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Posttraumatic Stress Disorder in Older Adults

Predominant Symptom Typologies, Treatment and Outcome Predictors

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Chapter 1

Introduction

Posttraumatic Stress Disorder (PTSD) is the most common mental disorder diagnosed after exposure to life-threatening events; it is associated with psychological, interpersonal and physical impairment. Epidemiological studies in different western countries reveal PTSD lifetime prevalence rates between 2 – 8% (e.g., Kessler et al., 2005; Maercker et al., 2008). Focusing on specific age cohorts, PTSD is also shown to be a common disorder in older adults. However, relatively little is known about the characteristics and treatment of the disorder in older adults.

Existing reviews concerning PTSD in older adults highlight different relevant age-specific aspects (e.g., Averill & Beck, 2001). The period of life in which the traumatic events occurred (early-life traumatization and late-life traumatization) as well as the type of PTSD (chronic, delayed onset, acute) may influence symptom severity in older adults (see reviews: Charles et al., 2005; Weintraub & Ruskin, 1999). Both symptom severity and the profile of PTSD symptoms may be represented differently across age cohorts (e.g., Averill & Beck, 2001). These differences in symptom presentation (i.e., symptom severity and symptom profile) may result in misdiagnosis in the elderly, so that caution is warranted in the diagnostic process. The abovementioned aspects of PTSD development and maintenance also raise the question of how far existing PTSD treatment approaches developed for young and middle-aged adults are applicable and effective for older adults.

To sum up, the available literature identified many unanswered questions concerning PTSD in older adults (i.e., influence of time of traumatization and type of PTSD, characteristics of the symptom profile, efficacy of PTSD treatment approaches). The increase in research on the topic over the last decade is a response to these unanswered questions as well as to demographic change and alterations in the perception of older adults in society.

The specific aim of this thesis was to further the knowledge of the phenotypic presentation of PTSD and of an age-specific treatment approach in older adults. First, an overview of current research regarding symptom profile, course and treatment approaches for PTSD in older adults is presented (article I). Based on this overview, studies were conducted to investigate the typologies of PTSD symptom clusters in older adults (article II) as well as an age-specific PTSD treatment approach (article III) and its outcome predictors (article IV). The studies (articles II-IV) focus on a homogenous group of older adults, permitting the provision of precise evidence concerning the age-specific aspects of time of traumatization.

The first chapter of this thesis gives a general introduction to the symptomatology and specific disturbances of PTSD. Developmental and maintenance models and treatment approaches for PTSD are also described. In addition, characteristics of older adults are briefly discussed. At the end of the first chapter, the research questions addressed in this thesis are outlined. The subsequent chapters comprise the original work carried out, which responds to the research questions and was submitted to peer reviewed journals. The final part summarizes the findings of this thesis and points to several possible future research directions and clinical implications, which are discussed.

Posttraumatic Stress Disorder

Definition and symptomatology

Trauma criteria

Posttraumatic stress disorder is one of the most common psychological consequences in the aftermath of a traumatic event. The exposure to trauma is well defined in the classification system of the DSM-IV (criterion A1 and A2; APA, 2010), whereby A1 defines the event as an exposition (direct, witnessing, indirect) to an unexpected and threatening situation associated with death or danger of death, or actual or threatened serious injury of oneself or of another person. Criterion A2 describes the reaction to the traumatic event, i.e., the response is associated with intense fear, helplessness or horror. In the current DSM-5 (APA, 2013) the criterion A2 has been removed.

Traumatic events can be classified concerning the type (man-made vs. accidental) and time duration (singular vs. continuous) (Table 1.1). Research showed that the development of a PTSD is most likely after the exposure to a type II and/or a man-made trauma (Maercker 2009).

Table 1.1: Types of trauma (Maercker, 2009)

	Accidental trauma	**Man-made trauma**
short-term (Type I) trauma	traffic accident, work-related trauma (e.g., fire-fighters)	physical and sexual assault, bank hold-up
long-term (Type II) trauma	long lasting natural disaster (e.g., flood), technical disaster	torture, war, domestic and sexual violence

Symptoms of PTSD

PTSD is characterized by well-defined symptom clusters. The former 3-factor structure (intrusion, avoidance, hyperarousal, see Table 1.2) from DSM-IV failed to fit the observed data adequately in many studies (e.g., Elhai et al., 2009; Naifeh et al., 2008). A 4-factor model proposed by King and colleagues (1998), separating the cluster of avoidance into two distinct factors (avoidance and emotional numbing) (e.g. Asmundson et al., 2004; Naifeh et al., 2008), received the strongest support. This structure could also be demonstrated for older adults with recent traumatization (Pietrzak et al., 2012;

Schinka et al., 2007). Both groups found that a 4-factor model (intrusion, avoidance, numbing and hyperarousal) provided a better data fit than the DSM-IV model.

As a consequence of these findings, the DSM-5 (APA, 2013) proposed four PTSD symptom clusters (Criterion B - intrusion, Criterion C - avoidance; Criterion D – negative alterations in cognition and mood; Criterion E – alterations in arousal and reactivity). An overview of the changes regarding the current DSM-5 classification is given in Table 1.2.

Table 1.2: Diagnostic criteria of PTSD symptoms in DSM-IV and DSM-5

	DSM-IV (Symptoms needed)	**DSM-5** (Symptoms needed)
Trauma criterion	**Cluster A (-)**	**Cluster A (-)**
Exposure to (threatened) death, serious injury	A1	A1
Emotional response to trauma	A2	-
Intrusion	**Cluster B (1/5)**	**Cluster B (1/5)**
Intrusive recollections	B1	B1
Traumatic nightmares	B2	B2
Acting/feeling as though the event were recurring	B3	B3
Intense or prolonged distress after exposure to traumatic reminders	B4	B4
Marked physiological reactivity after exposure to trauma-related stimuli	B5	B5
Avoidance of distressing trauma-related stimuli	**Cluster C (3/7)**	**Cluster C (1/2)**
Negative alterations in cognitions and mood		**Cluster D (2/7)**
Trauma-related thoughts or feelings	C1	C1
Trauma-related external reminders (e.g., places, people)	C2	C2
Inability to recall key features of the traumatic event	C3	D1
Markedly diminished interest in (pre-traumatic) significant activities	C4	D5
Feeling alienated from others (e.g., detachment)	C5	D6
Constricted affect	C6	D7
Persistent negative beliefs and expectations about oneself or the world	C7	D2
Persistent distorted blame of self or others for causing the traumatic event or for resulting consequences	-	D3
Persistent negative trauma-related emotions (e.g., fear, horror, anger, shame)	-	D4
Persistent symptoms of increased arousal	**Cluster D (2/5)**	**Cluster E (2/6)**
Sleep disturbance	D1	E6
Irritability or outburst of anger/	D2	
Irritable or aggressive behavior		E1
Concentration problems	D3	E5
Hypervigilance	D4	E3
Exaggerated startle response	D5	E4
Self-destructive or reckless behavior	-	E2
Persistence of symptoms > 1 month	**Cluster E**	**Cluster F**
Disturbance causes clinically significant distress or impairment in social, occupational, or other important functioning	**Cluster F**	**Cluster G**

Regarding the diagnostic criteria of the DSM-5, PTSD is mainly characterized by disturbances of the memory (e.g., intrusive re-experiencing, flashbacks, inability to recall key features of the trauma). Peritraumatic cognitive processes (e.g., dissociation) affect the functional encoding and integration of the traumatic event into the autobiographical memory. As a consequence, the recall of trauma-associated as well as non-traumatic memories in PTSD patients is disturbed (see Table 1.3).

Table 1.3: Memory disturbances in PTSD patients (Knaevelsrud & Böttche, 2013)

	Trauma-associated memory	**Non-traumatic memory**
Voluntary recall	Fragmentation, disorganization	Overgeneralized memory
Involuntary recall	Re-experiencing (intrusion)	Emotional reference points

Trauma-associated memories:

a) Voluntary recall – Fragmentation and disorganization: Based on Ehlers and Clark's model (2000), dysfunctional or missing associations between memories of a traumatic event interfere with the coherent intentional recall of the event (Ehlers et al., 2004). As a consequence, voluntary recall of trauma-associated memories is fragmented or disorganized (Engelhard et al., 2003; Halligan et al., 2003). The fragmentation/disorganization seems to be worst in temporal proximity to extremely threatening traumatic content (so called "hot spots", Ehlers & Clark, 2000), whereas temporal distance from the "hot spots" allows an unimpaired recall (Hellawell & Brewin, 2002). Empirical data demonstrates an association between fragmentation and the development of PTSD (e.g., Murray et al., 2002).

b) Involuntary recall - Re-experiencing (intrusion): The cluster of re-experiencing symptoms represents a characteristic of PTSD (APA, 2013; WHO, 2010). Primarily, these re-experiencing symptoms have a sensory character (Ehlers et al., 2002; Hackmann et al., 2004) and differ in their intensity compared to non-traumatic involuntary memories (Kleim & Ehlers, 2008). PTSD patients describe intrusive memories as vivid, overwhelming and threatening. Because of the lack of association between intrusive and other autobiographical memories (Kleim & Ehlers, 2008), patients are unable to recall corrective posttraumatic memories while experiencing

intrusions (Koriat et al. 2000); i.e., a corrective experience after the trauma (e.g., "my family survived the war") is not retrievable while experiencing intrusive symptoms. Therefore, the intrusive memory evokes the same intense threatening feelings as the traumatic situation itself.

Non-traumatic memory:

a) Voluntary recall - Overgeneralized memory: PTSD patients show an over-generalized memory (OGM) with regard to the intentional recall of non-traumatic autobiographical memories (Williams et al., 2007); i.e., a recall of specific and detailed memories is not possible (e.g., "I was fascinated by the great architecture of the amazing church in Barcelona on our vacation in 2013"), but only of general memories (e.g., "I went on holiday to Spain in 2013"). This deficient recall could impede the recall of resource-oriented and/or positive autobiographical memories (Ehlers et al., 2000). The self-memory model (Conway & Pleydell-Pearce, 2000) and the affect-regulation hypothesis (Williams et al., 2007) provide an explanation for this cognitive disturbance. They assume an early interruption in the hierarchical search of autobiographical event retrieval to minimize negative affects. Only PTSD patients show an OGM; trauma survivors without PTSD are not affected (Kleim & Ehlers, 2008; Moore & Zoellner, 2007), indicating a specific memory characteristic of PTSD.

b) Involuntary recall - Emotional reference points: Research demonstrates that the unintentional recall of non-traumatic memories could be associated with traumatic memories (Berntsen, 2001). This association occurs if the memories hold specific characteristics (e.g., personal importance, negative emotional valence). In PTSD patients, traumatic memories build strong links to non-traumatic autobiographical memories, i.e., they build reference points (Berntsen, 2000; Berntsen et al., 2001). These reference points organized non-traumatic memories, so that the unintentional recall of non-traumatic memories leads to trauma-associated content and to a possible change in the affect.

Posttraumatic Stress Disorder in older adults

Epidemiology

PTSD is a common disorder in older adults. Epidemiological studies reported a generally lower lifetime prevalence in older adults (range: 2.5 – 4.5%) than in younger (range: 4.0 – 6.3%) or middle-aged adults (range: 3.8 – 9.2%) (Frans et al., 2005; Kessler et al., 2005; Spitzer et al., 2008). Only Maercker and colleagues (2008) found a higher PTSD prevalence rate in older adults (3.4%; middle-aged: 1.9%; young adults: 1.3%).

Partial (or subsyndromal) PTSD also presents clinically significant symptoms, making it important to take this into consideration for this cohort. Results demonstrated that partial PTSD in older adults is also common (range: 3.8 – 5.5 %, Glaesmer et al., 2010; Pietrzak et al., 2012) and significantly associated with co-occurring mood and anxiety disorders (Pietrzak et al., 2012).

Characteristics of PTSD

For a better understanding of PTSD in older adults, it is necessary to distinguish between early-life and late-life traumatization. The available data tend to show significantly higher rates of PTSD in older adults with early-life traumatization than in those with late-life traumatization (Norris et al., 2002, Ogle et al., 2013).

Late-life traumatization. Studies focusing on the difference in PTSD symptom severity and profile between young and old adults with recent traumatization show inconsistent results. Many studies indicate no differences in symptom severity between young and old adults (e.g., Bleich et al., 2005; Chung et al., 2005). However, both lower and higher severity scores were found for older adults compared to young or middle-aged adults (Norris et al., 2002). Furthermore, no definitive conclusions can be drawn in relation to the symptom profiles of the different age groups because the existing studies cover a variety of age categories, types of trauma and cultural contexts (e.g., Chung et al., 2005; Goenjian et al., 1994; Norris et al., 2002).

Early-life traumatization. Findings on the longitudinal course of PTSD resulting from early-life traumatization are currently inconclusive. Most studies show that a decline in PTSD severity can be observed over the lifespan (e.g., Shlosberg & Strous, 2005; Trappler et al., 2002; Yehuda et al., 2009). However, this decrease is accompanied by a

change in the symptom profile, reflecting an increase in avoidance and a decrease in intrusion symptoms (Trappler et al., 2002; Yehuda et al., 2009). Although the data generally point to a decrease in PTSD symptom severity over time, delayed onset or a gradual increase of symptoms over time was examined in subgroups of early-life trauma survivors (e.g., Port et al., 2001; Solomon & Mikulincer, 2006). A recent study by Chopra and colleagues (2014) examining a 6-month longitudinal trial provides an explanation of the inconclusive data. They found both a chronic and a fluctuating course of PTSD.

Development and maintenance of PTSD

In the literature, there are several theoretical models explaining the development and maintenance of PTSD. Two empirically validated models are described below, explaining PTSD as a result of dysfunctional encoding and decoding of (trauma-related) memories.

Cognitive model (Ehlers & Clark, 2000)

Ehlers and Clark (2000) propose a cognitive model for the persistence of PTSD which comprises two key aspects:

- negative interpretation of the trauma and its sequelae
- dysfunctional elaboration and contextualization of trauma memories in the autobiographical memory (i.e., fragmented and disorganized intentional recall of traumatic memories; easily triggered and involuntary unintentional recall of intrusive memories; intrusions perceived as sensory impressions happening right now; difficulties in retrieving posttraumatic memories during intrusive re-experiencing; experiencing a trauma-associated negative affect without a specific trigger of the trauma)

These aspects produce an ongoing sense of threat accompanied by continuing dysfunctional behavioral and cognitive changes (e.g., avoidance of thoughts and feelings); see Figure 1.1.

Empirical evidence was found for the model itself (Ehring et al., 2008) as well as for specific components (e.g., fragmented intentional recall, Halligan et al., 2003; difficulties in retrieving posttraumatic memories during intrusive re-experiencing, Kleim & Ehlers, 2008).

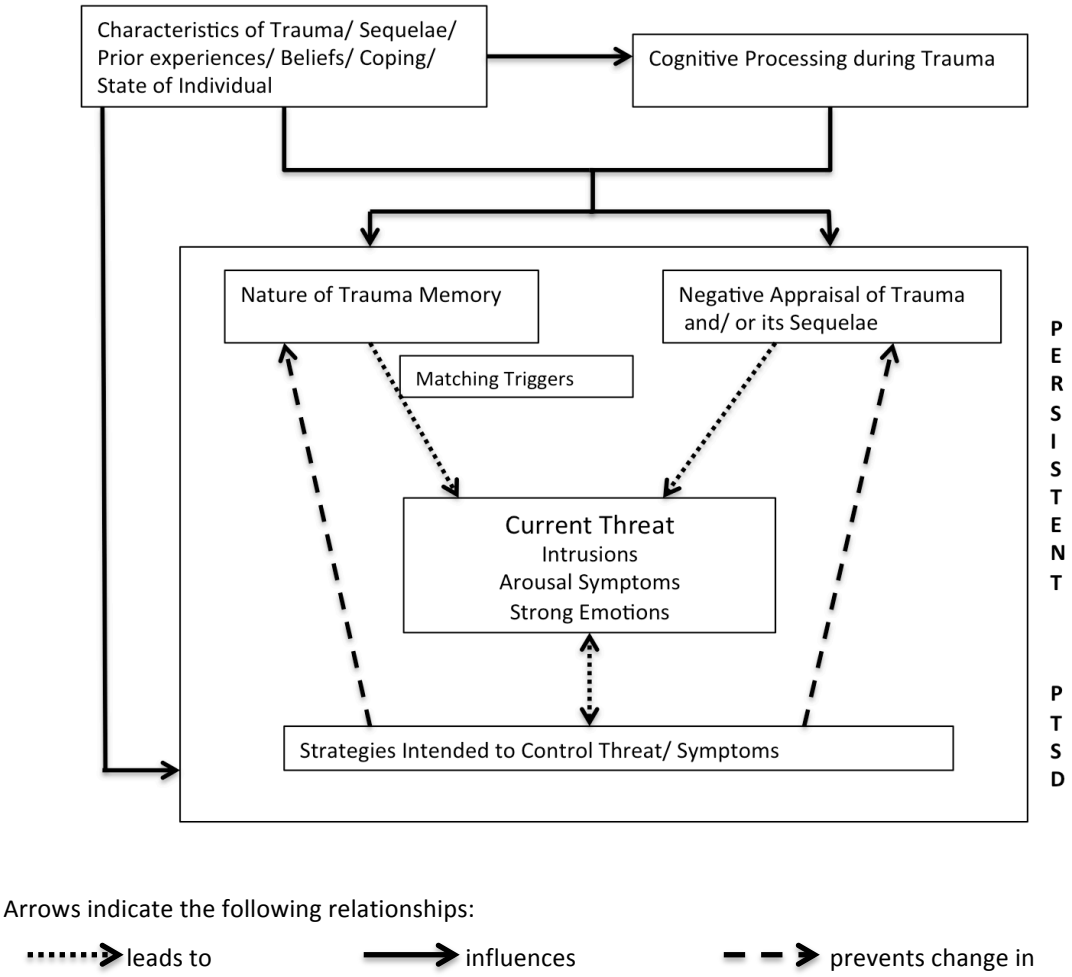

Figure 1.1: Cognitive model of PTSD (Ehlers & Clark, 2000)

Dual representation theory (Brewin, 1996, 2010)

Brewin's model is based on the assumption of two distinct representation systems of trauma memories which are both encoded during the trauma (see Figure 1.2):

- verbally accessible memory (VAM): Because of their integration within other autobiographical memories, trauma memories are voluntarily and intentionally retrievable and verbally communicable
- situationally accessible memory (SAM): Trauma memories are involuntarily triggered by external or internal reminders and therefore hardly communicable. The SAM stores vivid emotional information as well as sensory and bodily trauma-associated information

In a revised version, Brewin and colleagues (2010) implemented new terminologies for the two memory systems: contextual memory and representation (formerly VAM)

and sensation-based memory and representation (formerly SAM).

Empirical data supported the distinct memory systems (e.g., Brewin, 2013; Hellawell & Brewin, 2002). However, a controversy is still ongoing regarding the validity of the revised dual representation theory (Brewin & Burgess, 2014; Pearson, 2012, 2014; Pearson et al., 2012).

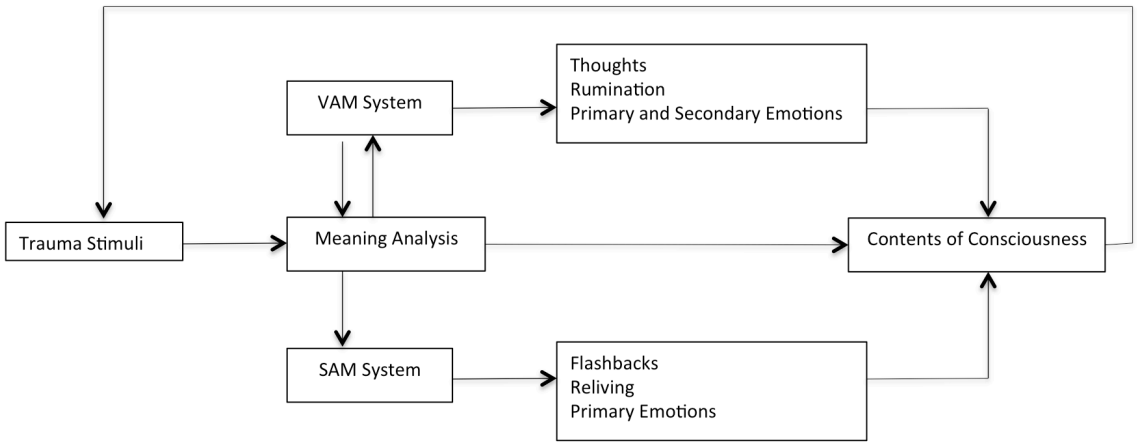

Figure 1.2: Dual representation model (Brewin, 2003)

Treatment approaches for PTSD

Over the last few decades, many approaches have been developed for the treatment of PTSD (i.e., psychotherapy, somatic and pharmacological treatments). The current state of research recommends cognitive behavioral therapy (CBT) as the method of choice. CBT is the most commonly studied treatment, including mainly mixed or primarily trauma-focused or cognitive therapy.

In a recent meta-analysis, Bisson and colleagues (2013) assessed the effects of psychological therapies for PTSD by comparing several approaches (e.g., trauma-focused CBT: TFCBT; Eye Movement Desensitization and Reprocessing: EMDR; waiting list/usual care). Results indicated a superiority of individual TFCBT and EMDR compared to a waiting list/usual care (standardized mean difference (SMD) –1.62 and (SMD) –1.17 respectively). No differences were found between EMDR and TFCBT (SMD –0.03). Another recent meta-analysis examined the efficacy of PTSD treatments (Watts et al., 2013). CBT (g = 1.26) was the most effective psychotherapy.

With established evidence of the efficacy of psychological PTSD treatments, research also focused on predictors of the treatment outcome. Studies with adolescents and middle-aged adults have concentrated mainly on examining sociodemographic variables, trauma characteristics and psychopathology as predictor variables. Studies of how sociodemographic variables (sex, age and educational level: Jaycox et al., 1998; Marks et al., 1998; Rizvi et al., 2009; Tarrier et al., 2000) and initial levels of psychopathology (high intake PTSD symptom severity: Foa et al., 1995; Jaycox et al., 1998; Karatzias et al., 2007; Munley et al., 1994; van Minnen et al., 2002) influence the outcome came up with inconsistent findings. Trauma characteristics, e.g., number of traumatic events (Ehlers et al., 1998; Tarrier et al., 2000) and time since trauma (e.g., Ehlers et al., 2005; Marks et al., 1998) were mostly unrelated to treatment outcome.

Taken together, variables at best show a trend regarding their influence as an outcome predictor for the psychological treatment of PTSD. There is little research on the special cohort of older adults.

Treatment approaches for older adults

When providing psychotherapy to older PTSD patients, particular challenges in the diagnostic process, age-specific cognitive changes and related needs in the therapeutic process must be taken into account (Charles et al., 2005; Owens et al., 2005). However, national and international guidelines for the treatment of PTSD (e.g., National Institute for Clinical Excellence, NICE, 2005; S3-Leitlinien, Flatten et al., 2011) do not specify the treatment of PTSD in old age and randomized controlled trials of psychotherapeutic interventions for older PTSD patients are scarce.

Cognitive approaches

Cognitive techniques focus on dysfunctional thoughts and feelings about the trauma and its sequelae. With the help of cognitive techniques (e.g., Socratic dialogue, double standard technique), patients are motivated to question their dysfunctional trauma-related cognitive schemas and paradigms, aiming to gain a functional view of the trauma and their post-traumatic life. In relation to older adults, the functional reconnection of past and present is essential for the development of a balanced and coherent biography.

In a recent meta-analysis, primarily cognitive therapy was shown to be highly effective in treating PTSD in adolescents and adults (g = 1.63, k = 10, n = 585, Watts et al., 2013). In particular, the cognitive processing therapy of Resick and Schnicke (1992), focusing on reducing negative trauma-associated feelings and regaining safety and control, showed a large effect size (g = 1.69, k = 3, n = 224, Watts et al., 2013).

Only a small number of field and case studies have been published using primarily cognitive techniques for older PTSD patients (Boehnlein & Sparr, 1993; Snell & Padin-Rivera, 1997). However, in other anxiety disorders (especially generalized anxiety disorder), cognitive techniques have been found to be applicable and effective for older adults (e.g., Ayers et al., 2007; Wolitzky-Taylor et al., 2010).

Exposure

Exposure techniques confront the patient with the traumatic event and with trauma-associated stimuli. The repeated confrontation activates the fear structure, which leads to modification and to habituation. Exposure is done in two ways:

- in vivo exposure – actual confrontation with the trauma-associated situation (e.g., sitting in and driving a car after a motorcycle accident).

- imaginal exposure – intentional imaginal recall (oral or written) of the traumatic event and trauma-associated thoughts and feelings.

In general, primarily exposure therapy demonstrates high effect sizes (g = 1.08, k = 27, n = 1310, Watts et al., 2013). The best-evaluated exposure approach is prolonged exposure therapy (PE, Foa, Hembree, & Rothbaum, 2007), proving its efficacy for the treatment of PTSD (g = 1.38, k = 10, n = 692, Watts et al., 2013). Simulator-based exposure therapy and narrative exposure therapy (NET, Neuner et al., 2004) were also shown to be effective PTSD treatment interventions (g = 1.01, k = 4, n = 79 and g = 1.00, k = 4, n = 242, respectively, Watts et al., 2013).

It can be assumed that the basic mechanisms of change also operate in a similar way in exposure interventions in older adults. Recent research demonstrated the efficacy of exposure therapy in older adults in pilot studies (Knaevelsrud et al., 2014; Thorp et al., 2012) as well as in controlled studies (Gamito et al., 2010; Yoder et al., 2013) and disproved the opinion widely held in the past that caution has to be advised in the treatment of older adults. Nevertheless, the same exclusion criteria for exposure therapy have to be taken into consideration for older adults as for young and middle-aged adults (e.g., psychosis, substance dependence, trauma-related amnesia).

In a brief digression, EMDR should be mentioned as another effective treatment approach (g = 1.01, k = 11, n = 390, Watts et al., 2013) which combines imaginal trauma confrontation with cognitive components. The imagination of trauma-associated memories while focusing a physical stimulus (eye movement, tapping) allows the integration of the improperly stored trauma memories in an adaptive and functional memory (Shapiro, 2001). For older adults, EMDR has been reported only in case studies (Hyper et al., 1995; Thomas & Gafner, 1993).

Narrative/Writing approaches

a) Life review approaches

Developmental and maintenance models of PTSD are based on the fact that the traumatic experience is insufficiently or not at all encoded in the autobiographical memory (Brewin, 2003; Ehlers & Clark, 2000) and therefore inadequately integrated in the trauma survivor's biography (Neuner et al., 2008). The consequences may include the inability to move on from the time of trauma, a sense of a foreshortened future and a loss of interest in significant pre-traumatic activities.

The life review approach aims to integrate the trauma in the biography. On the one hand, this approach focuses on the trauma itself and is thus aimed at a chronological coherent intentional recall of the traumatic event (see Table 1.3, trauma-associated memory). On the other hand, focusing on the entire biography allows a balanced and detailed reconstruction of significant life experiences and their evaluation for the subject's own life (see Table 1.3, non-trauma-associated memory).

In the field of psycho-gerontology, life review is already a common treatment approach for older adults, especially for depression (Bohlmeijer et al., 2003).

Maercker (2002a) developed a life review intervention especially for older chronic PTSD patients. In several treatment sessions, therapist and patient follow a semistructured questionnaire with the aim of building a coherent narrative from birth to the present age. In a separate session before or after the life phase in which the trauma occurred, the traumatic event is described in detail. Maercker (2002b) described three mechanisms of the life review intervention: 1) building a balanced biography with positive and negative memories; 2) finding a meaning for the traumatic event which enables a change in the patient's view of their own life; and 3) elaborating a more detailed recall of auto-biographical memories. Several case studies (Maercker et al., 2002a; Maercker & Müller, 2004) demonstrated effective treatment effects involving a decrease in PTSD symptoms, which remained stable at a 3-month follow-up assessment.

Excursus. Narrative Exposure Therapy is a short-term treatment approach based on CBT (Neuner et al., 2004). Another key element of the NET besides its trauma-focused exposure is the chronological narrative of the entire biography (based on testimony therapy). This narrative allows a balanced view and reflection of life. With the help of a therapist, the patient is encouraged to relive the trauma in detail on the sensory, emotional and cognitive levels. The aim is to reduce PTSD symptoms via habituation as well as to transform the fragmented traumatic event into a coherent narrative. The theoretical frame of the NET mechanisms is a dual representation of traumatic memories (Neuner et al., 2008). The efficacy was demonstrated in several randomized control trials in different cultural contexts and samples (Robjant & Fazel, 2010).

b) Writing approaches

In recent decades, written disclosure has been discussed in the clinical context as a psychotherapeutic approach for trauma and stress reactions and disorders. Writing approaches offer some specific advantages for older adults, who are, in general, more familiar with writing as a common communication medium (e.g., writing letters was a common form of communication). Older adults with potentially limited mobility can carry out the treatment sessions independently at a time and place which suits them (e.g., at home, residential home, day care). The non-visual anonymity of the writing approach also facilitates the overcoming of common treatment barriers in older adults such as the age difference between therapist and patient or worries of being stigmatized, making it easier to approach the disclosure of topics associated with shame and fear.

In the literature, two writing approaches for the treatment of traumatic and stressful events are described: expressive writing and writing therapy.

Expressive writing is a paradigm developed by Pennebaker and Beall (1986), which deals with the written disclosure of stressful life events without a therapeutic interaction. On average, participants complete 3 writing sessions of approx. 20 minutes each (all sessions on one day or one session per day). The writing instructions are not further specified, i.e., no instructions are given regarding psychoeducation, the use of tenses (present vs. past) or the form of address (first-person vs. third-person). Meta-analyses show inconsistent findings regarding the effect of expressive writing on psychological mental health (moderate effect size - Symth, 1998; small effect size - Frattaroli et al., 2004; no significant effect size - Frisina et al., 2004; Mogk & Reinhold-Hurley, 2006). No significant effects could be demonstrated for the treatment of PTSD in particular (Frattaroli et al., 2004; Mogk & Reinhold-Hurley, 2006).

Compared to the paradigm of expressive writing, *writing therapy* is a therapeutic approach consisting of different CBT techniques. In PTSD writing approaches, trauma exposure and cognitive restructuring are core components. The patient completes between 5 - 30 writing sessions, each of approximately 45 minutes and receives feedback from the therapist, so that a therapeutic relationship can be established. The therapeutic instructions are very detailed and clear. Due to the non-visual anonymity, self-disclosure of issues like shame and guilt is facilitated. In addition, it may be assumed that archiving the therapeutic texts and the possibility of patients re-reading their own

emotional and cognitive insights has a protective effect (relapse prevention). The AWMF S3 guidelines for PTSD refer to writing therapy as a new effective cognitive behavioral approach (Flatten et al., 2011). In a first meta-analysis, the efficacy of writing therapy for PTSD was demonstrated (effect size: g = 0.80; van Emmerik, 2013).

Writing therapy is mostly applied as an Internet-based intervention that is based on cognitive-behavioral techniques (e.g., exposure, cognitive restructuring) and applicable as self-guided (i.e., without any psychotherapeutic guidance/feedback through the process, e.g., Possemato et al., 2011) or therapist-guided (i.e., low-intensity guidance: short informative/motivational therapeutic feedback, e.g., Litz et al., 2007; or high-intensity guidance: intense and highly individual therapist-patient contact, e.g., Knaevelsrud et al., 2007). In recent decades, the efficacy of different Internet-based PTSD interventions has been remarkably robust across studies (meta-analysis: Cohen's d = 1.23, Hedman et al., 2012). The best evaluated Internet-based approach for PTSD is the therapist-assisted writing CBT of Lange and colleagues (2001, Interapy; Netherlands: Lange et al., 2003; Germany: Knaevelsrud et al., 2007; Iraq: Wagner et al., 2012). The intervention is based on a PTSD treatment manual (containing effective CBT components: exposure, social sharing, cognitive restructuring) and lasts between 5 and 16 weeks. The intense interaction between therapist and patient is realized via writing assignments and is asynchronous (i.e., the exchange of therapeutic texts is time-delayed). The patient produces his/her written therapeutic texts within a fixed time frame and makes them available to the therapist in a suitable way (e.g., via a secure platform). The therapist gives individual feedback (e.g., expressing empathy, complimenting the patient, motivating change) as well as specific writing instructions for the next assignment.

There is a range of theoretical models in the literature which attempt to identify the efficacious mechanisms underlying writing approaches. So far, empirical evidence regarding the concrete mechanisms of the effect of writing is still ambiguous (for a detailed overview, see Knaevelsrud & Böttche, 2013).

Habituation via trauma exposure. Writing about a traumatic event is associated with an increase in arousal symptoms and negative feelings in the first writing sessions. These negative responses could not be detected in the following writing session, so that a habituation could be assumed (Sloan et al., 2005). Furthermore,

explicit and focused writing about the trauma is associated with a decrease in PTSD symptoms (Sloan et al., 2012).

Building a coherent trauma narrative. Smyth and colleagues (2001) found a significant relationship between coherent writing about the trauma and a decrease of disorder-associated activities. This relationship did not occur in participants who were instructed to write a fragmented trauma narrative or about daily routine. The repeated writing about the traumatic event also allows a re-evaluation and rearrangement of traumatic memories (Pennebaker, 1997; Smyth et al., 2001).

Affect regulation. Writing about the trauma should enable the individual to experience and control negative affects. Smyth and colleagues (2008) demonstrated a significant decrease in feelings of anger and stress in the PTSD treatment group (writing about the trauma) compared to a control group. However, a study by Niedtfeld and colleagues (2008), who focused on mechanisms in expressive writing, failed to identify affect regulation as an effective mechanism.

Social integration. Disclosure of the traumatic event facilitates communication about the trauma itself (Horn & Mehl, 2004). Radcliffe and colleagues (2010) examined whether both shared disclosure and private disclosure (without sharing) reduced intrusion and avoidance symptoms compared to a control group. The study showed that shared disclosure resulted in a significant reduction in depressive symptoms and in social insecurity compared to both private disclosure and the control group. Another aspect of shared disclosure is the participant's acknowledgment of himself/herself as a victim, which is a protective factor for mental health and is associated with a reduction in mental stress (Maercker & Müller, 2004).

Integrative Testimonial Therapy

Based on case studies of Maercker (2002) and NET (Neuner et al., 2004), Integrative Testimonial Therapy (ITT, Knaevelsrud et al., 2011, 2014) was developed especially for PTSD treatment in older adults. ITT combines techniques of life-review, testimony and trauma-focused interventions. The aim of this Internet-based writing therapy is the integration of the traumatic event in the biography as well as a change in trauma-associated dysfunctional cognitions. In its structural design, ITT is based on the Internet-based intervention of Interapy (Lange et al., 2003). Over a six-week period, participants are asked to complete 11 writing assignments (two 45-minute assignments per week). Participants receive therapeutic feedback and new instructions for the next writing session within 24 hours (during the week). ITT consists of three treatment modules:

Resource-oriented biographical reconstruction (seven essays): The core component of ITT consists of the biographical reconstruction of the participant's life. The conscious and detailed recall of biographical events and feelings (positive and negative) allows a coherent life story in which the traumatic event is integrated and permits an adaptive and healthy review of the biography.

Moderate exposure (two essays): This module is integrated in the biographical reconstruction. Before describing the life phase where the traumatic event occurred, the participant is asked to describe the traumatic event(s) in detail, i.e., to focus on the most painful images. The aim of the exposure is a reduction of the high level of trauma-related distress (i.e., a reduction of the distress due to an involuntary uncontrolled recall of trauma-associated memories). The repeated written exposure also aims to break up the fragmented and disorganized trauma-associated voluntary memories and supports the development, processing and encoding of a coherent trauma narrative.

Cognitive reappraisal (two essays). The aim of the last treatment phase is to stimulate a new perspective on the traumatic event and to (re)gain a sense of control over it. Participants write a supportive letter to their younger self from their current perspective. Through the development and realization of their own resources and skills during the therapeutic process, participants are instructed to challenge dysfunctional thinking and behavior patterns, to correct unrealistic assumptions, and to reflect on the child's feelings. In addition, participants are asked to think about and write down possible coping skills for the future.

Research questions

To sum up, current research demonstrates that PTSD is a common and disabling condition in older adults following a traumatic event. Despite its prevalence rates and an increasingly aging population, relatively little is known about the characteristics of the disorder in older adults. The available data suggests that there are differences in PTSD symptom severity and symptom profiles in older adults compared to young or middle-aged adults, based on the time the traumatic event occurred. Moreover, there has been little evaluation of the efficacy of psychotherapeutic treatment approaches for older PTSD patients. The first article of the thesis therefore focuses on the current state of research on older PTSD patients and aims to summarize the characteristics of late-life PTSD and its current treatment approaches:

Does the timing of the trauma impact prevalence rates, course and symptom profile of PTSD in older adults?

What PTSD treatments are proposed for older adults?

While the overview has helped in characterizing PTSD in older adults, little is known about common clinical manifestations of this disorder, which can vary with respect to the heterogeneous PTSD symptom clusters. Older adults often have concurrent mental and physical problems, so symptoms of PTSD are often misdiagnosed as depression or anxiety. The second article of the thesis therefore focuses on the evaluation of predominant typologies of PTSD in older adults and aims to answer the following research questions:

Which predominant typologies of PTSD in older adults exist?

Are specific demographic and trauma-related factors associated with these typologies?

How do the typologies relate to comorbid symptoms?

Although specific CBT treatment approaches for PTSD have been found to be effective for young and middle-aged adults, there has been little evidence-based evaluation of the efficacy of psychotherapeutic treatment approaches for older patients. CBT techniques and narrative and biographical approaches have demonstrated promising preliminary

results in existing treatment studies for older adults. Nevertheless, research so far has led to the understanding that particular challenges in the therapeutic process must be taken into account when providing psychotherapy to older PTSD patients. The third and fourth articles of this thesis therefore examine the efficacy of an age-specific Internet-based CBT and aim at answering the following questions:

How efficacious and sustained is an age-specific Internet-based writing intervention (Integrative Testimonial Therapy) in mitigating PTSD symptoms among older adults with childhood traumatization?

Which variables in the context of development and maintenance of PTSD predict the treatment outcome in an Internet-based CBT for PTSD in older adults?

Chapter 2

Posttraumatic stress disorder in older adults: an overview of characteristics and treatment approaches

A slightly adapted version of this chapter has been published as
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Abstract

Objective: Posttraumatic stress disorder (PTSD) is a common and disabling condition following a traumatic event. Despite its high prevalence rates, relatively little is known about the manifestation and course of the disorder in older adults. Moreover, there has been little evaluation of the efficacy of psychotherapeutic treatment approaches for older patients.

Design: This overview aims to summarize available data on the prevalence and symptoms of late-life PTSD and to review the current treatment approaches for older adults.

Results: The course and severity of PTSD symptoms in older adults depends on the time the trauma occurred (early vs. late life). In the case of acute traumatization, lower prevalence rates and symptom severities are generally observed in older than in younger populations. In the case of early-life traumatization, a decline in PTSD symptom severity can be observed over the life course. Research on treatment approaches has produced promising results, indicating that disorder-specific interventions (i.e., trauma confrontation and cognitive restructuring) can be effectively combined with an age-specific narrative life-review approach.

Conclusion: Given the limited empirical evidence, caution is warranted in generalizing the reported findings. Nevertheless, it is possible to draw a number of conclusions concerning the characteristics and treatment of PTSD in older adults. Further research is needed to better understand the various presentations of PTSD in late life and to validate and improve the effectiveness of available treatment approaches.

Introduction

Due to demographic change, older people are making up an increasing proportion of the population in industrialized countries. This shift in the population structure is significantly affecting health care services, which are having to adjust to effectively address the needs and potentials of older adults. Although most older adults report good mental health and well-being, a substantial number have psychological and psychiatric disorders. A representative epidemiological study conducted in the United States found anxiety disorders to be the mental disorders most frequently experienced by older adults (Kessler et al., 2005).

Although there has been considerable research on generalized anxiety disorder (GAD) in older populations, little empirical attention has been paid to other anxiety disorders, such as posttraumatic stress disorder (PTSD). Rather, current clinical and empirical research on PTSD has focused primarily on the treatment of children and of young and middle-aged adults. Given the increasingly aging population, however, more detailed scientific and clinical knowledge of PTSD and its treatment in older adults is urgently required. The available research on PTSD in older adults can be roughly assigned to two categories, based on the period of life in which the trauma occurred. The first category covers older adults who were traumatized decades ago, in early life (specifically, veterans of World War II [WWII], the Korean or Vietnam war, and Holocaust survivors). The second category covers older adults traumatized more recently (e.g., survivors of violence, accidents, and natural disasters). It is yet not fully understood whether and how the time of traumatization and the resulting type of posttraumatic stress (chronic, delayed onset, or acute PTSD) influences the symptom profile and thus needs to be taken into account in the selection of a treatment approach.

The effects of time of traumatization and the different types of PTSD in older adults have previously been investigated in the reviews by Weintraub and Ruskin (1999) and Charles and colleagues (2005). Another review has examined difficulties in the assessment of PTSD in a specific group of older patients, namely U.S. veterans (Owens et al., 2005). In terms of age-specific treatment approaches, only Hyer and Sohnle (2001) have described a multimodal approach based on case studies. The aim of this article is therefore to review the available data on how the timing of the trauma impacts PTSD prevalence rates as well as the course and symptom profile of the

disorder in older adults. A further focus is to describe PTSD treatments proposed for older adults in the recent literature and to discuss the potential applicability of PTSD treatments initially developed for middle-aged adults to older patients. Finally, we describe a recently developed integrative treatment program for older patients with PTSD.

Epidemiology

Relatively few representative epidemiological studies have assessed traumatic exposure and PTSD lifetime prevalence in older adults. Moreover, the age ranges examined have differed across studies. Frans and colleagues (2005) surveyed a representative national sample in Sweden. Findings based on a PTSD checklist revealed that 73.7% of the older adults surveyed had been exposed to traumatic events. Younger and middle-aged adults showed higher rates of trauma exposure (83.0% in both samples). In contrast, two representative national studies in Germany using clinical interviews reported higher rates of trauma exposure in older adults than in younger or middle-aged adults (Maercker et al., 2008; Spitzer et al., 2008).

In general, older adults have been found to show lower lifetime PTSD prevalence rates than younger or middle-aged adults (Frans et al., 2005; Kessler et al., 2005; Spitzer et al., 2008; see Table 2.1). Only Maercker and colleagues (2008) reported a higher PTSD prevalence rate in older adults. The lower level of PTSD symptoms in older adults is consistent with the course of symptoms observed in other anxiety disorders (Regier et al., 1988).

Table 2.1 Trauma prevalence and PTSD lifetime prevalence in representative epidemiological studies

Paper and country (Total sample size)		**Older adults**	**Middle-aged adults**	**Young adults**
Frans et al., 2005, Sweden (N = 1824)	Total N subsample	435	812	575
	Trauma prevalence	73.7%	83.0%	83.0%
	PTSD lifetime prevalence	3.9%	6.2%	6.1%
Kessler et al., 2005, USA (N = 5692)	Total N subsample	907	1805† 1462‡	1518
	Trauma prevalence	-	-	-
	PTSD lifetime prevalence	2.5%	8.2%† 9.2%‡	6.3%

Table 2.1 (continued)

Paper and country (Total sample size)		Older adults	Middle-aged adults	Young adults
Maercker et al., 2008, Germany (N = 2426)	Total N subsample	814	1230	382
	Trauma prevalence	47.4%	13.3%	9.9%
	PTSD lifetime prevalence	3.4%	1.9%	1.3%
Spitzer et al., 2008, Germany (N = 3170)	Total N subsample	851	1322	997
	Trauma prevalence	76.5%	49.7%	42.3%
	PTSD lifetime prevalence	3.1%	3.8%	4.0%

†, ‡ Middle-aged category is classified in two subsamples († 30-44 years; ‡ 45-59 years).

Research focusing on high-risk groups (i.e., war veterans, Holocaust survivors, survivors of natural disasters) has reported significantly higher prevalence rates. As indicated above, research differentiates between early- and late-life traumatization. For older adults traumatized in early life, PTSD prevalence rates from 3% to 56% have been reported for veterans of WWII and the Korean War (for a review, see Averill & Beck, 2000). PTSD rates for former prisoners of war (POW) traumatized in early life are even higher than those reported for veterans. Kluznik and colleagues (1986) examined 188 former U.S. POWs 40 years after WWII and reported a PTSD prevalence of 67%. The authors argued that the higher rate of PTSD in POWs resulted from the more severe trauma they experienced in captivity. High rates of PTSD have also been reported for Holocaust survivors. In a randomly chosen sample of European-born Holocaust survivors who emigrated to Israel after WWII, Landau & Litwin (2000) reported a PTSD prevalence of 24.2% (75 years and older; N = 91). The matched control group of 103 European-born Jewish adults who emigrated to Israel before 1945 and did not personally experience the Holocaust had a PTSD prevalence rate of 5.8% (Landau & Litwin, 2000).

Most studies focusing on older adults with late-life traumatization have examined the survivors of natural disasters. In a population-based survey of older Chinese adults from an area severely affected by the 2008 Sichuan earthquake, 22.5% (N = 152; 60+ years) reported symptoms of PTSD (Jia et al., 2010). Likewise, in a community sample of

survivors of the 1989 earthquake in Newcastle, Australia, 20% of older adults (*N* = 636; 65+ years) fulfilled the criteria for PTSD (Carr et al., 1997).

The available data thus tend to show substantially higher rates of PTSD in older adults traumatized early in life than in those traumatized more recently. However, the wide range of reported prevalence rates may result not only from the different times of traumatization. Rather, the use of retrospective reports and of different diagnostic instruments (interview vs. self-reported checklist) across the studies may have contributed to the variability of their findings (Hyer et al., 1992). Also, the definition of PTSD has changed over time. The list of stressor events was extended in DSM-IV, thus broadening the trauma criteria. Finally, the socioeconomic status of the samples may have influenced the reported prevalence rates. Yehuda (2002) showed that lower socioeconomic background is related to an increased risk for PTSD.

In sum, PTSD is a common disorder in older adults, although its prevalence is generally lower than in younger and middle-aged populations. Thus, old age is not per se a risk factor for developing PTSD (Weintraub & Ruskin, 1999). In addition, traumatic events experienced in early life seem to be associated with higher PTSD prevalence rates in older adults than do late-life traumas. However, as the kind of traumatization (war-related vs. natural disasters) investigated in the respective groups differed markedly, these findings need further empirical confirmation.

Severity, course, and symptom profile of PTSD in older adults

As described above, epidemiological studies have identified differences in PTSD prevalence rates between younger and older populations. However, it remains unclear whether these differences are also reflected in different symptom severities, courses of the disorder, and symptom profiles.

Late-life traumatization

A key question addressed by research on acute traumatization is whether there is a significant difference in the severity patterns and symptom profiles experienced by older and younger PTSD patients. A number of studies reported no age-related differences in symptom severity (e.g., Bleich et al., 2005; Chung et al., 2005; Goenjian et al., 1994; see Table 2.2). Bleich and colleagues (2005) found no differences in traumatic stress symptoms and overall PTSD in young, young-old, and old-old adults who had been exposed to terrorism in Israel. Likewise, Goenjian and colleagues (1994) found no differences in the total mean PTSD score of young and old survivors of an Armenian earthquake. However, in a U.S. sample of hurricane survivors, Norris and colleagues (2002) reported significantly lower PTSD symptom severity for older adults. In contrast, in a Polish sample of flood survivors, the same authors found significantly higher PTSD symptom severity for older adults than for younger adults. A recent review of the empirical literature from 1981 to 2001 revealed that only two studies (12% of 13 distinct samples) found older adults to show higher levels of PTSD symptom severity than younger or middle-aged adults. In all other samples, the effects declined with age (Norris et al., 2002).

A closer look at the PTSD symptom profile (intrusion, avoidance, and hyperarousal) provides deeper insights into differences in symptom presentation in younger and older adults (Table 2.2). As reported above, Goenjian and colleagues (1994) found no differences in the overall PTSD severity of young and old earthquake survivors. Examining the symptom profile more closely, the researchers found higher hyperarousal and lower re-experiencing symptoms in older than in younger adults. In contrast, Norris and colleagues (2002), who reported lower overall PTSD severity for older Hurricane survivors in a U.S. sample, found that older adults reported significantly lower symptoms in two symptom clusters than did younger adults. Again, other studies

found no differences in the symptom profiles of older and younger adults (Chung et al., 2005; Norris et al., 2002).

Table 2.2: PTSD symptom severity (mean) in different samples of trauma survivors and age groups

Paper and questionnaire	Traumatic event Country, year	Old age	Middle age	Young age	Symptom profile of older adults relative to younger adults
No difference in overall PTSD:					
Goenjian et al., 1994 Posttraumatic Stress Disorder Reaction Index	Earthquake Armenia, 1988	42.70	-	46.00	Higher hyperarousal Lower re-experiencing
Norris et al., 2002 Revised Civilian Mississippi Scale	Hurricane Mexico, 1997	6.90	7.05	7.75	No differences
Bleich et al., 2005 Stanford Acute Stress Reaction Questionnaire	Terrorism Israel	4.50† 4.60‡	-	4.00	No differences
Chung et al., 2005 Impact of Event Scale	Aircraft crash UK, 1994	42.80	-	40.25	No differences
Chung et al., 2005 Impact of Event Scale	Train collision UK, 1996	21.95	-	31.40	No differences
Lower overall PTSD severity in older adults:					
Norris et al., 2002 Revised Civilian Mississippi Scale	Hurricane USA, 1992	4.80	6.56	6.53	Lower hyperarousal Lower re-experiencing
Higher overall PTSD severity in older adults:					
Norris et al., 2002 Revised Civilian Mississippi Scale	Flood Poland, 1997	9.44	8.38	6.67	Higher hyperarousal Higher re-experiencing Higher avoidance

Notes: Age ranges (i.e., minimum and maximum age in the old age, middle age, and young age categories) differed across studies. Likewise, the sample sizes of the age cohorts differed across studies.

†, ‡ Old age category is classified in two subsamples († 65-74 years; ‡ over 74 years)

Given the limited number of relevant studies, no definitive conclusions can be drawn on the symptom profiles of the different age groups. The varying definitions of age categories (young, middle-age, young-old, old-old), differing cultural contexts, and different types of trauma (man-made vs. natural disaster) limit the comparability of the available data.

Early-life traumatization

A key question of research on traumatization in early life is whether there is a characteristic course of PTSD across the lifespan (see Table 2.3 for an overview).

In longitudinal studies of WWII POWs, PTSD rates have been found to range from 48%–60% immediately after the war, decreasing to 29%–48% 40 years later (Beal, 1995; Speed et al., 1989; Zeiss & Dickman, 1989). These figures are in line with findings of Shlosberg & Strous (2005), who investigated the presence of PTSD in a cohort of Yom Kippur War veterans. Only 19 of 277 injured veterans who were diagnosed with PTSD immediately after the war fulfilled the PTSD criteria 32 years later. This gradual decline in overall PTSD prevalence rates has also been observed in medical care settings. Trappler and colleagues (2002) retrospectively examined the lifetime course of PTSD in 27 Holocaust survivors in a community-based medical practice. They observed a significant decrease in overall PTSD symptoms, which they found to be attributable to a decrease in re-experiencing and hyperarousal symptoms, despite a significant increase in avoidance symptoms. Yehuda and colleagues (2009) reported similar findings for a community sample of Holocaust survivors who had not received significant prior psychiatric treatment. The authors reported a decrease in PTSD symptom severity, with a marked decrease in re-experiencing symptoms and increase in avoidance symptoms.

Although the data generally point to a decrease in PTSD symptoms over time, a number of studies report contrasting results for subgroups of trauma survivors, with delayed onset or gradual increase of symptoms over time (Engdahl et al., 1998; Op den Velde et al., 1993; Port et al., 2001; Solomon & Mikulincer, 2006; see Table 2.3). In a review, Andrews and colleagues (2007) showed that delayed-onset PTSD in the absence of any prior symptoms is rare. However, if defined as an exacerbation or reactivation of prior symptoms, delayed-onset PTSD is reported frequently (e.g., Op den Velde et al., 1993; Yehuda et al., 2009). A number of reasons have been proposed for an increase in PTSD symptoms in older age. First, reminiscence research has shown that older adults generally reflect more on events that occurred earlier in life (Molinari & Williams, 1995). It is also possible that analogous historical events (e.g., the Gulf war) may trigger PTSD associated with a traumatic event that occurred decades ago (Solomon & Mikulincer, 2006). Finally, delayed-onset PTSD may be triggered by age-related life events, such as retirement, loss of significant others, and a general decrease in resources.

Table 2.3: Longitudinal course of PTSD symptoms in early-traumatized older adults

	Sample (Sample size)	Time between assessments (Time 1 to Time 2)	Longitudinal course	
			Cases of PTSD at Time 2 (Cases of PTSD at Time 1)	Cases of delayed-onset PTSD at Time 2 (Cases of non-PTSD at Time 1)
Elder & Clipp, 1988	WWII and Korean veterans (149)	40 years, longitudinal	37 (149)	7% of those not initially diagnosed
Op den Velde et al., 1993	WWII resistance fighters (147)	40 years, retrospective	-	84 (123)
Engdahl et al., 1998	WWII POWs (262)	50 years, retrospective	-	2 (140)
Port et al., 2001	WWII and Korean veterans (165 & 12)	4 years, longitudinal[2]	-	13 (130)
Trappler et al., 2002	Holocaust survivors (27)	approx. 62 years, retrospective	General decrease in symptom severity	-
Shlosberg & Strous, 2005	Yom Kippur veterans (1323)	32 years, longitudinal	19 (277)	-
Solomon & Mikulincer, 2006	Lebanon war veterans (83)	20 years, longitudinal	-	20 (32)
Yehuda et al., 2009	Holocaust survivors (40)	10 years, longitudinal[1]	General decrease in symptom severity	10% of those not initially diagnosed

[1] Time since trauma at Time 1: approx. 55 years
[2] Time since trauma at Time 1: approx. 50 years

Findings on the overall course of PTSD across the lifespan remain inconclusive. Different samples (community-based vs. primary care; treated vs. non-treated) and varying periods of assessments (immediately after the trauma vs. delayed) may explain part of the variance. Furthermore, given the small sample sizes and limited numbers of studies available, caution is warranted in generalizing the existing data. Taking a somewhat different perspective, Yehuda and colleagues (2009) argued that the change in overall symptom severity is less relevant than the change in the shape of the symptom profile. In their sample of 40 Holocaust survivors, four individuals showed delayed-onset PTSD after prior symptoms within a 10-year period (Table 2.3). This group showed a decline in re-experiencing symptoms, but an increase in avoidance and hyperarousal symptoms. The marked increase observed in avoidance symptoms can be

interpreted as an adaptive response to hyperarousal symptoms. Interestingly, this pattern of change in the symptom clusters is in line with the findings of studies reporting an overall decrease in PTSD symptomatology in older adults traumatized in early life (Trappler et al., 2002, Yehuda et al., 2009). The available data thus indicate that the long-term course of PTSD in older adults is characterized by a decline in re-experiencing and an increase in avoidance symptoms.

Treatment

The National Institute for Clinical Excellence (NICE, 2005) does not specify any detailed guidelines for the treatment of PTSD in old age. However, particular challenges in the diagnostic process, age-specific cognitive changes, and related needs in the therapeutic process must be taken into account when providing psychotherapy to older PTSD patients (Charles et al., 2005; Owens et al., 2005). In general, trauma is one of the "hidden variables" in old age (Cook & Niederehe, 2007). The underreporting of traumatic events due to forgetting, fear of stigmatization, and multiple, temporally distinct traumatizations necessitates a detailed and sensitive anamnesis at the beginning of any treatment. It should also be noted that symptoms of PTSD in older adults are often misdiagnosed as depression, anxiety, or psychotic disorders (De Beaurepaire, 2003). In addition, older adults often have concurrent mental, physical, and social problems that may complicate the therapeutic process. As such, greater diagnostic scrutiny is required and collaboration with significant others and health service providers is warranted (Owens et al., 2005). Many older adults still associate psychotherapy and mental disorders with insanity and fear of stigmatization. A clear explanation of the therapeutic process is therefore essential to facilitate the patient's disclosure of the traumatic events. Furthermore, older adults may experience cognitive decline and show reduced short-term memory capacity and thus slower learning rates (American Psychological Association, 2004). This cognitive decline in older age influences the processing of information and therefore complicates the comprehension and remembering of therapeutic material (Hyer & Sohnle, 2001). Multimodal representations of information and psychotherapeutic tasks (Cook & Niederehe, 2007) and a clear focus on the current topic of conversation are thus helpful modifications for older adults (Wilkinson, 1997). Finally, knowledge of specific historical events and cohort effects can help the therapist to gain a better understanding of the patient's sociocultural upbringing and underlying values and beliefs.

Effective PTSD treatment approaches

The NICE guidelines (2005) recommend psychotherapeutic approaches as the treatment of choice for PTSD that should be given preference whenever possible. Although specific treatment approaches for PTSD have been found to be effective for young and middle-aged adults (Foa et al., 2009), randomized controlled trials of psychotherapeutic and pharmacological interventions for older PTSD patients are scarce or have not yet been published. However, a number of psychotherapeutic case studies and group therapy approaches targeting this age group are available.

PTSD treatment approaches that have been found to be effective for younger adults in randomized controlled trials can be classified as follows: (a) cognitive approaches, such as cognitive restructuring and the associated component of psycho-education, (b) exposure approaches, such as imaginal and in vivo confrontation, Eye Movement Desensitization and Reprocessing (EMDR, Bradley et al., 2005; Shapiro, 1996), and (c) narrative/writing approaches, such as testimony therapy (Cienfuegos & Monelli, 1983), narrative exposure therapy (Neuner et al., 2004), life-review therapy (Maercker, 2002), and integrative testimonial therapy (Knaevelsrud et al., 2014). Although the latter approaches include various cognitive-behavioral components, they focus on the narrative reconstruction of the traumatic event and will therefore be described separately.

Various other treatment approaches are currently used to treat PTSD patients (e.g., acceptance and commitment therapy, interpersonal psychotherapy, supportive therapy, psychodynamic therapies). However, as the empirical evidence for the effectiveness of these approaches - even in younger PTSD patients - is sparse, they are not recommended as treatments of choice in the current guidelines (NICE, 2005). Therefore, these approaches are not discussed in the present article.

Cognitive approaches

Cognitive therapy (CT) is an effective and well-evaluated treatment approach for PTSD in young and middle-aged adults. Its aim is to identify negative automatic thoughts and to replace them with helpful thoughts. A key technique to this end is encouraging disclosure of dysfunctional perceptions, thoughts, and feelings about the trauma and its sequelae and prompting the patient to reinterpret the trauma and its outcomes (Ehlers & Clark, 2000). Cognitive reconstruction approaches such as Socratic dialogue, double standards technique, and logical analysis help patients and therapists to identify

trauma-related dysfunctional cognitive schemas and conceptions of the world. In this way, older patients, in particular, are able to reconnect the past and the present by developing new functional meanings of the traumatic event (Hyer & Sohnle, 2001). This reinterpretation is a crucial task that enables traumatized patients to develop a coherent life story in old age. Another technique within CT is psycho-education, which aims to empower the patient to understand the illness, its development, maintenance, and consequences and thus to cope with it successfully.

Cognitive techniques have been applied in a number of rehabilitation programs and case studies involving older PTSD combat veterans (see Table 2.4). Snell and Padin-Rivera (1997) developed a manualized group treatment for older combat veterans with PTSD. They combined psycho-education with stress and anxiety management. The primary aim of the intervention was to enable patients to reorient to the present during flashback episodes and to overcome dysfunctional thoughts about the traumatic event and its consequences. However, no outcome data have been reported. Boehnlein and Sparr (1993) published the outcomes of a 2-year support group that aimed at improving the cognitive reorganization and social reintegration of former WWII POWs. The authors observed an improvement in social functioning and well-being, but not in PTSD symptoms.

No randomized controlled studies have specifically examined the efficacy of cognitive techniques for older PTSD patients. However, cognitive approaches alone or combined with behavioral components have been found to be effective for other anxiety disorders in late life, especially GAD (for reviews, see Ayers et al., 2007; Wolitzky-Taylor et al., 2010).

Exposure approaches

Exposure techniques (imaginal or in vivo), which evoke physical and emotional reactions, help patients to confront their traumatic memories as well as trauma-related situations, objects, or persons. Through cognitive repetition of the traumatic event, the patient is able to retrieve the event more accurately and to gain control of trauma-related memories and emotions. Hence, it is possible for survivors to develop a coherent understanding of the event and its consequences and to construct a coherent biography in old age. The aim of exposure techniques is thus to reduce PTSD symptoms by repeated confrontation with trauma-related memories and stimuli until habituation is reached. In a meta-analysis, Bradley and colleagues (2005) reported an effect size of d =

1.57 for exposure interventions aimed at middle-aged adults with PTSD after a single traumatization.

Opinions on the use of exposure approaches with older adults are mixed. On the one hand, exposure has proved very effective in reducing PTSD in middle-aged adults. The basic mechanisms of change (habituation) can be assumed to operate in a similar way in older adults. However, given the high vegetative arousal associated with exposure, some authors recommend caution. Strong physiological reactions may be harmful to older patients, who are more likely to have cardiovascular disease (Hyer & Woods, 1998). Clarification of the patient's physical status by the general practitioner is therefore indicated for those with prior cardiovascular complications.

One controlled study and several single-case studies have described the application of exposure components in older adults (Table 2.4). Gamito and colleagues (2010) examined veterans of wars in former African colonies between 1963 and 1970. Portuguese veterans with PTSD were assigned to a virtual reality treatment group (VRET, 12 sessions), to a traditional imagination therapy group (imaginal exposure, 12 sessions), or to a waiting list. Descriptive analysis showed a decrease in PTSD symptoms, depression, and anxiety in the VRET group. Russo and colleagues (2001) applied exposure in a single-case study with a young-old woman with PTSD who was sexually abused in childhood. Specifically, imaginal exposure was applied after a phase of psycho-education and exposure preparation (e.g., relaxation, thought-stopping procedures). The observed decreases in PTSD symptoms (intrusion and avoidance) were stable 16 months after the treatment. Successful implementation of the specific imaginal exposure technique of EMDR (Shapiro, 1996) in older PTSD patients has been reported only in case studies (e.g., Hyer et al., 1995; Thomas & Gafner, 1993). In this approach, patients imagine unpleasant and frightening memories and associations while their attention is engaged by a physical stimulus (eye movement, tapping).

Narrative/Writing approaches

Distortion of the explicit autobiographic memory of traumatic events results in a fragmented narrative of traumatic memories. The reconstruction of these memories is crucial for a coherent narrative (Ehlers & Clark, 2000). Narrative treatment approaches thus aim to facilitate the reconstruction of a coherent biography in which the traumatic event is integrated. Narrative approaches have been found to be effective for middle-aged adults with PTSD. *Testimony therapy* (Cienfuegos & Monelli, 1983) was developed

to bear witness to the human rights violations committed in Chile during the Pinochet dictatorship. It aims to construct a biographical narrative focusing on the traumatic event. Neuner and coworkers (2004) drew on this narrative approach, combining biographical reconstruction with exposure interventions to develop *narrative exposure therapy* (NET). The core aspect here is the transformation of the fragmented trauma memory into a coherent narrative. A number of randomized controlled studies with different samples have shown NET to be effective (Neuner et al., 2004). The fact that narrative therapies help patients to process past biographical phases while integrating a present-oriented focus may be of specific relevance for older PTSD patients. Impoverished memory functioning in PTSD patients leads to deficits in and fragmentation of declarative and trauma-related memory (American Psychiatric Association, 2000; Hyer & Sohnle, 2001). These distortions may impede the adaptive and healthy review of the biography that is a crucial task of later life. *Life-review therapy,* a therapeutic narrative approach frequently used in gerontology, uses the conscious recall of biographical events and feelings to map out a coherent life story in which the traumatic event is integrated.

In a case series of older adults with PTSD who were traumatized in early life, Maercker (2002) found life-review therapy combined with exposure therapy to be effective (Table 2.4). All three patients reported an overall decrease in PTSD severity over the course of the therapy. This decrease remained stable at 3-month follow-up. Symptoms of re-experiencing and hyperarousal decreased in all patients, whereas symptoms of avoidance show divergent courses. Studies on the efficacy of life-review therapy—focusing primarily on depression in older adults—have shown promising effects (for a meta-analysis, see Bohlmeijer et al., 2003).

Table 2.4: Psychotherapeutic intervention studies for PTSD in older adults

	Sample (age)	**Study design**	**Type of therapy**	**Results**
Boehnlein & Sparr, 1993	8 WWII POWs (*M* = 70 years)	Case series	*Cognitive approach* Cognitive reorganization	No change in PTSD symptoms; improvement in social functioning and well-being
Snell & Padin-Rivera, 1997	Combat veterans	Case series	*Cognitive approach* Psycho-education Stress management	No outcome reported

Table 2.4. (continued)

	Sample (age)	Design	Type of therapy	Results
Thomas & Gafner, 1993	WWII and Korean veteran (68 years)	Case study	*Exposure approach* EMDR	Decrease in depression and distress symptoms
Hyer et al., 1995	Patient with dementia (72 years)	Case study	*Exposure approach* EMDR	Decrease in PTSD symptoms
Russo et al., 2001	Sexually abused woman (57 years)	Case study	*Exposure approach* Imaginal exposure	Decrease in intrusion and avoidance symptoms
Gamito et al., 2010	10 Portuguese veterans (M = 63.5 years)	Controlled study	*Exposure approach* Virtual reality Imaginal exposure	Decrease in PTSD symptoms
Maercker, 2002	3 civilian survivors of WWII bombings (60–72 years)	Case series	*Narrative approach* Life review Exposure	Decrease in PTSD symptoms
Knaevelsrud et al., 2009	30 civil WWII survivor	Controlled study	*Narrative approach* Life review Imaginal exposure Cognitive restructuring	Significant decrease in PTSD symptoms

Integrative Testimonial Therapy: A life-review approach for older PTSD patients

Despite the lack of empirically validated treatment approaches for older PTSD patients, case studies and clinical evidence indicate that life-review interventions in combination with cognitive techniques and exposure may be applicable in this population. Knaevelsrud and colleagues therefore combined treatment components that have proved effective for PTSD in middle-aged adults with a treatment approach specific to geriatric psychotherapy (Table 2.4). *Integrative Testimonial Therapy (ITT)* is a short-term writing therapy that integrates imaginary exposure and cognitive restructuring within a resource-oriented life-review approach (Knaevelsrud et al., 2014). It focuses on older adults (65+ years) who experienced war-related traumatic events in their child-hood and who now show PTSD symptoms associated with that initial trauma. The aim of ITT is to focus on and increase positive memories and to enable the patient to integrate the traumatic event within a coherent and balanced life story. Knaevelsrud and colleagues examined the efficacy of this approach in a randomized controlled trial with a sample of older PTSD patients who were traumatized as children during WWII. Preliminary results indicate that ITT significantly reduced both PTSD and anxiety symptoms. These results remained stable over 6 months (Knaevelsrud et al., 2009).

Conclusion

This overview summarized the clinical characteristics of and treatment approaches for PTSD in older adults. Given the limited empirical evidence, caution is warranted in generalizing the reported findings. Nevertheless, it is possible to draw a number of conclusions concerning the characteristics and treatment of PTSD in older adults. Relative to younger populations, older populations traumatized in later life show lower prevalence rates and generally lower symptom severity. However, studies focusing on high-risk groups report persistent and disabling PTSD symptoms in older adults. Findings on the longitudinal course of PTSD resulting from traumatization in early life are currently inconclusive. Although a decline in PTSD severity can be observed in most cases, change in the shape of the symptom profile may be even more relevant. Increased avoidance may to some extent be adaptive in geriatric populations, reflecting functional inhibitory processes that help to keep disturbing memories at bay. Longitudinal studies examining pathological—but also adaptive and even constructive (i.e., posttraumatic growth)—long-term psychological development are needed to disentangle the complex interplay of symptom presentation and impairment in older adults.

Despite the lower overall PTSD rates in older than in younger populations, the aging of industrialized countries will necessarily lead to an increase in the absolute numbers of those with PTSD in late life. Yet the current demand for PTSD treatment of older patients already exceeds the available health care provision. Measures are thus urgently required to increase the supply of effective treatment for this population. Despite the limitations of the research literature discussed, it seems that disorder-specific interventions (i.e., trauma confrontation and cognitive restructuring) are effective if embedded in an age-specific life-review approach. Initial findings suggest that psychotherapy combining narrative life-review with CBT is a promising treatment approach for older adults with PTSD.

Chapter 3

Typologies of posttraumatic stress disorder in treatment-seeking older adults

A slightly adapted version of this chapter has been published as
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Abstract

Background. While it is well known that posttraumatic stress disorder (PTSD) is characterized by heterogeneous symptom clusters, little is known about predominant typologies of PTSD symptoms in older adults.

Method. Latent profile analyses (LPAs) were employed to evaluate predominant typologies of PTSD symptoms in a sample of 164 treatment-seeking older adults with childhood war-related trauma. Multinomial logistic regressions were conducted to evaluate predictors of class membership.

Results. LPAs revealed that a 3-class solution best fit the data. These included an Intermediate Disturbance class (50.0%) and two Pervasive Disturbance classes, which differed with respect to severity of avoidance symptoms (Pervasive Disturbance-Low Avoidance: 33.5%, Pervasive Disturbance-High Avoidance: 16.5%). A greater number of traumatic events predicted membership in the Pervasive Disturbance classes. The Pervasive Disturbance-Low Avoidance class had a higher level of education than the Pervasive Disturbance-High Avoidance class. Compared to the Intermediate Disturbance class, the Pervasive Disturbance classes had the highest levels of depression, anxiety and somatization symptoms.

Conclusion. These results suggest that PTSD in treatment-seeking older adults may be characterized by three predominant typologies, which are differentiated by overall severity and avoidance symptoms, lifetime trauma burden, education level, and comorbid depression, anxiety, and somatization symptoms. These results underscore the importance of considering heterogeneity in the phenotypic presentation of PTSD in assessment and treatment approaches for this disorder in older adults.

Introduction

Extant research on posttraumatic stress disorder (PTSD) in older adults has primarily focused on the prevalence (e.g., Kessler et al., 2005, Pietrzak et al., 2012), and the course and severity of PTSD (e.g., Solomon & Mikulincer, 2006; Yehuda et al., 2009). This work has revealed that PTSD is a prevalent disorder in older adults, with notable differences in symptom profiles, as well as symptom course over time, compared to younger persons (Böttche et al., 2012). For example, while some studies of the longitudinal course of PTSD in older adults have observed a decline in PTSD severity over time (e.g., Yehuda et al., 2009), others have documented a delayed onset or a gradual increase of symptoms over time was examined in subgroups of older adults with early-life trauma (e.g., Solomon & Mikulincer, 2006). While this work has helped characterize the prevalence and burden of PTSD in older adults, little is known about common clinical manifestations of this disorder, which can vary with respect to the heterogeneous symptoms clusters that characterize this disorder.

Several dimensional models of PTSD exist. The 3-factor DSM-IV and ICD-10 models consist of intrusion, avoidance and hyperarousal symptom clusters (APA, 2000; WHO, 2010). However, many studies found that this 3-factor structure failed to fit the observed data adequately (e.g., Elhai et al., 2009; Naifeh et al., 2008). A 4-factor numbing model proposed by King and colleagues (1998), which separates the avoidance cluster into two distinct factors (avoidance and emotional numbing) (e.g., Asmundson et al., 2004; Naifeh et al., 2008, Naifeh et al., 2010; Palmieri et al., 2007) has been found to provide a better dimensional representation of these symptoms. Informed by these findings, DSM-5 criteria for PTSD (APA, 2013) now include four PTSD symptom clusters; Criterion B - intrusion, Criterion C – avoidance, Criterion D – negative alterations in cognitions and mood, and Criterion E – alterations in arousal and reactivity.

To date, only two studies have evaluated the dimensional structure of PTSD in older adults (Pietrzak et al., 2012; Schinka et al., 2007). In one study of 134 older adults who survived the 2004 Florida hurricanes, the 4-factor numbing model (intrusion, avoidance, numbing and hyperarousal) provided the best fit of nine tested models (Schinka et al., 2007). More recently, a study of 206 older adults affected by Hurricane Ike found that the 4-factor numbing model provided a better data fit than the DSM-IV model and equally well as a more refined 5-factor model (Pietrzak et al., 2012).

However, there was some support for a 5-factor model (i.e., splitting avoidance and hyperarousal into two factors, respectively: intrusion, avoidance, numbing, dysphoric arousal, anxious arousal) fitting the data better, although the χ^2-difference test did not indicate a significant difference between these two models.

In addition to evaluating the dimensional structure of PTSD, there is increasing interest in identifying predominant typologies or subgroups of individuals with PTSD, which provide insight into qualitatively distinct clinical presentations of this disorder. However, only a few studies to date have examined predominant symptom profiles (i.e., latent classes) of PTSD and all have focused on adolescent and middle-aged adult samples (e.g., Ayer et al., 2011; Naifeh et al., 2010; Pietrzak et al., 2014; Steenkamp et al., 2012). The studies have revealed three distinct classes of PTSD symptom severity (no, intermediate and pervasive disturbance with respect to each PTSD symptom) in community samples of young and middle-aged adults (Breslau et al., 2005), adolescents (Ayer et al., 2011), as well as in a national sample of early adulthood veterans (Steenkamp et al., 2012). In a general adult clinical sample of veterans, Naifeh and colleagues (2010) found two distinct classes of severity (intermediate and pervasive disturbance). These studies suggested that PTSD may have heterogeneous clinical manifestations in trauma-exposed samples with regard to distinguishable symptom severity classes (no disturbance: participants exhibit little distress, intermediate disturbance: participants exhibit moderate distress and pervasive disturbance: participants endorsed most PTSD symptoms). To date, however, no study has evaluated predominant typologies of PTSD specifically in older adults. PTSD in older adults has been found to differ with respect to severity of symptoms (Chopra et al., 2014), and even subsyndromal levels of PTSD symptoms have been linked to elevated rates of psychiatric comorbidity (Pietrzak et al., 2012). Thus, characterization of predominant typologies of PTSD symptoms in older adults can provide an understanding of predominant patterns of PTSD symptom expression that are specific to this population.

We had three objectives of this study: (1) evaluate predominant typologies of PTSD in a sample of treatment-seeking older adults, (2) examine demographic and trauma-related factors associated with these typologies; and (3) evaluate how the typologies relate to comorbid symptoms of anxiety, depression, and somatization in this age-specific cohort. Based on the results of Naifeh et al., (2010), we hypothesized that the manifestation of PTSD symptoms in this age cohort would be best represented by two classes of disturbance (intermediate and pervasive). Findings in older adults with

early-life traumatisation indicate an increase of avoidance symptoms in the long-term course (e.g., Trappler et al., 2002; Yehuda et al., 2009) and therefore, represent a delayed-onset PTSD (Andrews et al., 2007). Based on these findings, we further hypothesized that the pervasive disturbance group would be best characterized by a higher level of avoidance symptoms.

Methods

Participants

Recruitment occurred between May 2008 and February 2013 and was conducted through public advertisements (e.g., radio, newspaper, websites). Participants were treatment-seeking older adults with a history of childhood war-related traumatization during or in the aftermath of World War II (i.e., until 1946/47). To be included in this study, participants had to: 1) have experienced a war-related traumatic event as a child or adolescent during WW II that met Criterion A for PTSD as specified in DSM-IV; 2) indicate this trauma as the event which troubled them the most in the last month; and 3) were able to understand German language.

Initial contact with participants was either via Internet or telephone. All potential participants were invited to fill out a password-protected, Internet-based questionnaire. Those who did not have access to the Internet received a paper version of the questionnaire. In total, 333 participants were assessed and 164 participants were found to be eligible for the study. The Ethical Committee of the University of Greifswald, Germany approved the study and all participants provided informed consent.

Assessments

Sociodemographic data (e.g., age, sex, education), as well as sample-specific characteristics (e.g., number of traumatic events) were collected. The amount of disclosure concerning the war-related trauma that troubled them the most in the last month was also assessed with one item ("Did you talk with anyone about the traumatic event?") on a 9-point Likert scale (1 = never 2 = once, 3 = once a year, 4 = a few times/year, 5 = once a month, 6 = a few times/month, 7 = once a week, 8 = a few times/week; 9 = daily).

PTSD symptoms were evaluated using the *Posttraumatic Stress Diagnostic Scale* (PDS, Foa et al., 1997). The scale is a self-report measure mapping onto DSM-IV criteria. Part I indicates potential traumatic events and Part II the response to the most traumatic event. In Part III, 17 items assess the frequency of current PTSD symptoms on a 4-point Likert scale (0 = never to 3 = nearly always). The severity index ranges from 0 to 51 (1-10 mild, 11-20 moderate, 21-35 moderate to severe, 36-51 severe). The PDS demonstrated highly satisfactory validity and reliability for screening and assessing

PTSD (Foa et al., 1997). In our study, the PDS had good internal consistency (Cronbach's $\alpha = 0.86$).

Depression, anxiety and somatization symptoms were assessed using subscales of the *Brief Symptom Inventory-18* (BSI-18, Derogatis, 2000). The BSI-18 consists of 3 subscales (depression, anxiety, somatization) with 6 items each. Items range on a 5-point Likert scale from "0 = not at all" to "4 = extremely". T-scores (converted from raw scores) of 63 or higher in two or more of the subscales suggest a positive case (Derogatis, 2000). The BSI-18 has demonstrated in general good psychometric properties, reliability and validity (Derogatis, 2000) and also provides good internal consistencies for older adults (Petkus et al., 2010). In our study, the BSI-18 exhibited good internal consistencies for the three subscales (Cronbach's $\alpha = 0.70 – 0.85$).

Data analyses

Based on the large body of empirical evidence supporting a 4-factor emotional numbing model of PTSD (King, et al., 1998), we used the DSM-IV PTSD symptom clusters of intrusion (5 items), avoidance (7 items) and hyperarousal (5 items) but split the avoidance cluster into symptoms of avoidance (2 items) and of numbing (5 items). This 4-factor model is also most similar to the PTSD symptom clusters in DSM-5 (APA, 2013).

Latent profile analyses (LPA) were conducted to model latent typologies of PTSD symptom clusters using Mplus 5.0 (Muthén & Muthén, 1998-2007). LPA performs the equivalent of latent class analyses (LCA) on continuous variables. In this study, latent profiles were identified on the basis of the four PTSD symptom clusters, which represent the sum scores of the 17 defining PTSD symptoms of the PDS (Foa et al., 1997). The aim of LPA is to identify the smallest number of latent profiles that can account for the relationship among the observed symptoms. To identify the best-fitting model, we assessed 1) the Bayesian Information Criterion (BIC), 2) the entropy (the highest entropy value indicates the best-fitting model), and 3) the likelihood ratio tests (bootstrap likelihood ratio test, BLRT; and Lo-Mendell-Rubin adjusted likelihood ratio test, LMR). The BIC is the most appropriate information criterion to use in comparing models in small samples, with lower BIC values indicating better fit (Nylund et al., 2007). The BLRT and the LMR also both identify the optimal model, although the LMR tends to overestimate the number of classes (Nylund et al., 2007). In both likelihood tests, a significant value indicates that the estimated model with g classes fits the data

better than a model with *g*-1 classes. A non-significant p-value indicates that the model with g-1 classes fits better.

A multinomial logistic regression analysis was conducted to examine sociodemographic and trauma-related predictors of class membership derived from the best fitting model. We then conducted one-way analyses of covariance (ANCOVAs) to evaluate how the classes compared on measures of comorbid depression, anxiety, and somatization symptoms. Class membership was entered as an independent variable; sociodemographic and trauma-related variables as covariates, and depression, anxiety, and somatization symptoms as dependent variables in separate analyses. Pairwise comparisons were computed using the Bonferroni method, and Cohen's *d* values were computed to estimate effect sizes of significant differences. Descriptive and regression analyses as well as ANCOVAs were performed using the IBM Statistical Package for Social Sciences (SPSS), version 22.0 for MAC OS X.

Results

Descriptive analyses

The sample was comprised of 97 women (59.1%) and 67 men (40.9%). The average age was 71.2 years (*SD* = 4.96) and participants had completed an average of 11.3 years of education (*SD* = 1.79). The majority of the sample was married (54.9%, *n* = 90), 23.8% were divorced (*n* = 39), 12.2% were widowed (*n* = 20) and a small percentage was single (6.1%, *n* = 10) or lived in a civil union (2.4%, *n* = 4).

Twenty-seven participants never (16.6%) or rarely (39.3%, *n* = 64) spoke to someone about their traumatic childhood events. One third (31.9%, *n* = 52) sometimes disclosed their experiences and only 2.4% (*n* = 4) and 9.8% (*n* = 16) spoke about the traumatic events "often" or "very often", respectively. Sixty-six participants had completed 12/13 years of education (40.3%), 18.9% had completed 9 years (*n* = 31) or 10 years (*n* = 31) of education, respectively. Thirty-one participants (18.9%) reported another educational level, and for 3.0% (*n* = 5) the information was missing. The number of traumatic events in this sample ranged from 1 to 8 (*M* = 3.58, *SD* = 1.77).

The mean PDS score was 18.67 (*SD* = 10.19) indicating a moderate severity of PTSD symptoms. The means of the PTSD symptom clusters were as follows: intrusion (*M* = 5.42, *SD* = 3.71), avoidance (*M* = 1.83, *SD* = 1.89), numbing (*M* = 5.10, *SD* = 4.06) and hyperarousal (*M* = 6.32, *SD* = 3.59).

The mean anxiety, depression and somatization scores, as assessed by the BSI-18, for the full sample were *M* = 7.04 (*SD* = 4.81), *M* = 7.54 (*SD* = 5.14) and *M* = 5.22 (*SD* = 3.95), respectively. According to the criteria (at least 2 subscales achieved a T-score of 63 or higher), 66 participants (40.3%) can be designated as potential cases.

Latent profile analyses

The model fit indices for 1- to 4-class solution are shown in Table 3.1. Fit indices indicated that a 3-class solution was superior to a 2- or 4–class solution. Although the bootstrap likelihood ratio test suggested that a 4-class solution fit the data better than a 3-class solution (*p* = .018), the Lo-Mendell-Rubin test did not (*p* = .540) and indicated a 3-class solution. Also, BIC values were lowest and entropy values were largest for the 3-class solution. Figure 3.1 shows the estimated means of the symptom clusters for the 3-class solution.

Table 3.1: Model fit indices for latent profiles of PTSD symptoms

	BIC	Bootstrap LRT	Bootstrap *p* value	LMR adjusted LRT	LMR *p* value	Entropy
1-Class	3444.554			-	-	-
2-Class	3310.577	-1701.853	<.001	153.495	<.001	.791
3-Class	**3288.991**	**-1622.100**	**<.001**	**45.340**	**.014**	**.828**
4-Class	3296.157	- 1598.542	.018	17.670	.540	.815

Notes: BIC, Bayesian information criterion; LMR, Lo-Mendell-Rubin; LRT, likelihood ratio test.

Best fitting model is highlighted in bold.

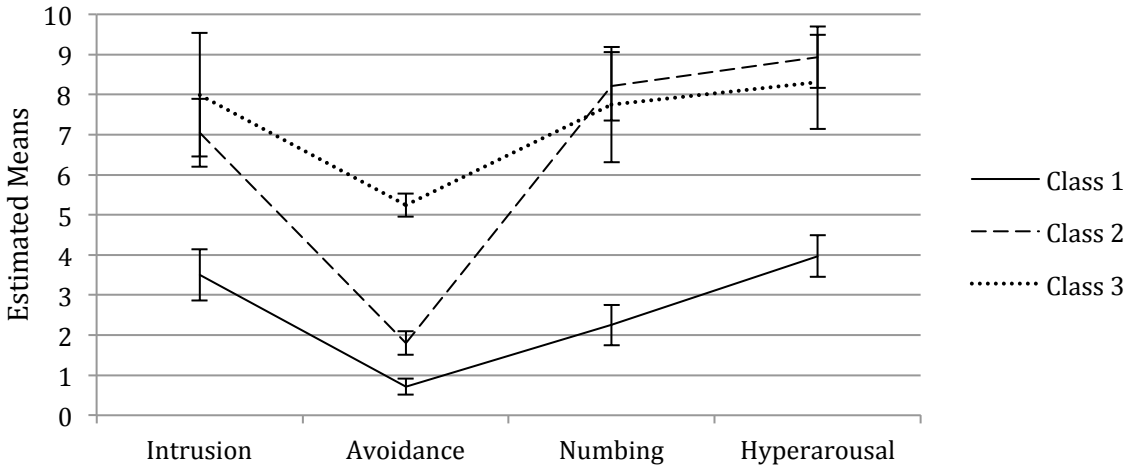

Figure 3.1: Estimated means of PTSD symptom clusters for each of the 3 latent classes (Error bars denote 95%CI)

Means as well as standardized means of symptoms for the 3-class model are presented in Table 3.2. The Intermediate Disturbance class (*n* = 82, 50.0%) had significantly lower scores for all symptom clusters than the Pervasive Disturbance classes. Class 2 (*n* = 55, 33.5%) and 3 (*n* = 27, 16.5%) both exhibited pervasive disturbance but differed with regard to severity of avoidance symptoms; *t*(80) = -15.55, *p* < .001, with the Pervasive Disturbance-Low Avoidance class (class 2) having significantly lower avoidance symptoms than the Pervasive Disturbance-High Avoidance class (class 3). The Intermediate Disturbance group had a mean PTSD score of 10.19 (*SD* = 5.13), which is indicative of mild symptom severity, whereas the Pervasive Disturbance-Low Avoidance class (*M* = 26.09, *SD* = 5.73) and Pervasive Disturbance-High Avoidance class (M = 29.33, *SD* = 6.32) had mean scores indicative of moderate-to-severe PTSD symptom severity.

Table 3.2: Results of class membership for a 3-class solution

		PTSD classes			Effect size		
		Intermediate Disturbance (Class 1)	**Pervasive Disturbance Low Avoidance (Class 2)**	**Pervasive Disturbance High Avoidance (Class 3)**	**Class 1-2**	**Class 1-3**	**Class 2-3**
Model results	**Mean**	**Mean (*SE*)**	**Mean (*SE*)**	**Mean (*SE*)**	***d***	***d***	***d***
Intrusion	5.38	3.503 (0.461) [a b]	7.048 (0.551) [a]	7.997 (0.855) [b]	1.25	1.21	.17
Avoidance	1.81	0.713 (0.147) [a b]	1.800 (0.229) [ac]	5.242 (0.259) [b c]	1.11	4.58	3.48
Numbing	5.07	2.249 (0.350) [a b]	8.206 (0.791) [a]	7.754 (0.769) [b]	2.23	1.83	.12
Hyperarousal	6.28	3.972 (0.397) [a b]	8.935 (0.647) [a]	8.312 (0.621) [b]	1.94	1.57	.16
Class proportion,%		0.50	0.33	0.16			
Class counts, *n* (%)		82 (50.0 %)	55 (33.5 %)	27 (16.5 %)			
PTSD sum, M, SD		10.19, 5.13	26.09, 5.73	29.33, 6.32			

Notes: *d*, Cohen's *d*; *M*, Mean; *SD*, Standard Deviation; *SE*, Standard Error, [a] significant difference between Class 1 and 2, $p < .001$; [b] significant difference between Class 1 and 3, $p < .001$; [c] significant difference between Class 2 and 3, $p < .001$

Prediction of class membership

Multinomial logistic regression analyses were used to assess predictors of class membership. The included predictors were: age, sex, level of education (low = "9th grade", middle = "10th grade", high = "12th or 13th grade", other), number of traumatic events, and amount of disclosure concerning the trauma. Results of this analysis are presented in Table 3.3.

Table 3.3: Results of multinomial logistic regression

	Pervasive Disturbance - Low Avoidance vs. Intermediate Disturbance		**Pervasive Disturbance - High Avoidance vs. Intermediate Disturbance**		**Pervasive Disturbance - Low Avoidance vs. Pervasive Disturbance - High Avoidance**	
	OR (95% CI)	***p***	**OR (95% CI)**	***p***	**OR (95% CI)**	***p***
No. of traumas	1.47 (1.15-1.88)	.002	1.46 (1.09-1.94)	.010	1.01 (.76-1.34)	.953
Disclosure	.933 (.72-1.21)	.596	.838 (.60-1.18)	.307	1.11 (.78-1.59)	.560
Age	.934 (.86-1.02)	.148	1.00 (.90-1.12)	.979	.94 (.84-1.05)	.266
Sex (female)	1.77 (.75-4.13)	.191	1.10 (.39-3.07)	.860	1.61 (.53-4.89)	.402
Education						
low	.431 (.10-1.79)	.247	.48(.12-1.96)	.306	.89(.19-4.32)	.895
middle	.382 (.10-1.49)	.166	.42(.10-1.77)	.238	.91(.19-4.36)	.909
high	1.10 (.37-3.27)	.856	.26(.07-0.99)	.050	4.31(1.09-17.05)	.037

Notes: class 1, intermediate; class 2, pervasive-low avoidance; class 3, pervasive-high avoidance; CI, Confidence Interval; OR, Odds Ratio; *p*, *p*-value; $R^2 = .19$ (Cox & Snell), .22 (Nagelkerke). Model $x^2(14) = 29.31$, $p = .009$.

The Pervasive Disturbance-Low Avoidance and Pervasive Disturbance-High Avoidance classes both reported a significantly higher number of traumatic events (*M* = 4.08, *SD* = 1.71 and *M* = 4.16, *SD* = 1.52, respectively) than the Intermediate Disturbance class (*M* = 3.06, *SD* = 1.75). The two pervasive classes (class 2 and 3) differed with respect to level of education, with the Pervasive Disturbance-Low Avoidance class (class 2) having higher education (47.3% completed 12th or 13th grade) compared to the Pervasive Disturbance-High Avoidance class (22.2% completed 12th or 13th grade).

Differences in comorbid depression, anxiety, and somatization symptoms across the typologies

As shown in Table 3.4, results of the three ANCOVAs demonstrated a significant main effect of PTSD class membership on severity of comorbid depression, anxiety and somatization symptoms: $F(2,134) = 10.24$, $p < .001$, anxiety: $F(2,134) = 12.31$, $p < .001$, somatization: $F(2,134) = 12.75$, $p < .001$. Pairwise contrasts revealed that the Pervasive Disturbance-High Avoidance class and Pervasive Disturbance-Low Avoidance class had significantly greater severity of depression, anxiety and somatization symptoms than members of the Intermediate Disturbance class. No significant differences were observed between the Pervasive Disturbance classes (all *p*'s >.05).

Table 3.4: Pairwise comparisons of comorbid disorders by class membership

			Adjusted mean differences (Cohen's *d* in parentheses)		
Group	**Mean**	**Adjusted mean**	**1.**	**2.**	**3.**
		Depression			
1. Intermediate Disturbance	5.52	5.64	-		
2. Pervasive Disturbance – Low Avoidance	9.11	8.94	3.30*** (.72)	-	
3. Pervasive Disturbance - High Avoidance	9.91	9.88	4.25*** (.93)	.94 (.20)	-
		Anxiety			
1. Intermediate Disturbance	3.58	3.63	-		
2. Pervasive Disturbance – Low Avoidance	6.36	6.39	2.91** (.68)	-	
3. Pervasive Disturbance - High Avoidance	7.25	7.07	4.77*** (1.11)	1.85 (.43)	-
		Somatization			
1. Intermediate Disturbance	3.58	3.63	-		
2. Pervasive Disturbance – Low Avoidance	6.36	6.39	2.77*** (.82)	-	
3. Pervasive Disturbance - High Avoidance	7.25	7.07	3.45*** (1.02)	.68 (.20)	-

Notes: ** $p < .01$; *** $p < .001$

Discussion

This study evaluated predominant typologies of PTSD in a sample of treatment-seeking older adults with childhood war-related trauma. Three latent classes were found to optimally characterize the data, which represent 2 different levels of symptom severity (intermediate and pervasive). Our hypothesis that two classes of disturbance would best represent the manifestation of PTSD symptoms was partly supported. Class 1 (50.0%) represents an intermediate disturbance in all PTSD symptom clusters. Classes 2 and 3 exhibited both pervasive disturbances; however, these classes differed with respect to the severity of the avoidance symptom cluster, with Class 2, labeled Pervasive Disturbance-Low Avoidance (33.5%), showing pervasive disturbances in intrusion, numbing, and hyperarousal clusters and intermediate disturbance in the avoidance cluster, whereas Class 3, labeled Pervasive Disturbance-High Avoidance (16.5%), showed pervasive disturbances in all four symptom clusters. In sum, three different classes were identified, which represent two levels of symptom severity (intermediate and pervasive). These levels are consistent with our hypothesis, however, as two subtypes of the pervasive disturbance category were identified. The absence of a class without elevated symptoms is likely due to the treatment-seeking nature of the sample. Thus, the differentiation in two different severity groups (intermediate and pervasive) is consistent with findings of Naifeh and colleagues (2010) who also examined latent profiles of PTSD in a clinical sample and found that a 2-class solution that differed based on symptom level provided the best fit to the data.

A notable finding of this study is that the Pervasive Disturbance classes differed only with respect to severity of avoidance symptoms. Available data indicated an increase of avoidance symptoms (using DSM-IV criteria) in the long-term course of PTSD in older adults (Trappler et al., 2002; Yehuda et al., 2009). A possible explanation for increased avoidance symptoms in the Pervasive Disturbance-High Avoidance class could be related to delayed-onset PTSD (i.e., an exacerbation or reactivation of PTSD symptoms, Andrews et al., 2007). Thus, the Pervasive Disturbance-High Avoidance class could represent a delayed-onset PTSD subsample, whereas the Pervasive Disturbance-Low Avoidance class could represent a chronic PTSD subsample. However, given the cross-sectional design of this study, we could not directly evaluate the course of PTSD symptoms; and age of onset of PTSD was not assessed. Another possibility is that these

groups differed with respect to trauma histories. Additional research that employs more nuanced measures of trauma history and course of PTSD symptoms will be useful in evaluating factors that might differentiate these two groups.

Regarding the degree of disturbance, the three classes are characterized by intermediate (class 1) and moderate to severe (class 2 and 3) PTSD symptom severity. The absence of an extremely severe symptom class is consistent with findings of a general decline in PTSD symptom severity over the life course in older adults (Böttche et al., 2012). Nevertheless, half of the participants reported moderate to severe PTSD symptom severity (class proportion of class 2 and 3: 33.5% and 16.5%, respectively). This finding is comparable to the proportion in the clinical sample of Naifeh and colleagues (2010).

The analyses predicting class membership showed significant contributions in distinguishing the classes. Compared to the Intermediate Disturbance class, both of the Pervasive Disturbance classes reported a significantly higher number of experienced traumatic events. This finding is consistent with existing studies that have indicated a relationship between the number of traumatic events and PTSD (e.g., Kolassa et al., 2010). This cumulative effect of trauma on severity of PTSD has also been observed among older adults (Ogle et al., 2014). The Pervasive Disturbance-Low Avoidance class reported a higher educational level compared to participants in the Pervasive Disturbance-High Avoidance class. One explanation for this finding may be that higher education facilitates reappraisal strategies and social support seeking, which can help to mitigate symptoms of avoidance. Thus, additional research will be useful in better understanding how education may help to mitigate avoidance symptoms in older adult trauma survivors. Other demographic and trauma-related characteristics, namely age, sex, and the degree of trauma-associated disclosure, were unrelated to latent classes.

Finally, results of the ANCOVAs showed that, relative to the Intermediate Disturbance group, the Pervasive Disturbance classes had significantly greater severity of depression, anxiety and somatization symptoms, even after controlling for sociodemographic and trauma-related variables. These results support the notion of a severity gradient, with more severe PTSD symptom profiles being associated with greater severity of commonly trauma-related comorbid disorders. This finding could have practical implications for the assessment of PTSD in older adults and applicable treatment approaches, especially in older adults with PTSD who are often misdiagnosed as having depression or anxiety.

Taken as a whole, these results have two overarching clinical implications for geriatric mental health practice. First, they suggest that assessment of the full spectrum of PTSD and symptom clusters from contemporary phenotypic models of this disorder may be useful in understanding the nature of PTSD symptoms such as sleep disturbance (which may possibly be misdiagnosed as somatic disease), flashbacks (which may possibly be misdiagnosed as hallucinations) or problems of concentration (which may possibly be misdiagnosed as mild cognitive impairment); such an assessment can ultimately match patients to treatment that treat the broad constellation and predominant phenotypic presentation of PTSD instead of single symptoms. Second, given the severity gradient observed in the latent classes, these results suggest that the clinical presentation of comorbid symptoms—depression, anxiety, and somatization—may warrant attention in assessment and treatment of older trauma survivors with PTSD. For example, assessment of unique trauma and clinical histories (i.e., comorbidity profiles, natural courses) of older persons with PTSD may help inform more personalized approaches to treatment in this population.

Several limitations of the study should be noted. First, data were collected via self-report questionnaires, so it is unclear if results were differed if data were obtained via clinical interview. Second, data were mainly gathered through Internet-based questionnaires which as yet have not been completely validated for Internet-based administration. Nevertheless, there is evidence for equivalence in reliability and validity of paper-pencil and Internet-based questionnaires especially in the context of anxiety disorders (Carlbring et al., 2007). Third, we used a cross-sectional design which precludes us from understanding temporal relationships among study variables. In light of longitudinal results of Ayer and colleagues (2011) indicating a qualitative change in the PTSD class structure over time and of existing literature reporting a change in the symptom profile in older adults (e.g., Trappler et al., 2002), further research is to evaluate possible changes in PTSD class structure over time. Fourth, the generalizability of these findings to the broader population of treatment-seeking older adults remains unclear. The sample comprised older adults who were seeking treatment for early-lifetime war traumatization and its consequences. Therefore, generalizability is thus limited to this subgroup. In a next step, it will be important to examine PTSD typologies of older adults experiencing recent as well as accidental or other man-made traumatic events. Fifth, PTSD symptoms were assessed based on DSM-IV criteria which did not represent the recent valid diagnostic criteria of the four symptom clusters of PTSD

(DSM-5, APA, 2013). Nevertheless, a splitting of DSM-IV Criterion C into avoidance and numbing is justified due to the consistent findings indicating that these are separate and distinct constructs (Asmundson et al., 2004), and also represent the factor structure of PTSD in older adults (Pietrzak et al., 2012; Schinka et al., 2007).

Despite these limitations, our findings are consistent with prior data, which have identified heterogeneous PTSD typologies that differ with respect to symptom severity and symptom presentation. They extend this work to suggest that there are three predominant typologies of PTSD symptoms in treatment-seeking older adults, which are differentiated with respect to education, number of traumatic events, and psychiatric comorbidities. That the pervasive disturbance classes differed only with respect to severity of avoidance symptoms aligns with a large body of confirmatory factor analytic studies (e.g., Naifeh et al., 2010, Palmieri et al., 2007), suggesting that the splitting of the DSM-IV cluster C into two separate factors (avoidance and negative alterations in cognitions and mood) in DSM-5 is important to be able to qualitatively evaluate differences in PTSD symptom profiles. Although replications are necessary, especially in other older adult samples and using DSM-5 criteria for PTSD, results of this study underscore the importance of considering the heterogeneous manifestations of PTSD symptoms in treatment-seeking older adults.

Chapter 4

Integrative Testimonial Therapy (ITT): An Internet-based, therapist-assisted therapy for German elderly survivors of the World War II with posttraumatic stress symptoms

A slightly adapted version of this chapter has been published as
Knaevelsrud, C., Böttche, M., Pietrzak, R. H., Freyberger, H. J., Renneberg, B. & Kuwert, P. (2014). Integrative Testimonial Therapy (ITT): An Internet-based, therapist-assisted therapy for German elderly survivors of the World War II with posttraumatic stress symptoms. *Journal of Nervous and Mental Disease, 202(9), 651-658*.

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Abstract

Background: Trauma-focused cognitive behavioral treatments are known to be effective for posttraumatic stress disorder (PTSD) in adults. However, evidence for effective treatments for older persons with PTSD, particularly elderly war trauma survivors, is scarce.

Methods: In an open trial, 30 survivors of World War II aged 65-85 (*M* = 71.73 years, *SD* = 4.8; *n* = 17 female) with PTSD symptoms were treated with a Web-based, therapist-assisted cognitive-behavioral/narrative therapy for 6 weeks.

Results: Intent-to-treat analyses revealed a significant decrease in PTSD severity scores (Cohen's *d* = .43) and significant improvements on secondary clinical outcomes of quality of life, self-efficacy and posttraumatic growth from pre- to posttreatment. All improvements were maintained at a 3-month follow-up. The attrition rate was low (13.3%), with participants who completed the trial reporting high working alliance and treatment satisfaction.

Conclusion: Results of this study suggest that ITT is a well-accepted and potentially effective treatment for older war trauma survivors suffering from PTSD symptoms.

Trial registration number: Current Controlled Trials ACTRN12608000259347

Chapter 5

Predictors of outcome of an Internet-based cognitive-behavioral therapy for posttraumatic stress disorder in older adults

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Abstract

Objectives. Cognitive-behavioral therapies (CBT) have shown promise in treating posttraumatic stress disorder (PTSD) in older adults. However, little is known about demographic, psychopathology, and resource-oriented variables that may mediate response to such therapies. The aim of this study was to examine the influence of such variables on treatment outcome in an internet-based CBT for PTSD in older adults traumatized as children during the Second World War.

Methods. Sixty-one older adults with war-associated subsyndromal or greater severity of PTSD symptoms completed a randomized controlled Internet-based CBT. Assessments of PTSD and resource-oriented variables (self-efficacy, locus of control - LOC, posttraumatic growth - PTG) were conducted at baseline, posttreatment and 6-month follow-up.

Results. Results revealed that pretreatment scores on measures of internal LOC and PTG predicted PTSD symptom severity at posttreatment, even after controlling for initial PTSD. At the 6-month follow-up, internal LOC continued to predict PTSD symptom severity. In addition, repeated measure analyses of variance revealed that participants with higher internal LOC and higher PTG respectively did not differ in initial PTSD severity comparing with participants with low resources but benefitted significantly more from the treatment in terms of PTSD than the low resource group. Treatment outcomes were unrelated to demographic variables and self-efficacy.

Conclusion. These findings suggest that greater internal LOC and PTG at treatment initiation are associated with greater improvement in PTSD symptoms following Internet-based CBT. Assessment of these constructs may be useful in identifying trauma survivors who are most likely to respond to CBT.

Introduction

In recent years, there have been important advances in the development of treatment approaches for posttraumatic stress disorder (PTSD; e.g., National Clinical Practice Guideline for PTSD, National Institute for Clinical Excellence, 2007). With the established evidence of the efficacy of psychological PTSD treatments (e.g., Bisson & Andrew, 2010), it is important to examine potential determinants and factors influencing treatment outcome, as this can provide knowledge of difficult prognostic features in advance which may reduce or prevent dropout and may identify treatment-resistant participants. Several variables related to the development and maintenance of PTSD may also predict response to treatment. However, data regarding which variables are uniquely linked to treatment response remain mixed.

Predictors of treatment response may be organized into three overarching categories: (1) sociodemographic variables; (2) trauma characteristics; and (3) initial level of psychopathology. Regarding sociodemographic variables, one study has shown that female sex predicted a better outcome in PTSD treatment (Tarrier et al., 2000). Other studies, however, did not find such sex differences (Jaycox et al., 1998; Marks et al., 1998). Further, Rizvi and colleagues (2009) reported young age and low educational level as predictors for poorer outcome in their study. However, other studies have found that age is unrelated with CBT outcomes (Marks et al., 1998, Tarrier et al., 2000). Marital status, employment, and educational level have also been found to be unrelated to outcome in PTSD treatment (Ehlers et al., 1998, Tarrier et al., 2000). Regarding trauma characteristics, studies have shown that number of traumatic events (Ehlers et al., 1998; Tarrier et al., 2000) and time since trauma (e.g., Ehlers et al., 2005; Marks et al., 1998) were mostly unrelated to treatment outcome. Finally, with regard to levels of psychopathology, high intake PTSD symptom severity has generally been shown to predict a poorer treatment outcome (e.g., Karatzias et al., 2007; van Minnen et al., 2002). However, in one study, higher intake symptom severity predicted a better outcome (Foa, et al., 1995), while in other studies no relationship between symptom severity and outcome were found (Jaycox et al., 1998; Munley et al., 1994). Taken together, these studies suggest that the literature on predictors of PTSD treatment response is inconsistent and at best variables show a trend regarding their influence as outcome predictors. Therefore, in addition to the focus on already known and mentioned

predictors, research that examines additional predictors of PTSD treatment response is needed to understand factors that are differentially associated with benefit from such interventions.

According to the well-established PTSD explanatory models (Brewin, 2001; Ehlers & Clark, 2000), pre- and posttraumatic beliefs about the world and the self, as well the ability to restore a sense of control and safety are not only related to the development but may also influence the maintenance of PTSD and its response to treatment. Perceived controllability and positive psychological changes experienced as a result of trauma (i.e., posttraumatic growth) are often conceived as resilience factors that may influence one's appraisal of a trauma and its sequelae. However, little is known about whether these factors may predict treatment response in trauma-exposed individuals.

Experiencing a trauma is often accompanied by a perceived loss of control just as symptoms of PTSD are typically experienced as unintentional and uncontrollable. Thus, an individuals' self-perception of control may help to maintain a level of functioning by being able to cope with a traumatic event. Several authors found a positive relationship between external locus of control and current levels of PTSD symptom severity (Mellon, 2009; Shaw, 2000). Additionally, researchers have demonstrated a relation between locus of control and the development and maintenance of PTSD, with an internal LOC associated with a resistance to PTSD development (Leiderman-Cerniglia, 2002) and external LOC with the development and maintenance of PTSD (McKeever et al., 2006). Another construct related to perceived controllability is self-efficacy, which reflects an individual's perception of his or her ability to cope with stressful situations (Bandura, 1982). Benight and colleagues (2004) emphasize that greater self-efficacy provides persons with a feeling of control in barely controllable situations. Several studies have shown the relevance of self-efficacy as a predictor of PTSD (e.g., Benight, 2000; Flatten, 2008). To our knowledge, however, no study has evaluated whether self-efficacy and locus of control may predict treatment outcome in trauma survivors.

Both LOC and self-efficacy are related to posttraumatic growth (PTG), which is defined as positive psychological changes that may be experienced in the aftermath of a traumatic event (Tedeschi & Calhoun, 1995). Pooley and colleagues (2013) found low self-efficacy scores and high PTG scores to be important predictors of posttraumatic stress symptomatology. Further, in the aftermath of a traumatic event, Maercker and colleagues (2003) and Park and colleagues (1996) found a significant positive relation

between PTG and internal LOC. Research regarding the relation between PTG and PTSD, however, has yielded conflicting results (for reviews see Linley & Joseph, 2004; Zoellner & Maercker, 2006). To our knowledge, only two treatment studies have examined how PTG is related to treatment-related changes in PTSD. Knaevelsrud et al. (2010) found that a decrease of PTSD symptoms following treatment predicted PTG at posttreatment. In another study, higher initial PTG predicted better PTSD outcome (Hagenaars et al., 2010).

The aim of the present study was to examine the relationship between initial resource-oriented variables, including LOC, self-efficacy, and PTG, and treatment-related changes in PTSD symptom severity immediately after treatment and in the long-term course (6-month follow-up). In addition, we were interested in whether higher initial PTSD symptoms influence resources and outcome. In evaluating these aims, we also examined whether sociodemographic variables (i.e., sex, educational status) and initial PTSD severity predicted PTSD outcome.

Method

Participants

Potential participants were recruited from primary care practices, referrals from clinicians, radio and newspaper announcements, and advertisements posted on websites. Potential participants were invited to apply for treatment via e-mail or telephone and received an individual access code to enter the web-based screening questionnaires. Those who were assessed as potentially suitable for the study were assigned to an individual therapist.

Individuals excluded from the study are provided with information on where they could receive treatment elsewhere. Individuals who fulfilled the following inclusion criteria were entered into the study: 1) have experienced a traumatic event as a child or adolescent during World War II that met diagnostic criteria for PTSD as specified in DSM-IV; 2) report at least subsyndromal level of PTSD (i.e., participants met Criterion B and either Criterion C or D; Blanchard et al., 1996); and 3) were able to understand and write texts in German language. Exclusion criteria included: 1) self-report of receiving psychological treatment elsewhere simultaneously; 2) abuse of drugs or alcohol; 3) severe depression (BSI-18 depression score < 3); or 4) suicide risk (endorsement of item "thoughts about committing suicide", if a participant was determined to be high risk, we contacted them via telephone and provided appropriate referrals).

In the current study, to enhance the power of the assessment of outcome predictors, analyses were conducted with a pooled sample consisting of treatment (n = 40) and waiting list (n = 43) participants between May 2008 and July 2011. After a 6-week waiting period, 35 out of 43 patients of the control group received the same treatment, eight elected to not start the treatment after the waiting period. In all eight cases, severe illness was reported as the primary reason for non-participation. Of the 75 participants who were included in the treatment, sixty-eight patients (82%) completed treatment, seven patients (8%) dropped out at a very early stage during treatment due to own severe illness or illness of a significant other or circumstances of the time. Sixty-one patients (90%; treatment group: n = 32; waiting list: n = 29) completed a 6-month follow-up.

Treatment study

Participants were enrolled in a randomized controlled trial assessing the efficacy of Integrative Testimonial Therapy (ITT; Knaevelsrud et al., 2014), a therapist-assisted, internet-based cognitive behavioral writing therapy. ITT is based on the treatment concept of Interapy (Lange, 2000), which has been extended by age-specific geropsychological treatment components. It is comprised of three treatment modules: 1) resource-oriented biographical reconstruction of the patient`s life (seven essays), 2) moderate exposure (two essays). Specifically, participants are instructed to describe in detail the traumatic event thoroughly including their intimate fears and thoughts concerning the traumatic experience; and 3) cognitive restructuring (two essays), which consists of writing a supportive letter to the traumatized child/adolescent from current perspective to stimulate new perspectives on the traumatic event, challenge dysfunctional automatic thinking and behaviour patterns.

Communication between therapist and patient was exclusively text-based and asynchronous via the study website. At the beginning of each writing phase, participants were asked to propose individual timetables for the writing sessions. After each letter, patients received individual feedback and further writing instructions within 24 hours. The communication was facilitated through a database implemented in the Internet with the study participants writing their assigned essays and the therapists providing feedback. Treatment was planned to consist of two weekly 45-minute writing assignments over a six-week period (11 essays in total). Results of a pilot study and a detailed description of the treatment have been reported by Knaevelsrud and colleagues (2014).

Assessments

Online self-report questionnaires were used to determine the eligibility for the treatment program, and to assess symptom severity and resource-related constructs. Assessments were completed at four timepoints (pre, post, and 3- and 6-month follow-up). In the current study, we focused on post-assessment and 6-month follow-up to evaluate short- and long-term effects of treatment. Sample characteristics in terms of sociodemographic variables (e.g., age, sex, marital status, educational level) were also recorded.

Outcome measurement. Posttraumatic stress disorder symptoms were assessed using the Posttraumatic Diagnostic Scale (PDS, Foa, 1995, 1997), a 17-item questionnaire of PTSD symptoms that corresponds to DSM-IV criteria for this disorder (score range: 0-51). The PDS has demonstrated validity and reliability and is recommended as particularly useful when used for screening and assessing PTSD.

Predictor variables of PTSD outcome. The first predictor category included socio-demographic variables (sex, educational status) assessed at baseline. The second predictor variable was intake PTSD symptoms assessed with the PDS (Foa, 1995). Resource-oriented variables (i.e., LOC, self-efficacy, and PTG) were the third predictor category. Locus of control was assessed with the 24-item Internal, Powerful Others, and Chance-Questionnaire (IPC; Krampen, 1981), a German version of the instrument developed by Levenson (1981), which consists of three subscales (range 8 – 48 each: internality: e.g., "My life is determined by my own actions", powerful others externality: e.g., "I have a feeling that most of my life depends on other people", chance control externality: e.g.," If I get what I want, it is mostly by luck."). The Cronbach's alpha values for each scale range from 0.67 (Internal, Powerful others) to 0.71 (Chance) (Krampen, 1981). Self-efficacy was assessed using the General Self-Efficacy Scale (GSE, Schwarzer & Jerusalem, 1995), a 10-item measure of adaption and coping abilities in daily hassles and stressful life events (range 10 - 40). High reliability of the GSE scale was confirmed (Cronbach's α between .78 and .89; Schwarzer et al., 1999). Posttraumatic growth were measured by a short form of the Posttraumatic Growth Inventory (Tedeschi et al., 1996), which was comprised of items with the highest power on each subscale (Cronbach's α between 0.87 and 0.92) in the German validation of PTGI (PTGI-SF, 5 items, range 5 - 30; Maercker & Langner, 2001). The PTGI-SF assesses the perceived positive outcomes of traumatic events.

Statistical analyses

Chi-square tests and t-tests were used to compare participants of the treatment and waiting list on all predictor variables and on PTSD at pretreatment. Descriptive statistics were used to examine the demographic data. Bivariate correlations were computed to examine relationships between initial levels of PTSD and potential predictors. Therapy outcome at posttreatment and 6-month follow-up were analysed with repeated measure ANOVAs on the PTSD outcome scores. Wilcoxon signed-rank tests were computed to

assess the direction of change. Results were presented among the long-term trial completers (n = 61). Change scores from pre to post and from pre to follow-up were used as the main outcome variables. The usage of change scores was justified because of its conservative form of hypothesis testing. In addition, the assumed advantages of using residual scores could not be replicated (Monte-Carlo-Studies, Stelzl, 2001). Factors associated with treatment were investigated using stepwise multiple regression analyses with change scores in the total PDS severity from pre- to posttreatment and pretreatment to follow-up as the main outcome variables, and the sociodemographic variables and clinical measures as predictor variables. First, each predictor variable was entered in a single regression analysis separately with intake PTSD (and posttreatment PTSD for follow-up outcome prediction, respectively) controlling for initial symptom level. Next, all significant predictor variables from single regression analyses were entered in a hierarchical regression model for showing their independent contribution to outcome at posttreatment and 6-month follow-up. To test our hypothesis that patients with high scores on measures of resource-oriented variables benefit more from therapy, longitudinal data were analysed with repeated measure ANOVAs using each identified predictor as a between-subject factor. Statistical analyses were performed with the IBM Statistical Package for Social Sciences (SPSS), version 20.0 for MAC OS X.

Results

Baseline characteristics

Participants were aged between 63 and 85 years, with an average age of 71.2 years (*SD* = 4.6); 69 % (*n* = 42) were female; on average they received 11.6 (*SD* = 1.6) years of education. The majority was married (62%, *n* = 38), 25% (*n* = 15) were divorced, 8% (*n* = 5) were widowed, and 5% (*n* = 3) were single. Thirty-six percent (*n* = 23) reported war-associated traumatic events as their index trauma, including witnessing dead bodies, killing of family members, forced separation of family, being exposed to shootings, 26% (*n* = 16) reported bombings, 25% (*n* = 15) fled from home, 7% (*n* = 4) were raped; and 6% (*n* = 3) reported detainment (being prisoner of war, concentration camp). On average, the traumatic event had occurred 65.2 (*SD* = 1.3) years prior to the intervention.

Baseline characteristics of outcome and predictor variables, as well as bivariate correlations among potential predictor variables are shown in Table 5.1. The mean intake PTSD symptom severity was 21.2 (*SD* = 8.1), which is indicative of moderate to severe severity of symptoms (Foa, 1995). Nearly all participants (94.4%) had at least moderate PTSD symptoms above the PDS cut-off score of 10 for a probable diagnosis of PTSD (Foa, 1995). Initial PTSD symptom severity correlated positively with higher levels of external LOC (powerful others). No other correlations between PTSD indices and other variables were found.

Attrition

We assessed differences between completers (*n* = 61) and dropouts (*n* = 15; i.e., patients who did not start treatment after waiting period and patients who dropped out during treatment) as well as between completers and follow-up attrition (*n* = 7). Chi-square analyses failed to reveal any significant differences between completers and dropouts as well as between completers and follow-up attrition in terms of sex (χ^2 = 2.56, *df* = 1, *p* > .05, χ^2 = - 1.89, *df* = 1, *p* > .05, respectively) and educational level (χ^2 = 1.97, *df* = 2, *p* > .05, χ^2 = 1.08, *df* = 2, *p* > .05, respectively). A t-test did not indicate a significant difference in terms of age between completers and dropouts (*t*(74) = -1.38, *p* > .05) and between completers and participants who had not completed follow-up measurement (*t*(66) = - .14, *p* > .05).

We also assessed differences between completers in dropouts in terms of PTSD and resource-oriented variables. T-tests showed no significant differences for PTSD $t(74) = -.87$, $p > .05$, PTG $t(73) = .91$, $p > .05$, external LOC (powerful others) $t(74) = 2.09$, $p > .05$ and internal LOC $t(74) = -1.64$, $p > .05$. However, significant differences were noted for self-efficacy $t(73) = -2.50$, $p = .02$ and external LOC (chance) $t(74) = 2.57$, $p = .01$. Dropouts reported lower external LOC (chance) ($M = 23.07$, $SD = 5.39$) and higher self-efficacy ($M = 31.33$, $SD = 6.91$) than completers ($M = 27.05$, $SD = 5.37$ and $M = 26.97$, $SD = 5.83$, respectively). Concerning differences between completers and follow-up attrition, no significant differences were found for PTSD, PTG, external and internal LOC, and self- efficacy.

Table 5.1 Characteristics and bivariate correlations among study variables at baseline measurement

Variables.	***M*** **(*SD*)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. PTSD severity	21.23 (8.07)	-							
2. PTG	3.38 (.97)	.07	-						
3. Self-efficacy	26.97 (5.83)	-.22	.59**	-					
4. Internal LOC	34.26 (4.15)	.03	.28*	.44*	-				
5. External LOC (c)	26.21 (4.80)	.29*	.06	-.18	-.09	-			
6. External LOC (p)	27.05 (5.36)	.28*	.13	-.03	-.10	.62*	-		
7. Sex (female=1)	1.31 (.40)	-.07	.06	.13	-.17	.10	.01	-	
8. Education	11.56 (1.62)	.04	-.18	-.27*	-.14	-.01	-.01	-.06	-

Notes: External LOC (c) = External Locus of Control (chance control externality); External LOC (p) = External Locus of Control (powerful others externality); PTG = Posttraumatic Growth; PTSD = Posttraumatic Stress Disorder

N = 61, Self-efficacy and PTG $N = 60$; Significant correlation, *$p < .05$, **$p < .01$.

Pooled sample

Chi-square analyses failed to reveal any significant differences between the treatment group and wait-list control group with respect to sex and education level, and a t-test showed no significant difference in terms of age. We also used t-tests to assess

differences between treatment group and wait-list control group with respect to initial psychopathological and resource-oriented variables: no significant differences were found for PTSD symptom severity $t(59) = .18$, $p > .05$, PTG $t(59) = .83$, $p > .05$, external LOC (powerful others) $t(59) = .49$, $p > .05$, external LOC (chance) $t(59) = -.41$, $p > .05$, internal LOC $t(59) = .34$, $p > .05$, or self-efficacy $t(59) = –.13$, $p > .05$.

Outcome characteristics at posttreatment and 6-month follow-up

A repeated-measures ANOVA revealed a significant effect for time on PTSD symptoms; $F(2.58, 141.61) = 33.79$, $p < .001$ partial $\eta^2 = .38$. Pairwise comparisons corrected using a Bonferroni adjustment revealed a significant effect for time from pretreatment to post-treatment for overall PTSD (Mean Difference = 7.39, $SE = 1.18$, $p < .001$, CI 4.35 - 10.44) which was maintained at 6-month follow-up. The mean PTSD change score from pre- to posttreatment was $M = 7.33$ ($SD = 8.28$), PTSD symptom severity was significantly higher at pretreatment ($Z = -5.34$, $p < .001$, $r = -.48$). The mean change score from pre-treatment to 6-month follow-up was $M = 9.62$ ($SD = 9.03$) with PTSD symptom severity also significantly higher at pretreatment ($Z = -5.97$, $p < .001$, $r = -.54$).

Prediction of treatment outcome

From baseline to posttreatment. There were significant correlations between pre to post change score in PTSD severity and initial PTSD ($r = -.49$, $p < .01$), as well as intake PTG ($r = -.34$, $p < .01$) and intake internal LOC ($r = - .34$, $p < .01$) at pretreatment, i.e., patients with high values of these variables benefit more from treatment. Bivariate correlations with sociodemographic variables (sex, educational status), self-efficacy and external LOC failed to show any significance.

Using linear single regression models to predict PTSD outcome from baseline to posttreatment, intake PTSD controlling for initial symptom level were included as predictor variables as well as a resource-oriented variable respectively. Analyses revealed initial PTSD as a predictor ($\beta = -0.48$, $t = -4.11$, $p < .001$). In addition, initial higher internal LOC predicted a better outcome at posttreatment ($\beta = -.66$, $t = -3.01$, $p = .003$). Also, initial higher PTG were associated with better outcome ($\beta = -3.15$, $t = -3.51$, $p = .001$). All other resource-oriented variables showed no significant results.

Each significant variable of single regression analyses was entered into a hierarchical regression analysis with PTSD change score as outcome variable. In the first step, analysis revealed initial PTSD as a predictor ($\beta = -.48$, $t = -4.11$, $p < .001$) and

explained 21% of variance (ΔF = 16.92, p < .001). Greater PTSD symptom severity at baseline predicted greater treatment-related change in PTSD. In addition in step two, initial higher internal LOC predicted a better outcome at post measurement (β = -.77, t = -3.60, p = .001) and predicted 35% of the variance (ΔF = 12.96, p = .001). The total model including initial PTSD, internal LOC and PTG explained 42% of the variance (ΔF = 7.67, p = .008) and predicted a better outcome (β = -2.44, t = -2.77, p = .008). Table 5.2 summarizes the results of the hierarchical multiple regression analysis showing the influence of all three variables as outcome predictors.

Table 5.2 Hierarchical regression for variables predicting therapy outcome (pre to post)

		B	***SE B***	***β***	**ΔR^2**	***p***
Step 1						
	Constant	2.66	2.65			
	Initial PTSD	-0.48	0.12	-.48***	.23	< .001
Step 2						
	Constant	28.55	7.59			
	Initial PTSD	-0.47	0.11	-.47***		
	Internal LOC	-0.77	0.21	-.38**	.14	.001
Step 3						
	Constant	31.72	7.27			
	Initial PTSD	-0.49	0.10	-.49***		
	Internal LOC	-0.60	0.21	-.30**		
	PTG	-2.44	0.88	-.29**	.08	.008

Note: adj. R^2 = .21 for Step 1, adj. R^2 = .35 for Step 2, adj. R^2 = .42 for Step 3. ***p < .001, **p < .01

From baseline to 6-month follow-up. In these analyses, initial PTSD severity (r = - .51, p < .001) as well as internal LOC (r = - .37, p < .01) were significantly correlated to the mean PTSD change score at 6-month follow-up. Bivariate correlations with potential sociodemographic predictors (sex, educational status), as well as with other resource-oriented variables failed to reach statistical significance.

Regression analyses with pretreatment to 6-month follow-up PTSD change score as outcome variable were performed with each resource-oriented variable as predictor as well as initial and posttreatment PTSD score to control for symptom level. Analysis revealed initial and posttreatment PTSD (β = .48, t = 3.83, p < .001) as predictors explaining 40% of the variance (adj. R^2 = .40, F = 20.59 p < .001). Additionally, only higher levels of internal LOC were associated with a greater benefit at 6-month follow-up (β = -.52, t = -2.21, p = .03) and explained 44% of the variance (adj. R^2 = .44, F = 16.29 p < .001).

Hierarchical linear regression analysis using the change score of PTSD severity from pretreatment to 6-month follow-up as outcome variable included the reported three significant variables (Table 5.3). In step 1 and 2, initial PTSD and posttreatment PTSD explained 26% (ΔF = 21.44, p < .001) respectively 40% (ΔF = 14.69, p < .001) of the variance. In the last step, adding internal LOC, 44% of the outcome at 6-month follow-up was explained (ΔF = 4.88, p = .03).

Table 5.3: Hierarchical regression for variables predicting therapy outcome (pre to 6-month follow-up)

		B	***SE B***	***β***	***ΔR²***	***p***
Step 1						
	Constant	2.99	2.91			
	Initial PTDS	-0.60	0.13	-.52***	.27	< .001
Step 2						
	Constant	1.35	2.65			
	Initial PTDS	-0.83	0.13	-.73***		
	PTDS post	0.49	0.13	.44***	.15	< .001
Step 3						
	Constant	18.92	8.36			
	Initial PTDS	-0.76	0.13	-.67***		
	PTDS post	0.38	0.13	.35**		
	Internal LOC	-0.52	0.23	-.23*	.05	.03

Note: adj. R^2 = .26 for Step 1, adj. R^2 = .40 for Step 2, adj. R^2 = .44 for Step 3. ***p <. 001, **p < .01 *p < .05

Baseline LOC and PTG as treatment outcome predictors

To test our hypothesis that high initial PTSD symptoms may be related with lower initial resources and therefore a worse outcome, for each of the resource-related variables participants were divided into two extreme groups. Using a tertile split procedure, two dummy variables were created dividing the sample in those with high (highest tertile) versus low (lowest tertile) levels of resources at baseline. Repeated measures ANOVAs, including between-subjects variable (dummy variable) show a significant interaction between time and extreme group for PTG ($F(3, 120) = 2.88$, $p = .039$) and internal LOC ($F(3, 105) = 3.79$, $p = .013$) indicating that the amount of decrease in PTSD was dependent on the extreme group (highest tertile of PTG and internal LOC show greatest decrease, respectively). Self-efficacy and external LOC show no significant interaction.

There were no significant differences between the two extreme groups concerning their initial PTSD score (internal LOC: $t(44) = .01$, n.s., PTG: $t(53) = .07$, n.s., self-efficacy: $t(44) = 1.08$, n.s.; external LOC-chance: $t(48) = -1.97$, n.s.). Except for external LOC-powerful others ($t(44) = -2.57$, $p = .01$), indicating a higher initial PTSD score in patients with high external LOC. Figure 5.1 shows the course of PTSD severity from pretreatment to 6-month follow-up in patients with high and low internal LOC and PTG, respectively. T-tests at 6-month follow-up show significant changes between both extreme groups – for internal LOC groups: $t(39) = 2.36$, $p = .02$ and for PTG groups: $t(44) = 2.43$, $p = .02$.

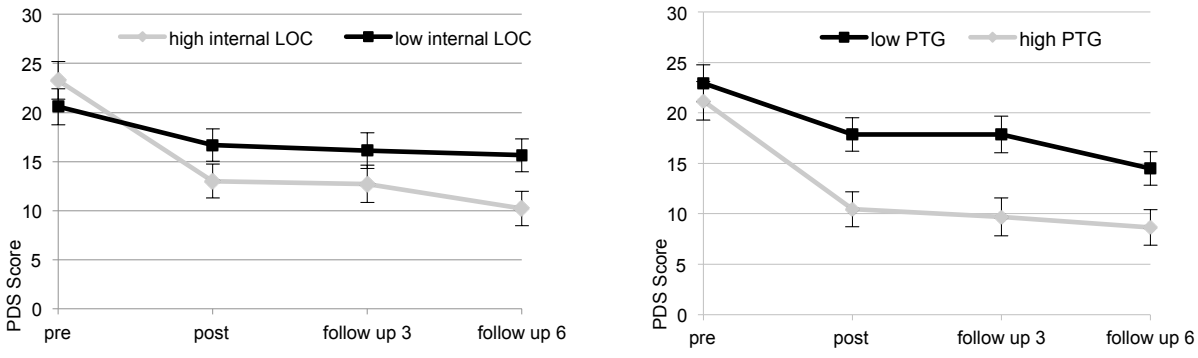

Figure 5.1: Course of PTSD severity from pre to 6-month follow-up in patients with high vs. low internal LOC and PTG, respectively (repeated measures ANOVA). Error bars denote standard error of mean.

Discussion

In this study, we investigated the relation between resource-oriented variables on treatment outcome of an Internet-based cognitive-behavioral writing therapy for older adults with war-related PTSD at posttreatment and at 6-month follow-up. Pretreatment internal LOC and PTG both predicted PTSD outcome directly after treatment even after controlling for initial level of PTSD symptoms. Individuals with higher levels of initial internal LOC as well as of initial PTG showed a greater treatment benefit than patients with lower levels of these resource-oriented variables. This finding is in line with the results of Hagenaars and van Minnen (2010), who similarly found that higher pretreatment PTG predicted a better PTSD outcome. With regard to internal LOC, as noted by Tedeschi & Calhoun (1995), self-perception of control may help an individual cope with a traumatic event and its sequelae (e.g., intrusion symptoms). Looking at the long-term effects at 6-month follow-up, only higher initial levels of internal LOC predicted better treatment outcome. Unfortunately, there is a lack of studies on long-term effects of resource-oriented variables on treatment outcome in PTSD. Ehlers and Clark (2000) assumed in their cognitive model that PTSD patients have negative appraisals of the trauma and/or its sequelae which induce a sense of persistent serious threat. Thus, internal LOC, or the feeling and experience of being able to regain control over one's own life, may decrease PTSD symptom severity and compensate feelings of uncontrollability. For long-term treatment effects, a strong internal LOC may therefore help increase one's sense of controllability of the traumatic sequelae, which may in turn enhance treatment response.

Contrary to our expectations, self-efficacy was unrelated to PTSD treatment outcome. In prior work, self-efficacy has been shown to be an important predictor for the development of PTSD (e.g., Benight, 2000; Flatten, 2008) and was associated with a feeling of control in barely controllable situations (Benight et al., 2004). One possible explanation for self-efficacy being unrelated to PTSD treatment outcome is that this construct is too broad and consequently unrelated to intervention-associated reductions in PTSD symptoms. Here, the concept of coping self-efficacy seems to be more adequate and precise.

Focussing on participants with high and low initial internal LOC and PTG respectively, patients with higher internal LOC (or PTG, respectively) did not differ in

initial PTSD severity compared to patients with low scores in internal LOC or PTG, respectively. These results point to an independence between PTSD symptom severity and internal LOC (and PTG) at pretreatment. However, the high resource-oriented groups benefitted significantly more from the treatment than the low resource-oriented groups. Possibly, patients dispose of high levels of PTG and internal LOC at pretreatment but may not be able to benefit from these variables in terms of coping with PTSD symptoms (i.e., they did not perceive controllability or positive psychological changes in their perceptions). The high activity level of the writing therapy as well as the therapist-guided examination with the trauma and the biography may empower the patients to cope with PTSD symptoms by perceiving control about themselves and their environment as well as by experiencing positive changes regarding their trauma.

Pre- to posttreatment decrease of PTSD symptoms demonstrates the efficacy of this Internet-based cognitive-behavioral PTSD treatment approach (Knaevelsrud et al., 2014). In this study, although internal LOC and PTG respectively predicted outcome over and above initial PTSD symptom severity, higher initial PTSD severity also predicted better treatment outcome at posttreatment and 6-month follow-up and explained a significant proportion of variance in symptoms. This finding accords with those reported by Foa and colleagues (1995), who interpreted this result as not simply statistical regression toward the mean, but rather that during the exposure phase of treatment, patients with more severe symptoms who displayed more intense fear benefitted more from the therapy. Further research will be useful in expanding upon the present study and examining the influence of each of the treatment components on therapy outcome. This approach would be able to make assertions whether intense fear during exposure underlies improvement in severely impaired patients or whether there are other indicators (e.g., building a coherent biography) that influence these outcomes.

Sociodemographic factors of sex and educational status were unrelated to treatment outcome, as has been observed in prior work (e.g., Marks et al., 1998; Tarrier et al., 2000). However, the existing literature for both sociodemographic variables is highly inconsistent and additional research on more heterogeneous samples of trauma survivors will be useful in further evaluations.

To our knowledge, this is one of the first studies to identify resource-oriented predictors of PTSD treatment response. Specifically, we found that pretreatment internal LOC and PTG significantly predicted PTSD treatment outcome independently of initial PTSD symptom severity. These results may help to understand the influence of

resource-oriented variables in coping with PTSD symptoms and benefiting from cognitive-behavioral therapy for PTSD.

Although the study has several strengths, including recruitment of a sample of PTSD patients with a unique trauma background; evidence of significant improvements in PTSD symptoms (Knaevelsrud et al., 2014); and an employment of a longitudinal design and manualised treatment, some limitations must be mentioned. First, the sample size was still modest, which might have influenced the identification or replication of other predictors of treatment response. Second, half of participants in this study were in a wait-list control group of a randomized control trial. Thus, it is not clear whether the waiting period had any influence on the results. Nevertheless, the treatment and wait-list control groups did not differ with respect to sociodemographic variables, initial psychopathology, or treatment outcome. In addition, it would be rather unlikely that patients suffering from PTSD symptoms for decades would suddenly improve without intervention. Third, clinical assessments were exclusively based on self-reported questionnaires, which as yet have not been validated for Internet-based administration. However, administration of online assessments has been found to be reliable when compared to face-to-face paper and pencil assessments (Carlbring et al., 2007). Fourth, the sample comprised exclusively childhood-survivors of World War II. Generalizability of results is thus limited to older survivors with childhood war-related trauma. Therefore, results need to be replicated with other age cohorts and trauma populations. Fifth, posttreatment and long-term data were not available for individuals who dropped out of treatment. Concerning sociodemographic variables and outcome predictors, no differences between completers, dropouts and follow-up attritions were found. However, dropouts showed a lower level of initial external LOC (chance externality) and a higher level of self-efficacy compared to completers, i.e., they seemed to be less influenced by beliefs of chance and have a stronger feeling of facing challenges and making choices.

In summary, our findings suggest that internal LOC and posttraumatic growth predict response to Internet-based CBT for PTSD. The interrelations of the mentioned initial resource-oriented variables with PTSD symptom improvement suggest a need for further research on the role of resource-oriented variables in mediating PTSD treatment response. Additional research is needed to confirm these results in larger samples and to evaluate additional resource-related predictors of PTSD treatment response in trauma survivors.

Chapter 6

General Discussion

Main results

Article I - Overview

The aim of article I was firstly to summarize the clinical characteristics of PTSD in older adults regarding how the timing of the trauma influences PTSD prevalence rates, its course and symptom profile. The second aim was to summarize the existing PTSD treatment approaches proposed for older adults. The overview highlights the limited amount of available data, emphasizing that caution is therefore warranted in summarizing the data. In general, epidemiological studies in different countries (e.g., Netherlands, USA, Germany) demonstrate that PTSD is a common disorder in older adults. Although the prevalence rates of PTSD are generally lower in older than in younger adults, high-risk groups (e.g., veterans, survivors of natural disasters) reported significantly higher prevalence rates.

The overview answers the research question concerning the timing of the trauma impact and highlights the need to differentiate between early and late-life traumatization for a better understanding of the course and characteristics of PTSD in older adults. Regarding late-life traumatization, no definitive conclusion about the symptom profile can be drawn because the number of available studies comparing differences across age cohorts is small and existing studies vary considerably in their methodologies (e.g., definition of age groups, types of trauma, cultural context). In cases of early-life traumatization, a general decline in PTSD symptom severity can be observed over time. However, there is evidence for an exacerbation or reactivation of prior PTSD symptoms in a subgroup of older adults (Op den Velde et al., 1993; Yehuda et al., 2009). The

available data also indicate a change in shape of the symptom profile; PTSD in older adults seems to be characterized by a decrease of re-experiencing and an increase of avoidance symptoms (Trappler et al., 2002; Yehuda et al., 2009).

Specific PTSD treatment approaches have been found to be effective for young and middle‐aged adults and are recommended as treatments of choice (e.g., cognitive behavioral therapy, NICE, 2005). However, only a small number of treatment studies relating to older adults are available. These studies suggest that disorder-specific CBT components (e.g., trauma exposure, cognitive restructuring) are promising and can be effectively embedded in an age-specific narrative life-review approach.

Taking all these aspects into account, the overview highlights the importance of further research into the cohort of older adults for a better understanding of the appearance and course of the disorder in this group, permitting examination of the needs of older trauma survivors and identification of adequate treatment.

Article II – Typologies of PTSD

The findings of the overview showed that little research has been carried out to address the clinical manifestations of PTSD, which can vary with respect to the heterogeneous PTSD symptom clusters. The second article therefore focuses on evaluating the predominant typologies of PTSD in older adults as well as examining the demographic and trauma-related factors associated with the typologies detected. It also aims to evaluate the relationship of the typologies to comorbid disorders. All research questions have been answered.

We found that a 3-class solution best fits the data, comprising an Intermediate Disturbance class and two Pervasive Disturbance classes, which differ with respect to the severity of avoidance symptoms (Pervasive Disturbance-Low Avoidance, Pervasive Disturbance-High Avoidance). The absence of a class without disturbances might be due to the nature of the sample which comprised treatment-seeking adults; this is consistent with existing findings in clinical samples (Naifeh et al., 2008). We hypothesized that avoidance symptoms play an important role in the distinction between the typologies, based on findings in older adults with early-life traumatization which indicate an increase of avoidance symptoms in the long-term course. This hypothesized importance of avoidance points to differentiation in the long-term course of PTSD in older adults. On the one hand, the Pervasive Disturbance-High Avoidance class could refer to delayed-

onset PTSD (i.e., an exacerbation or reactivation of PTSD symptoms) and on the other hand, the Pervasive Disturbance-Low Avoidance class could refer to a chronic PTSD subsample.

Our second research question was the examination of predictors of class membership. A greater number of traumatic events predicted membership in the Pervasive Disturbance classes compared to the Intermediate Disturbance class; this finding is consistent with existing studies that have indicated a relationship between the number of traumatic events and PTSD severity (de Jong et al., 2001; Neuner et al., 2004). Regarding differentiation between the two pervasive classes, the Pervasive Disturbance-Low Avoidance class had a higher level of education than the Pervasive Disturbance-High Avoidance class. This higher education level might facilitate the usage of reappraisal strategies or social support-seeking and therefore lead to lower avoidance symptoms.

Evaluating the relationship of typologies and comorbid disorders demonstrated that the Pervasive Disturbance classes showed higher levels of depression, anxiety and somatization compared to the Intermediate Disturbance class. This finding supported the notion of a severity gradient.

In sum, the results extended the existing findings, suggesting heterogeneity in PTSD symptoms in older adults and therefore the need for a differentiated and elaborated assessment in this age cohort.

Article III – PTSD treatment approach

The lack of evidence-based treatment interventions for older adults with PTSD prompted the development and implementation of a CBT intervention for PTSD in this age group. The narrative life review approach represents the core intervention component here, focusing on the crucial age-specific task of an adaptive and healthy life review in later life. This narrative technique also addresses the PTSD-specific dysfunctional memory recall by modifying the process of intentional recall of autobiographic memories (i.e., recall of specific non-traumatic memories, recall of a coherent trauma narrative). Taking into account this age-specific and memory-specific approach while integrating effective CBT techniques (i.e., exposure, cognitive restructuring), Integrative Testimonial Therapy (ITT, Knaevelsrud et al., 2009, 2014) was developed to treat PTSD in older adults with early-life traumatization. In the pilot

study, ITT resulted in a significant decrease in PTSD symptom severity and significant improvements in constructive dimensions (quality of life, self-efficacy and posttraumatic growth). These improvements remained stable at a 3-month follow-up measurement, suggesting a significant benefit from this intervention. Participants reported a positive working alliance as well as a high level of treatment satisfaction with the Internet-based intervention.

To sum up, article III of this thesis suggests that the age-specific short-term intervention of ITT is potentially effective for PTSD treatment of older adults with early-life war-associated traumatization. The study also demonstrated that the treatment has an impact not only on psychopathology but also on constructive dimensions.

Article IV – PTSD outcome predictors

The efficacy of treatment approaches for PTSD is well established in younger and middle-aged adults. Therefore, the research focus shifted to potential determinants and factors influencing the treatment outcome. In the literature, variables influencing the maintenance and development of PTSD are examined in particular as potential predictors for treatment outcome. Sociodemographic and trauma-related variables as well as severity of psychopathology are assumed to be outcome predictors. However, the data remain inconsistent and at best, variables show a trend regarding their predictive value. This makes it necessary to broaden the view of potential outcome predictors.

Cognitive models of the development and persistence of PTSD (e.g., Ehlers & Clark, 2000) as well as the findings from article III (i.e., the increase of constructive dimensions) underscore the importance of resource-oriented variables both in the course of PTSD and in the therapeutic process. Article IV therefore deals with the influence of previously assumed predictor variables as well as potential new ones on treatment outcomes in older adults. The study also aimed to pinpoint the influence of initial PTSD symptom severity on resource variables and outcomes.

Results revealed that initial scores of internal locus of control (LOC) predicted PTSD at posttreatment and at 6-month follow-up. In line with the cognitive model of Ehlers and Clark (2000), if patients are able to regain control over their own life (i.e., high internal locus of control), this may increase the sense of controllability of the traumatic sequelae, which may in turn enhance treatment response. Posttraumatic

growth (PTG) was also an outcome predictor for PTSD symptom severity at post-treatment, which was in line with earlier findings showing that higher pretreatment PTG predicted a better PTSD outcome (Hagenaars & van Minnen, 2010). Demographic variables were unrelated to treatment outcome, which also is in line with previous findings and underscores the need for a broader view of predictor variables.

An important finding was the independence of resource-oriented variables and PTSD at pretreatment. Participants with high internal LOC and high PTG respectively did not differ in initial PTSD severity compared with participants with low resources, but benefitted significantly more from the treatment. A possible explanation seemed to be the high activity level of the writing intervention as well as the resource-oriented treatment component, which may empower the patient to perceive control and experience positive changes regarding the trauma and its sequel.

To sum up, these results may help to broaden the view for other potential outcome predictors and to emphasize the importance of resource-oriented variables in the maintenance of PTSD as well as in treatment response.

Limitations

Despite the merits of the findings of the present thesis, some limitations have to be addressed in the following section. These limitations refer to the data in articles (II, III, IV).

First, the clinical assessment of all data may have impacted the results. All data were gathered through self-report questionnaires, so only the patient's subjective perspective was assessed without further information (e.g., from the clinician), which might diminish the accuracy of the diagnostic evaluation. Nevertheless, the questionnaires used in this thesis showed satisfactory psychometric validity and reliability and in terms of PTSD, referred to the DSM-IV diagnostic criteria. Another aspect of the exclusive use of self-report questionnaires is the lack of clarity on how a clinical interview influences social desirability (i.e., the tendency to answer in a favorable way), therapeutic alliance and treatment response. A clinical interview seems to be helpful in giving patients a better understanding of their problems and the sense that they and their problems are taken seriously (Suppiger et al., 2009). An additional clinical interview might therefore strengthen treatment adherence. A study comparing the influence of a clinical interview and a self-report questionnaire on treatment outcomes in a sample of patients with social anxiety disorder demonstrated no differences between the groups regarding social anxiety but revealed a difference in relation to depressive symptoms (Boettcher et al., 2012). Patients undergoing a clinical interview before treatment showed significantly fewer depressive symptoms at follow-up assessments compared to patients without an interview. The authors assumed depressive symptoms to be more sensitive to contact to the clinician (Boettcher et al., 2012). A direct comparison of this kind for PTSD patients has not yet been carried out.

Another aspect is that data were mainly gathered through Internet-based questionnaires. No direct comparison of existing validated paper-pencil questionnaires assessing PTSD symptoms and their Internet-based equivalent exists. However, in the context of disorder-specific self-report questionnaires assessing anxiety disorders, an equivalence in the psychometric properties of both forms is demonstrated (e.g., Carlbring et al., 2007; Hedman et al., 2010). There is also evidence that an idiographic usage of Internet-based questionnaires is appropriate (Buchanan, 2003); i.e., the

continuous longitudinal usage of Internet-based questionnaires for one person without switching the modalities (paper-pencil and Internet-based).

A limitation relating to article II only is the use of cross-sectional data instead of longitudinal data, meaning that causal relationships remain unclear. In the light of the findings of Ayer and colleagues (2011), which demonstrated a longitudinal qualitative change in the PTSD class structure in adolescents, and especially in the context of the changes demonstrated in the course of PTSD over the life span in older adults, the examination of longitudinal data is important for future research. Nevertheless, the cross-sectional findings of article II demonstrated the typologies of PTSD in older adults for the first time and based on that, gave important results for continuing research.

Second, the sample and its characteristics comprise limitations of the thesis. The generalizability of the results in this case is limited to the specific cohort: treatment-seeking (in article II), time of the traumatic event (childhood traumatization – in articles II, III and IV) and the traumatic event itself (war-associated trauma – in article II, III and IV). Therefore, further research is needed to confirm the results for older adults experiencing other traumatic events (i.e., man made vs. accidental; single vs. multiple traumatic events) in different life phases (e.g., early adulthood or old age).

Furthermore, the sample in the thesis was relatively well educated compared to the general age cohort. A possible explanation seems to be the Internet-based setting for assessment and treatment. However, in the pilot study no significant differences in the educational status for clinical variables were found. Also in article IV, no significant differences between completers and dropouts were found in terms of educational level. Because of the fact that the use of the Internet rises steadily in the general population and also in this age cohort, it could be assumed that the educational level in future research will be more representative.

In relation to article II in particular, it is also necessary to examine the PTSD typologies in a representative sample of older adults, i.e., not only in a sample of treatment-seeking older adults. Comparable findings of a study of treatment-seeking middle-aged adults demonstrated the comprehensible absence of a class without disturbances (Naifeh et al., 2008); with this in mind, it could be assumed that in a representative sample in older adults the common class structure (no – intermediate – pervasive disturbance) is similar to existing findings in middle-aged adults. Nevertheless, further research is necessary to verify this assumption.

Another aspect concerning the sample and its generalizability is its modest size – especially for articles III and IV. For the uncontrolled open treatment trial, a larger randomized control trial currently underway is showing the same results and therefore confirming the generalizability of the results of article III. A replication with a larger sample size is also indispensable for the outcome predictors in article IV.

Future research and implementation in clinical practice

The results presented in this thesis provide suggestions for future research and implementations in clinical practice. First and foremost, future research should take the aforementioned limitations into account and implement longitudinal studies with larger, more heterogeneous samples to examine typologies of PTSD in a representative sample and underpin the findings of the pilot study as well as replicate the outcome predictors.

Another general aspect in future research should be the examination of different subgroups of old age. A more detailed classification of older adults with regard to their age enables a more precise view in the context of aging (e.g., young-old: 65-74 years, middle-old: 75-84 years and oldest-old: over 85 years).

Typologies of PTSD

In the context of typologies of PTSD in older adults (article II), findings support the importance of avoidance symptoms in older adults.

First, the specific characteristic of avoidance symptoms in this thesis underlines the splitting of the DSM-IV cluster C into two separate factors (avoidance and negative alterations in cognitions and mood) in DSM-5 because it allows a qualitative evaluation of differences in PTSD symptom profiles in older adults. Results also suggest that assessment of the full spectrum of PTSD and symptom clusters from contemporary phenotypic models may be useful in understanding the nature of PTSD symptoms such as sleep disturbance (which may possibly be misdiagnosed as somatic disease), flashbacks (which may possibly be misdiagnosed as hallucinations) or problems of concentration (which may possibly be misdiagnosed as mild cognitive impairment). Nevertheless, failures of PTSD screening assessments in identifying PTSD in older adults also occur because cut-off scores based on middle-aged samples result in an increase in false negatives in samples of older adults (Cook et al., 2005; Hudson et al., 2008; Pietrzak et al., 2012). As a consequence, PTSD in older adults is often misdiagnosed as depression and anxiety or is only diagnosed as partial PTSD without further treatment implications. Therefore, assessment of unique trauma and clinical histories (i.e., comorbidity profiles, natural courses) of older persons with PTSD may help inform more personalized approaches to treatment in this population and can ultimately match patients to

treatment that treat the broad constellation and predominant phenotypic presentation of PTSD instead of single symptoms.

Second, avoidance symptoms were found to change over the life course, making them relevant for symptom severity and diagnosis of PTSD in older adults. In a subgroup of trauma survivors, studies examined a decline in PTSD symptom severity while avoidance symptoms increased and re-experiencing symptoms decreased (Trappler et al., 2002; Yehuda et al., 2009). These changes in the shape of PTSD symptom clusters point to difficulties in the diagnosis of PTSD. Because of the change, the required number of symptoms in each cluster may not be fulfilled for a PTSD diagnosis, meaning that only subthreshold/partial PTSD is diagnosed and no psychological treatment is recommended. As a result of the assumed change in symptom shape, further research regarding the course and expression of PTSD in older adults with early-life traumatization is indispensable, both in order to disentangle the complex interplay of symptom presentation and impairment and for the understanding of early-lifetime traumatization and its sequelae during life course. For example, if the expression of chronic PTSD during life course fluctuates in its symptom profile and therefore only partial PTSD in later life stages is diagnosed, PTSD criteria for older adults with early-life traumatization must be adapted. Also, research regarding evidence for and precise definition of delayed-onset PTSD is important for the description of the course and therefore, for the diagnosis of PTSD in older adults. Regarding late-life traumatization, future research has to examine a possible relevance of avoidance symptoms in PTSD symptom profile.

Third, avoidance also represents a coping mechanism ("avoidance coping") in older adults reducing stress-associated emotions and thoughts but may lead to emotional numbness. Findings concerning the course of avoidance coping in late life are inconsistent, showing decreases, increases and no changes (e.g., Aldwin, 1991; Armirkhan & Auyeung, 2007; Whitty, 2003). Nevertheless, studies have demonstrated that subjective ratings of threat and stressor severity were associated with an increase of avoidance coping strategies (Chung et al., 2001; 2010). These results highlight an important future research question and possible practical implication. It is therefore essential to examine whether the difference in the severity of avoidance symptoms (Pervasive Disturbance-High Avoidance and Pervasive Disturbance-Low Avoidance) is 1) a result of the coping strategies, or 2) only caused by the manifestation and severity of PTSD symptoms, or 3) an overlap of avoidance coping and PTSD avoidance

symptoms. The results of this further research could provide clinical implications regarding specific treatment approaches. Leiner and colleagues (2012) showed that avoidance as a coping mechanism seems to be negatively associated with rape-related PTSD treatment outcome in women, even after controlling for initial PTSD and removing PTSD avoidance symptoms. In this study women using avoidance coping strategies benefitted most from treatment (Prolonged Exposure or EMDR). However, a subgroup of women with low levels of avoidance coping at pretreatment did not respond to the treatment (Leiner et al., 2012). This result underpins the importance of distinguishing coping mechanism and symptom regarding treatment response and demands an examination in the cohort of older adults. To sum up, knowledge about different coping strategies could lead to an adaption of existing interventions and to a development of additional treatment components to better address the needs of older adults, promoting improved health and well-being.

Another important finding in the context of the typologies of PTSD in older adults (article II) is the association of the pervasive disturbance classes with trauma-related comorbid disorders. Given the severity gradient observed in the latent classes, the detection of PTSD in older adults needs scrutiny because of factors such as simply forgetting, fear of stigmatization or misinterpretation of psychological symptoms as somatic concerns. Clinical presentation of comorbid symptoms may warrant attention in assessment and treatment. Furthermore, significant positive associations of PTSD symptom severity and other disorders (anxiety, somatization, depression) in this thesis highlight the common comorbidity of these disorders.

Treatment of PTSD

Recent research demonstrated the enduring impairment of early-life traumatization in older adults not only in PTSD but also in social support and subjective happiness (Ogle et al., 2013). Regarding the PTSD treatment approach for older adults in this thesis (article III), there is evidence for the efficacy of the Internet-based therapist-assisted writing intervention presented, not only in a decrease of psychopathological variables but also in an increase of constructive dimensions. These changes reveal that the impact of early-life traumatization still influences mental health and well-being decades after the traumatic experience and is not a time-limited phenomenon.

Changes also reveal that the Integrative Testimonial Therapy enables older adults to cope with an early-life traumatic event which had an impact decades later. Unfortunately, the collected data did not allow an evaluation of the course of PTSD symptoms (i.e., chronic or delayed-onset PTSD) because age of onset of PTSD was not assessed. Therefore, no comparison of participants with delayed-onset and chronic PTSD with regard to treatment response and shape of constructive dimensions was possible. It could be assumed that chronic PTSD (i.e., development of PTSD directly after the traumatic event without no symptom improvements into old age) has a greater impact during lifespan due to assumed fewer social support, intensified emotional reactivity to negative life events or dysfunctional coping abilities. Future research should examine a potential role of chronic and delayed-onset PTSD concerning treatment response.

Examination of mental health care utilization by older adults in Germany reveals a severe undersupply of psychotherapy in relation to the prevalence of mental disorders in older adults. The sixth report on the situation of the older generation in Germany demonstrated that only a marginal percentage of older adults made use of psychotherapy: 5.2% of all patients in Germany are between 60 and 69 years old; 1.3% are over 70 years (BMFSFJ, 2010). These results are consistent with other studies examining psychotherapy service utilization in the older population (e.g., in Switzerland: Maercker et al., 2005; Survey of the German Association of Psychotherapists [Deutsche Psychotherapeuten Vereinigung], 2010). Reasons for the undersupply vary. Barriers are identified 1) in the assumption that older adults have limited ability to achieve a change in symptoms of mental disorders (BMFSFJ, 2010); 2) in the therapeutic perception of the older patient as “difficult” (Heuft & Schneider, 2004); 3) in the cohort-specific fear of stigmatization and 4) in the physicians and psychotherapists’ lack of knowledge regarding age-specific diagnostic criteria and treatment approaches for mental disorders. In light of the existing undersupply of psychotherapeutic treatment for older adults, therefore, the Integrative Testimonial Therapy represents an important clinical tool for overcoming the barriers mentioned. The therapy demonstrated an efficacious change in psychopathological variables and also in the motivation of treatment-seeking older adults. Older adults actively sought participation in the treatment and were aware of their mental problem and of its origin (traumatization during World War II). They

were also able to achieve and perceive a change in psychopathological symptoms and constructive dimensions.

The acceptance of an age-specific intervention by older adults is a crucial aspect, particularly in the light of the age gap as well as the above-mentioned stereotyped attitudes of older adults regarding treatment seeking. The pilot study indicated that a stable therapeutic relationship in this age cohort could be established. The dropout rate was very low (13.3 %) indicating a high level of treatment credibility and satisfaction. In addition, the working alliance was stable and positive. In the pilot study, the agreement between patient and therapist on the therapeutic tasks and goals as well as the degree of therapeutic bond was rated as "high" or "very high". The reported means were comparable with results from PTSD treatments with middle-aged adults (e.g., Knaevelsrud & Maercker, 2007; Wagner et al., 2012). Knaevelsrud and Maercker (2007) as well as Wagner and colleagues (2012) reported a significant relationship between working alliance and treatment response in middle-aged adults, indicating that working alliance predicted treatment outcome for PTSD in an Internet-based writing therapy. Although participants rated the presented treatment as very helpful in dealing actively with their problems and being able to disclose thoughts and problems, the relationship between working alliance and treatment outcome remained unclear.

We hypothesized that the setting of the Internet-based treatment facilitates the use of this intervention, providing a low-threshold treatment approach especially for older adults. The Internet-based treatment is independent of location and time, also enabling older adults with restricted mobility to participate autonomously and without the knowledge of other family members. This independence seems to be important for older adults because of their initial fear of stigmatization. In personal feedback of participants after the treatment, they addressed this initial fear ("if you need mental help, your family thinks you are crazy", "if you need mental help you are not strong enough", "I can handle my problems by myself") but reported that the low-threshold treatment approach was helpful to overcome this fear and their prejudice and attitudes towards psychotherapy.

Another advantage of the Internet-based setting seems to be the non-visual anonymity, which enables the patient to imagine the ideal therapist in terms of age and appearance. This non-visual aspect might therefore help to overcome the age gap between therapist and patient, allowing the patient to imagine the therapist as parental,

amicable, of the same age or older. The same effect occurs in the therapist who also imagines the patient in his/her own way, which might help to overcome barriers or age-specific stereotypes (e.g., resistant towards change processes, assumption of aging as a dysfunctional process itself).

The presented Internbet-based treatment includes a high-intensity therapeutically guidance with highly individual asynchronous therapist-patient contact. In the literature, the aspects of guidance (guided vs. unguided) as well as the dosage of guidance (low vs. high) in Internet-based interventions are currently being discussed. A recent review demonstrated the superiority of guided over unguided interventions with regard to symptom severity (standardized mean difference (SMD) = -.27, Baumeister et al., 2014) and is in line with former reviews (Johansson & Andersson, 2012; Richards & Richardson, 2012). Given the limited number of studies and types of mental disorders (depression and social phobia) included in the review of Baumeister and colleagues (2014), caution is warranted in generalizing the findings. The influence of dosage (low- vs. high-intensity) in guided interventions still remains open, although it could be assumed that guidance is only beneficial to a certain dosage (Titov, 2011). Regarding the synchronicity in guided interventions, a review of Richards and Richardson (2012) provided evidence for the superiority of asynchronous (e.g., contact via email, g = .70) over synchronous communication (e.g., contact via chat, g = .28).

To sum up, the presented treatment approach that takes age-specific barriers into account provides promising results and is well accepted in this specific age cohort. Future research is needed to evaluate the efficacy in a more heterogeneous sample (i.e., different types of trauma, different time of traumatization) as well as the influence of working alliance on treatment outcome in older adults. In addition, with regard to specific changing mechanisms in Internet-based interventions, the influences of dosage of guidance as well as of an asynchronous communication have to be examined. Finally, it is worth mentioning that Internet-based interventions should be regarded as alternatives to face-to-face treatments that address a specific sample of patients.

In addition, the crucial topic of an implementation of Internet-based interventions in standard clinical routine in Germany shall be mentioned. In the professional code of conduct (MBO-PP/KJP Section 5, para. 5; Stellpflug & Berns, 2008), psychotherapists have to provide treatment in personal contact and only in exceptional cases via electronical communication (e.g., Internet). In some states in Germany, Rules of

Professional Practice do not directly exclude Internet-based interventions (e.g., Bremen, Baden-Württemberg). Nevertheless, an implementation is difficult because the informed consent has to be realized in an oral interview (BGB, Section 630e, para. 2, German Civil Coder, Bürgerliches Gesetzbuch, 2014). According to that, an initial face-to-face contact is needed, which annul the advantage of geographical independence of patient and psychotherapist, i.e., the patient has to live in the catchment area of the treatment. In the current German health care system, some practical solutions for Internet-based interventions exist based upon already implemented strategies in other European countries (e.g., Sweden). A potential strategy seems to be an Internet clinic affiliated in a university hospital realizing Internet-based interventions. Here, the patient gets information from a particular website with the option to register for the treatment approach. After an initial personal contact in the setting of the hospital-based university, trained psychologists or psychiatrists guide the patient through the Internet-based intervention.

Treatment components

The central component in this thesis represents a resource-oriented life-review approach. This component aimed at two aspects. On the one hand, the reconstruction of specific detailed non-traumatic memories allows an integration of the traumatic event into a coherent life story. Especially in the light of difficulties in interpreting the traumatic event as time-limited (Ehlers and Clark, 2000) as well as in envisioning the future (see Criterion C7 in DSM-IV or D2 in DSM-5, APA, 2000, 2013), this integration is important in assessing the traumatic event as an experience in life, which happened in the past and did not have a general negative impact for the future (Ehlers and Clark, 2000). On the other hand, the reconstruction allows a conscious recall of detailed positive and negative memories, dissolving the PTSD-associated overgeneralized memory. This permits a functional balancing and a quest for meaning which are crucial developmental tasks in later life. In addition, it can be assumed that this resource-oriented biographical reconstruction makes a contribution to the increase of constructive dimensions such as quality of life, self-efficacy and posttraumatic growth. Although this assumption remains unproven in the present thesis, preliminary implications could be made by evaluating single items of the used questionnaires which assessed constructive dimensions (e.g., self-efficacy, posttraumatic growth). Changes to

particular abilities (e.g., coping with difficulties) and perceptions (e.g., perceiving life as worth living) during therapy are likely due to the use of the resource-oriented life review focusing directly on skills and mastery experiences. In addition, the patients were asked to remember difficulties during lifetime and how they solved them (e.g., "How did you manage to solve the particular problem back then?"). These recalls should help the patients to be aware of effective problem solving strategies used in the past as well as to encourage them to use these strategies for current problems.

The moderate exposure component aimed to reduce the high trauma-related distress (until habituation is reached) and to develop, process and encode a coherent voluntary recall of the traumatic event. The use of exposure for older adults is a controversial topic. In particular, health arguments concerning the strong physiological reactions as well as the decreased cognitive performance (e.g., Hyer et al., 1995; Hyer & Woods, 1998) were stated as contraindications. In recent research, exposure-based treatments have been conducted for older adults. Treatments vary from imaginal exposure (e.g., Integrative Testimonial Therapy, Knaevelsrud et al., 2014) to prolonged in vivo exposure (e.g., virtual reality exposure therapy, Gamito et al., 2014). They found positive results in the decrease of PTSD symptoms and no adverse changes in mental or physical health over the course of the treatment (e.g., Gamito et al., 2010; Thorp et al., 2012; Yoder et al., 2013). Most of these studies examining older war veterans with war associated traumatic events, which occurred several years ago during (early) adulthood. The treatment approach in this thesis also showed the efficacious applicability of exposure to a traumatic event, which occurred decades ago but in childhood. Future research should examine exposure therapy also for older adults with recent traumatization in old age. Concerning arguments of cognitive performance, a recent case study examining prolonged exposure therapy in an older adult with PTSD and early-stage dementia demonstrated a significant decrease in PTSD and depression symptoms at posttreatment. In addition, the absence of psychopathological symptoms allowed a clearer diagnosis of dementia type (Duax et al., 2013).

The third treatment component aimed to challenge dysfunctional automatic thoughts and behavior in order to stimulate a new perspective on the traumatic event. As mentioned above, a barrier for therapists working with older adults is their assumption that older adults' mental processes are unlikely to change and that these patients have limited opportunities to make changes in important life domains. In the pilot study (article III), the patients' texts revealed a high level of motivation to change

their perspective and also to modify as well as to envision future perspectives (e.g., traveling, writing a biography, volunteering). In addition, it could be assumed that the significant change of posttraumatic growth is also a result of this treatment component, which focuses on the acknowledgment of their achievements and their survivor status (e.g., "Has something positive resulted from the events?" "How did you manage to survive and live on despite the events?", "How has your way of thinking changed because of the events?"). The aim of future research is therefore to quantitatively assess a potential change of (future) perspectives as well as of posttraumatic growth based on cognitive restructuring.

The structure of the presented treatment approach (CBT components and life-review) seems to be promising for an implementation for other target groups than those of older adults. It could be assumed that especially the biographical reconstruction is an effective treatment component for specific trauma survivors, allowing an integration of the traumatic event into a coherent life story as well as the recall of a balanced biography (e.g., asylum seekers and refugees who experienced traumatic events in their countries of origin and host countries). In case of asylum seekers, a detailed biographical reconstruction could enable the trauma survivor to deal with the traumatic event but also to report a coherent life story in the interview in the asylum procedure. Due to memory disturbances (overgeneralized memory, fragmentation in trauma narrative) trauma survivors with PTSD have difficulties in remembering a consistent life story. However, a coherent biographical as well as a coherent trauma narrative is essential for the judgment concerning asylum. Another possible target group are middle-aged adults with childhood maltreatment. Child maltreatment has serious long-term consequences. The life-review approach could enable these patients to identify their strengths and achievements as well as to integrate the maltreatment as an event in life, which happened in the past and did not have a general negative impact for the future. For middle-aged patients, an extension of the component of cognitive restructuring is required focusing more detailed towards the future and potential aims in life.

To sum up, the combination of the age-specific life-review with existing PTSD treatment components (i.e., exposure and cognitive restructuring) seems to be an effective treatment approach for older adults. Nevertheless, future research should examine the efficacy of each treatment component, i.e., changes in psychopathological and

constructive dimensions have to be evaluated regarding each component in order to identify the effective mechanisms of change.

The pilot study comprised a written narrative treatment approach (as opposed to an oral narrative). An initial meta-analysis demonstrated the efficacy of writing approaches in reducing PTSD symptoms (van Emmerik et al., 2013). In general, some components of writing therapy (exposure, cognitive restructuring) are very strongly based on conventional trauma-focused face-to-face therapies. A possible explanation for the efficacy of writing approaches, therefore, lies in the similarity of the underlying mechanisms (e.g., habituation, change in encoding process of autobiographical (non)traumatic memories) but not in the form of performance (oral or written).

Another differentiation with respect to the form of performance relates to the type of communication (Internet-based vs. face-to-face). The writing therapy presented in this thesis is performed via Internet and as mentioned before, treatment components are strongly based on PTSD face-to-face treatment approaches. Results of the pilot study (article III) and of former research (e.g., Lange et al., 2001; Wagner et al., 2012) demonstrated that face-to-face CBT components could be adapted effectively in Internet-based interventions. Therefore, future research should compare face-to-face and Internet-based interventions, which are based on the same treatment components to examine potential differences due to type of communication. In addition, Internet-based interventions should also use the potential of web-based technology (e.g., video or audio sequences, serious gaming) to broaden and specify therapeutic techniques. For example, the narrative exposure component could be replaced with a treatment component of serious gaming.

The writing approach has some advantages compared to oral treatment approaches (Knaevelsrud & Böttche, 2013). First, writing is an intrapsychic process, allowing the patient to focus on feelings of shame and guilt without the fear of stigmatization or belittlement by the therapist. Second, the written texts from the therapeutic process can be stored, which may help prevent relapses. First indications of this relapse prevention were provided by the findings of an Internet-based writing therapy for PTSD in which 60% of the patients stated that they re-read the therapeutic texts after the treatment (Knaevelsrud et al., 2010). However, it remained unclear why they read the texts and whether reading them had positive effects. Further research is required in future to prove this assumption. In addition, storing the material also

provides documentation for possible personal use (e.g., a draft for the participant's own biography) or public use (e.g., historical witness projects). For example, the documentation of the experienced traumatic event(s) is the political aim of Testimony Therapy (Cienfuegos & Monelli, 1983) which was developed for torture victims of the Pinochet regime. At the end of this therapy, a written therapeutic text could be used for documentation processes of human rights organizations. Third, in addition to the quantitative analyses, the written narratives offer a database for qualitative research. An initial qualitative content analysis with therapeutic texts from the Integrative Testimony Therapy evaluated the course of expressed affects within the treatment components (Böttche et al., 2014). The aim of this work was to identify and distinguish therapeutic components on a vocabulary level. Results demonstrated differences in the frequency of use of affects in the particular treatment components. In texts of trauma exposure, a significant increase of use of stressful word categories (e.g., fear, anxiousness) has been identified compared to biographical reconstruction. The highest affective density for stressful (e.g., fear, anxiousness) as well as positive (e.g., love, satisfaction) affects was found in texts of cognitive restructuring. Sociodemographic variables (sex, age, education, partnership) had no influence on the frequency of use of affects. The content analysis seems to be a promising approach in evaluating the course of affects within and between components of writing therapy. Therefore, future research should also examine qualitative data to provide insights into the therapeutic process in addition to questionnaires. Furthermore, an interesting research question is the relationship between quantitative and qualitative data in relation to changes in psychopathological variables, demonstrating whether the decrease in PTSD symptoms is also representable using qualitative research methods.

PTSD outcome predictors

In literature, single-patient variables show a trend regarding their influence as outcome predictors. Nevertheless, current research failed to investigate a clear relationship of predictor variables and treatment outcome. Clarkin and Levy (2004) explained this failure with the dynamic and changing therapeutic process in which pretreatment patient variables only have a modest impact. In addition, they concluded that a constellation of salient variables is needed to show an impact on treatment outcome instead of single-patient variables. Beutler and colleagues (2000) systematically

identified and organized potential predictor variables into overarching categories: *functional impairment* and *problem chronicity/comorbidity* are categories which are directly related to the psychopathology; the categories of *subjective distress*, *client reactance/resistance* and *coping styles* deal with the patient's problem solving behaviour; and the category of objectively and subjectively perceived *social support*. In addition, characteristics of the therapist and the treatment approach as well as study design have to be taken into account (Clarkin & Levy, 2004).

Based on the inconsistency in the literature (concerning sociodemographic variables and symptom severity) and on the results of the pilot study, which indicated a change in constructive variables, the focus for outcome predictor variables was broadened in the fourth article of this thesis.

Reflecting previous work (e.g., Tarrier et al., 2000), the presented results demonstrated that PTSD treatment outcome was independent of sociodemographic factors (sex and educational status). An explanation of the lack of relationship between sociodemographic variables and treatment outcome could be the treatment approach itself. The Internet-based writing approach could have a selective influence on the sample; i.e., patients preferring writing instead of oral communication and therefore benefitting more from intrapsychic processes register for this treatment.

Higher initial PTSD severity predicted better treatment outcome and explained a significant proportion of variance in symptoms. It could be assumed that a high PTSD symptom severity affects functional impairment and has an influence on subjective distress. There is evidence that patients with high levels of PTSD benefitted more from therapy (Foa et al., 1995) and that this finding is not simply a result of statistical regression toward the mean. Nevertheless, in the light of the symptom presentation of PTSD in older adults indicating an heterogeneity with regard to avoidance symptoms (see article II), it would be important to examine the influence of the single symptom clusters instead of the total symptom severity score.

Resource-oriented variables (i.e., internal locus of control and posttraumatic growth) were shown to be significant predictors of treatment outcome. Regarding the aforementioned categories of Beutler and colleagues (2000), internal locus of control could be characterized as a way of coping. They defined this category as an ability to adapt to the environment and avoid negative affects. PTSD patients with a high level of internal locus of control might be able to regain control over the own life which may

increase the sense of controllability of the traumatic sequelae. Posttraumatic growth might also refer to coping due to the individual's ability to perceive a positive change in the aftermath of the traumatic event.

In terms of clinical implications, it could be assumed that individuals with lesser initial resource-oriented variables (i.e., lesser internal locus of control and posttraumatic growth) may benefit from a preceding treatment component to strengthen these resources. This pretreatment component may help engender stronger feelings of control and capability of coping with previously uncontrollable PTSD symptoms. In addition, this component may also be advantageous for patients with initial high levels of resource-oriented variables, as the activation and awareness of resources in advance may help them make use of their existing resources and reinforce their therapeutic changes and goals.

In sum, future research should take further constructive variables into consideration (e.g., coping self-efficacy) for a more complex view of predictor variables. In addition, it could be promising to develop a resource-strengthening treatment component to examine a potential change in treatment outcome.

Conclusion

Posttraumatic stress disorder (PTSD) is a common mental disorder in the aftermath of a traumatic event and associated with psychological, interpersonal and physical impairments. Because of demographic change and of change in the perception of older adults in society, detailed studies of PTSD in this age cohort is essential. The present thesis contributes to a better understanding of symptom manifestation and treatment of PTSD in older adults by analyzing the phenotypic presentation of this disorder as well as the efficacy of an age-specific treatment approach. Results indicate heterogeneity in the phenotypic presentation of PTSD and an effective implementation of a trauma-focused cognitive behavioral therapy with age-specific treatment components. In addition, the presented Internet-based treatment approach could be substantial in terms of people in need which are difficult to reach.

In sum, findings of this thesis broaden the view of PTSD in older adults, providing important knowledge for a better understanding of PTSD in this group of patients and emphasize the consideration of age-specific characteristics and needs.

Chapter 7

Summary

Posttraumatic stress disorder (PTSD) is a common and disabling psychological consequence in the aftermath of traumatic events in older adults. Nevertheless, symptoms of PTSD (re-experiencing, avoidance/numbing, hyperarousal) are often misdiagnosed as depression or anxiety in older adults because of concurrent mental and physical problems. The scarcity of evidence-based empirical research on PTSD and its characteristics in older adults lies behind these misdiagnoses. The available data demonstrates differences in PTSD prevalence and severity between different age cohorts (adolescents, middle-aged adults, older adults) and highlights time of traumatization (early vs. late life) as a prominent factor for severity, course and shape of PTSD symptoms in older adults. In addition, little is known about the efficacy of existing non-age-specific treatment approaches in older adults. Research so far has led to the understanding that particular challenges in the therapeutic process must be taken into account when providing psychotherapy to older PTSD patients and therefore, age-specific adaption is needed.

To address the above-mentioned gaps in research, four research studies investigated the characteristics and treatment of PTSD in older adults with early-lifetime traumatization.

The overview set out a summary of the characteristics of PTSD and its current treatment approaches in older adults. Research into characteristics indicated that the timing of the trauma (recent vs. early life) impacts prevalence rates, course and symptom profile of PTSD in older adults. Current data demonstrates generally lower prevalence rates and symptom severity in older than in younger adults with acute traumatization. Regarding early-life traumatization, a decline in PTSD symptom severity

could be observed over the life span. However, a change in shape of PTSD symptoms was observed in a subgroup of older adults, indicating an increase in avoidance symptoms and a decrease in re-experiencing symptoms. Research into PTSD treatment approaches for older adults indicated that PTSD-specific interventions (e.g., trauma exposure) could be effectively combined with age-specific approaches (e.g., life-review). The overview allowed a general classification of the characteristics of PTSD symptoms in older adults; however, it became apparent that little is known about common clinical manifestations of this disorder, which can vary with respect to the heterogeneous PTSD symptoms clusters.

To approach this topic, article II broadens the knowledge about predominant typologies of PTSD in treatment-seeking older adults. The hypothesis was that the typologies in older adults are similar to those in other age cohorts (intermediate and pervasive) and that the pervasive disturbance group would be best characterized by a higher level of avoidance symptoms. The findings suggested that PTSD in treatment-seeking older adults may be characterized by three predominant typologies: an intermediate disturbance class and two pervasive disturbance classes which differed by their level of avoidance symptoms (high and low avoidance). Both pervasive disturbance classes showed higher depression, anxiety and somatization symptoms and a higher number of traumatic events compared to the intermediate disturbance class. The pervasive disturbance classes were differentiated by educational level.

Articles III and IV focused on the treatment of PTSD in older adults. Article III evaluated the efficacy of an age-specific Internet-based writing intervention (Integrative Testimonial Therapy) in mitigating PTSD symptoms. ITT combined well-evaluated PTSD-specific CBT components (i.e., exposure and cognitive restructuring) and age-specific components (i.e., life-review). The pilot study revealed a significant decrease in PTSD symptom severity as well as significant increase in constructive dimensions (quality of life, self-efficacy and posttraumatic growth) from pretreatment to post-treatment. These results remained stable at three-month follow-up. To extend the findings of Article III regarding specific variables that may mediate the response to this effective treatment approach, Article IV aimed at examining the influence of predictor variables on treatment outcomes for PTSD in older adults. Because of the inconsistent findings on previously evaluated predictors of PTSD treatment response, Article IV also focused on additional predictor variables by including constructive variables, which changed during the ITT. Results revealed that higher scores of initial internal locus of

control and posttraumatic growth predicted a better outcome at posttreatment, even after controlling for initial PTSD severity. In addition, participants with higher scores of constructive dimensions (internal locus of control and posttraumatic growth) did not differ in initial PTSD severity compared with participants with low scores on constructive dimensions, but benefitted significantly more from the treatment. Demographic variables did not influence the treatment outcome.

To sum up, the findings of the current thesis enhance the knowledge of PTSD in older adults with early-life traumatization. They provide insights into the heterogeneous manifestation of PTSD symptom clusters in older adults, underscoring the importance of considering this in assessment and treatment approaches in this age cohort. The findings also provide promising insights into evidence-based age-specific treatment for PTSD regarding potential outcome predictors and potential effective treatment components. In view of demographic change and taking into account the fact that PTSD is a disabling disorder, it is a matter of urgency that clinical routine should effectively reach and address the needs of older adults suffering from PTSD.

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List of Abbreviations

ACTRN	Australian New Zealand Clinical Trial Number
ANCOVA	Analysis of Covariance
ANOVA	Analysis of Variance
APA	American Psychological Association
AWMF	Arbeitsgemeinschaft der Wissenschaftlichen Medizinischen Fachgesellschaften (Association of the Scientific Medical Societies in Germany)
β	Beta – Standardized Regression Coefficient
B	Non-standardized Regression Coefficient
BGB	Bürgerliches Gesetzbuch (German Civil Code) - Bürgerliches Gesetzbuch in der Fassung der Bekanntmachung vom 2. Januar 2002 (BGBl. I S. 42, 2909; 2003 I S. 738), das zuletzt durch Artikel 1 des Gesetzes vom 22. Juli 2014 (BGBl. I S. 1218) geändert worden ist.
BIC	Bayesian Information Criterion
BLRT	Bootstrap Likelihood Ratio Test
BMFSFJ	Bundesministerium für Familie, Senioren, Frauen und Jugend (Federal Ministry for Family Affairs, Senior Citizens, Women and Youth)
BSI	Brief Symptom Inventory
BPtK	Bundespsychotherapeutenkammer (Federal Chamber of Psychotherapists)
CBT	Cognitive Behavioral Therapy
χ^2	Chi- Square
CI	Confidence Interval
CT	Cognitive Therapy
Δ	Delta - Difference
d	Cohen's d (Effect Size)
df	Degrees of Freedom
DSM	Diagnostic and Statistical Manual of Mental Disorders

EMDR	Eye Movement Desensitization and Reprocessing
EUROHIS	EUROHIS-Quality of Life 8-Item Index
η^2	Eta-Square (Effect Size)
F	F-Value in ANOVA or ANCOVA
Hedges g	Hedge's g (Effect Size)
g	Number of Classes
GAD	General Anxiety Disorder
GSE	General Self-Efficacy Scale
ICD	International Statistical Classification of Diseases and Related Health Problems
IPC	Internal, Powerful Others, and Chance - Questionnaire
ITT	Integrative Testimonial Therapy
k	Number of Studies in Meta-Analysis
LCA	Latent Class Analysis
LMR	Lo-Mendell-Rubin
LOC	Locus of Control
LOCF	Last-Observation-Carried Forward
LPA	Latent Profile Analysis
LRT	Likelihood Ratio Test
M (m)	Mean
MBO-PP/KJP	Musterberufsordnung für Psychologische Psychotherapeuten/Kinder- und Jugendlichenpsychotherapeuten (Professional Code of Conduct)
N (n)	Sample Size
NET	Narrative Exposure Therapy
NICE	National Institute for Clinical Excellence
Non-TFCBT	Non-Trauma Focused Cognitive Behavioral Therapy
n.s.	Non significant
OGM	Overgeneralized Memory
OR	Odds Ratio
p	p-Value, Probability
Para.	Paragraph
PE	Prolonged Exposure
PDS	Posttraumatic Stress Diagnostic Scale

POW	Prisoner of War
PTBS	Posttraumatische Belastungsstörung
PTG	Posttraumatic Growth
PTGI	Posttraumatic Growth Inventory
PTSD	Posttraumatic Stress Disorder
r	Pearson Product-Moment Correlation Coefficient (Pearson's r)
R^2	Explained Variance (Regression)
RCI	Reliable Change Index
RCT	Randomized Control Trial
QLDS	Quality of Life in Depression Scale
QOL	Quality of Life
S3-Leitlinien	Guidelines of AWMF
SAM	Situationally Accessible Memory
SCL	Symptom Check List
SD	Standard Deviation
SE	Standard Error
SF-12	Short Form Health Survey (Fragebogen zum Gesundheitszustand)
SMD	Standardised Mean Difference (Effect Size)
SPSS	Statistical Package for Social Sciences
t	t-Test
T-Score	Scores converted from Raw Scores
TFCBT	Trauma Focused Cognitive Behavioral Therapy
UK	United Kingdom
VAM	Verbally Accessible Memory
VRET	Virtual Reality Exposure Therapy
WAI-S	Working Alliance Inventory-Short
WHO	World Health Organisation
WHOQOL	World Health Organisation Quality of Life
WW II	Second World War

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Zusammenfassung

Posttraumatische Belastungsstörung (PTBS) ist eine häufige und schwerwiegende Traumafolgestörung bei älteren Menschen. Jedoch werden die Symptome der PTBS (Wiedererleben, Vermeidung/Entfremdung, vegetative Übererregung) in dieser Altersgruppe oft aufgrund von gleichzeitig auftretenden psychischen und physischen Erkrankungen als Depression oder Angst diagnostiziert. Ursächlich für diese Fehldiagnosen ist hier der Mangel an evidenzbasierter empirischer Forschung bezüglich PTBS und ihren Charakteristika bei älteren Menschen. Bestehende Daten weisen auf Unterschiede in der PTBS-Prävalenz und Symptomschwere zwischen verschiedenen Altersgruppen (Jugendliche, Erwachsene mittleren Alters, ältere Erwachsene) hin und zeigen einen bedeutenden Einfluss des Zeitpunktes der Traumatisierung (frühe vs. späte Lebensphase) für Schwere, Verlauf und Profil der PTBS-Symptomatik bei älteren Menschen. Ebenso ist wenig über die Wirksamkeit von bereits bestehenden altersunspezifischen Behandlungsansätzen bei älteren Menschen bekannt. Bisherige Forschung wies darauf hin, dass besondere Herausforderungen im therapeutischen Prozess mit älteren PTBS-Patienten existieren und daher eine altersspezifische Anpassung bestehender Therapieansätze unabdingbar ist.

Um die oben genannten Forschungslücken aufzugreifen, werden in vier Forschungsarbeiten die Charakteristika und die Behandlung von PTBS bei älteren Menschen mit Traumatisierungen im frühen Lebensalter untersucht.

Die Übersichtsarbeit fasst die bestehende Literatur zu Charakteristika der PTBS und derzeitiger Behandlungsansätze bei älteren Menschen zusammen. Es zeigte sich, dass Prävalenz, Verlauf und Symptomprofil der PTBS bei älteren Menschen vom Zeitpunkt der Traumatisierung (aktuelle vs. frühe Lebensphase) abhängen. Bei aktuellen Traumatisierungen im hohen Alter zeigte sich eine geringere Prävalenzrate sowie Symptomschwere im Vergleich zu jüngeren PTBS-Patienten. Hinsichtlich des zeitlichen Verlaufs der PTBS bei Traumatisierungen in früheren Lebensabschnitten konnte ein Rückgang der Symptomschwere über die Lebensspanne identifiziert werden. In einer Subgruppe älterer Menschen wurde eine Änderung des Symptomprofils der PTBS

beobachtet. Dies zeigte sich in einer Zunahme der Vermeidungs- und in einer Abnahme der Intrusionssymptome. Hinsichtlich der Behandlungsansätze für ältere Menschen wurde deutlich, dass bestehende störungsspezifische Interventionen (z. B. Trauma-Exposition) effektiv mit altersspezifischen Ansätzen (z.B. Lebensrückblick) kombiniert werden können. Insgesamt erlaubt der Übersichtsartikel eine allgemeine Klassifikation der Charakteristika der PTBS-Symptome bei älteren Menschen. Allerdings wird deutlich, dass nur wenig über die allgemeinen klinischen Manifestationen dieses Störungsbildes bekannt ist, das aufgrund seiner heterogenen Symptomcluster variieren kann.

Daher weitet Artikel II die Erkenntnis über die vorherrschenden Typologien von PTBS bei älteren Menschen, die Behandlung suchen, aus. Die Hypothese ging von einer Ähnlichkeit der Typologien mit anderen Altersgruppen aus (d.h. mittlere und schwere Symptomausprägungen). Dabei sollte sich die schwerbelastete Gruppe bei den älteren Menschen durch eine hohe Vermeidungssymptomatik auszeichnen. Die Ergebnisse zeigten, dass PTBS bei älteren, Behandlung suchenden Menschen am besten durch drei Klassen charakterisiert ist. Diese umfassen eine Klasse mittlerer Symptomatik und zwei Klassen mit hoher Symptomatik, welche sich jeweils im Symptomcluster der Vermeidung unterscheiden (hohe und niedrige Vermeidungssymptomatik). Beide schwerbelastete Symptomklassen unterscheiden sich gegenüber der Klasse mittlerer Symptomatik durch höhere Ausprägungen in Depression, Angst und Somatisierung sowie in einer höheren Anzahl erlebter Traumata. Der Bildungsstand bildete das Unterscheidungsmerkmal für die beiden schwerbelasteten Symptomklassen.

Artikel III und IV fokussieren auf die Behandlung von PTBS bei älteren Menschen. Artikel III evaluiert die Wirksamkeit einer altersspezifischen Internet-basierten Schreibintervention (Integrative Testimonial Therapie, ITT) zur Reduktion der PTBS-Symptomatik. Dabei kombiniert die ITT evaluierte PTBS-spezifische kognitiv-behaviorale Therapiekomponenten (Exposition und kognitive Umstrukturierung) mit einer altersspezifischen Komponente (Lebensrückblick). Die Pilotstudie zeigte einen signifikanten Rückgang der PTBS-Symptomschwere sowie eine signifikante Zunahme ressourcenorientierter Variablen (Lebensqualität, Selbstwirksamkeit und post-traumatische Reifung) zum Abschluss der Behandlung. Diese Ergebnisse blieben auch drei Monate nach Behandlungsende stabil.

Um die Ergebnisse des Artikel III in Bezug auf spezifische, den Behandlungserfolg vermittelnde Variablen zu erweitern, wurde in Artikel IV der Einfluss von Prädiktorvariablen auf das Therapieergebnis bei älteren PTBS-Patienten untersucht.

Aufgrund der Tatsache, dass bisher untersuchte Variablen zur Vorhersage des Behandlungserfolges bei PTBS inkonsistente Befunde lieferten, fokussiert Artikel IV auf zusätzliche Einflussvariablen. Hierbei handelt es sich um jene ressourcenorientierten Variablen, die sich im Verlauf der ITT veränderten. Ergebnisse zeigten, dass höhere Werte initialer internaler Kontrollüberzeugung und posttraumatischer Reifung auch nach Kontrolle der initialen PTBS-Symptomsschwere einen besseren Therapieoutcome vorhersagen. Darüber hinaus gab es keinen Unterschied in der initialen PTBS-Symptomschwere zwischen Patienten mit höheren und niedrigen Ausprägungen in den ressourcenorientierten Variablen (internale Kontrollüberzeugung und posttraumatische Reifung). Jedoch profitierten Personen mit höheren Ausprägungen signifikant mehr von der Behandlung. Demographische Variablen hatten keinen Einfluss auf den Behandlungserfolg.

Zusammenfassend vertiefen die Ergebnisse der vorliegenden Arbeit den Wissensstand über PTBS bei älteren Menschen mit frühkindlicher Traumatisierung. Die Ergebnisse liefern Erkenntnisse bzgl. der heterogenen Manifestation der PTBS-Symptomcluster bei älteren Menschen und unterstreichen damit die Wichtigkeit einer Berücksichtigung dieser Heterogenität in Diagnostik und Behandlung. Die Ergebnisse bieten weiterhin vielversprechende Einblicke hinsichtlich möglicher Outcome-prädiktoren sowie effektiver Behandlungskomponenten in einer evidenzbasierten altersspezifischen PTBS-Behandlung. Angesichts des demographischen Wandels und unter Berücksichtigung der Tatsache, dass PTBS eine schwerwiegende Störung darstellt, ist es eine Frage der Dringlichkeit, die Bedürfnisse älterer PTBS-Patienten im klinischen Alltag zu erreichen und zu behandeln.

APPENDIX

Publications

(*) Publications are part of this thesis.

Böttche, M., Berth, H., Knaevelsrud, C. & Kuwert, P. (2014). Affektverläufe in einer internetbasierten Schreibtherapie für ältere Kriegstraumatisierte. *Zeitschrift für Gerontologie und Geriatrie*, 47, 214-220.

Böttche, M., Klasen, M. & Knaevelsrud, C. (2013). Ein internetbasiertes Unterstützungsangebot zur Gesundheitsförderung pflegender Angehöriger – Ergebnisse der Pilotstudie. *Psychiatrische Praxis*, 40(6), 327-331.

Böttche, M. & Knaevelsrud, C. (2013). Schreibtherapie nach traumatischen Belastungen: Therapieansätze und Wirkmechanismen. *Psychotherapie - Psychosomatik - Medizinische Psychologie*, 63(9/10), 391-397.

Böttche, M. & Knaevelsrud, C. (2014). Die Narration des Traumas als therapeutischer Ansatz am Beispiel der Integrativen Testimonial Therapie. In C. E. Scheidt, G. Lucius-Hoene, A. Stukenbrock & E. Waller (Eds.), Narrative Bewältigung von Trauma und Verlust (pp. 170-182). Schattauer.

*Böttche, M., Kuwert, P. & Knaevelsrud, C. (2012). Treatment Approaches of Posttraumatic Stress Disorder in the Elderly: An overview. *International Journal of Geriatric Psychiatry*, 27(3), 230-239.

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Selbstständigkeitserklärung

Hiermit versichere ich, dass ich die vorgelegte Arbeit selbstständig verfasst habe und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt habe, sowie Zitate kenntlich gemacht habe.

Die Arbeit ist in keinem früheren Promotionsverfahren angenommen oder abgelehnt worden.

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