure social support. The CSS and especially the use of single items may not be sensitive enough to capture the range of social support that the participants encountered. Although, emotion-focused coping was moderately associated with PTSD severity (r = .47), emotion-focused coping was not a significant predictor of PTSD severity when controlled for the other predictor variables. It has been argued that many coping measures, including the CSQ, confound emotion-focused coping with an emotional outcome, specifically distress (cf. Christiansen & Elklit, 2011; Stanton, Danoff-Burg, Cameron, & Andrews, 1994). Thus, emotion-focused coping was likely not to be a significant predictor in the current study as we controlled for the effect of neuroticism. This assumption is supported by the strong association between emotion-focused coping and neuroticism (r =.71). The use of another coping scale may have produced a different result. However, many coping scales exhibit this confounding problem (Stanton et al., 1994).

LIMITATIONS

The current study has several limitations. Firstly, both the ASD and the PTSD prevalence rates were based on self-report measures rather than clinical interviews. Although both ASD and PTSD were assessed with standardized scales and according to the DSM-IV-TR, the estimated ASD and PTSD prevalence rates may still be imprecise. Secondly, although the translation and back-translation of several of the scales into Danish were done independently,

the psychometric properties of the original English scales cannot necessarily be transferred to the Danish versions. Thirdly, although there were no significant differences in ASD severity and PTSD severity between the debriefed and non-debriefed participants, debriefing may still have affected the results. It is possible that debriefing may have affected some of the participants' recovery process negatively and maybe other participants' recovery process positively. Finally, it is possible that the single items used to measure negative social support and social support satisfaction are not sensitive enough to capture the complexity of these aspects of social support that the participants experienced after the robbery.

CONCLUSION

Despite these limitations the current study is the only national cohort bank robbery study investigating the psychological impact and predictors of PTSD following bank robbery ever conducted. Among the strengths of the current study is a large and highly representative sample of bank robbery victims including a high initial response rate and a low dropout rate. The results show that exposure to bank robbery is a potentially traumatic event. The ASD prevalence rate was 11.1 % and subclinical ASD rates ranged from 11.1 % to 26.7 %. The PTSD prevalence rate was 6.2 % and subclinical PTSD prevalence rates ranged from 6.2 % to 18.1 %. The high subclinical prevalence rates indicate that many participants, who do not meet the diagnostic criteria for a full diagnosis, still suffer from severe symptoms of both ASD and PTSD.

The current study investigated a unique combination of predictors of PTSD severity in the attempt to identify and understand the psychological factors involved in the complex relationship between exposure to bank robbery and the development of PTSD. Results showed that 51 % of the variance in PTSD severity could be explained with only peritraumatic dissociation, ASD severity, and negative cognitions about self being significant predictors. However, due to a statistical artifact it was not possible to assess how peritraumatic dissociation is related to PTSD severity in the multivariate analysis. ASD severity and negative cognitions about self are of particular importance in the development of PTSD following bank robbery as they alone explained 41 % and 37 % of the variance in PTSD severity, respectively. Thus, victims with high levels of ASD severity are at increased risk of developing PTSD and screening for PTSD following bank robbery should focus on ASD severity. At the same time, in accordance with a cognitive model of PTSD and

the DSM-5, posttraumatic negative cognitions about self also play a pivotal role in the development of PTSD symptoms following bank robbery. Thus, future research should focus on the possibilities of developing preventive actions against the development of PTSD by focusing on negative cognitions.

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