Evidence of the dissociative PTSD subtype: a systematic literature review of latent class and profile analytic studies of PTSD

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Abstract

**Background.** The dissociative PTSD (D-PTSD) subtype was first introduced into the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) in 2013. Prior to this, studies using latent profile analysis (LPA) or latent class analysis (LCA), began to provide support for the D-PTSD construct and associated risk factors. This research is important, because dissociative symptoms in the context of PTSD may potentially interfere with treatment course or outcome. The aims of the present study were twofold: to systematically review the LCA and LPA studies investigating support for the D-PTSD construct; and to review the associated research on the risk factors or covariates of D-PTSD in the identified studies. **Method.** Six databases (PubMed, Web of Science, Scopus, PILOTS, PsychInfo, and Embase) were systematically searched for relevant papers. **Results.** Eleven studies were included in the present review. The majority of the studies were supportive of the D-PTSD subtype; primarily characterized by depersonalization and derealization. Several covariates of the D-PTSD subtype have been investigated with mixed results. **Limitations.** Many limitations relate to the state of the current literature, including a small number of studies, the use of self-report measurements of PTSD, and heterogeneity across the samples in investigated covariates. **Conclusion.** The results were overall supportive of the D-PTSD construct. Future research on D-PTSD and associated risk factors is needed to shed light on the possibilities of facilitating preventive actions, screening, and implications on treatment effects.

*Key words:* posttraumatic stress disorder; dissociative PTSD; depersonalization; derealization; systematic review; latent structure
1. Introduction

The diagnostic criteria for posttraumatic stress disorder (PTSD) have undergone a comprehensive revision with the release of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013). This revision has not been without controversies; indeed, it has been debated whether the changes in the DSM-5 should be considered a step forward or back (Friedman, Kilpatrick, Schnurr, & Weathers, 2016; Hoge et al., 2016). Compared to the DSM-IV (APA, 1994), there have been several changes; the most notable of which were the inclusion of a fourth symptom cluster of negative alternations in cognitions and mood and the addition of a dissociative PTSD subtype (Friedman, 2013). According to the current DSM-5 diagnostic criteria, individuals who endorse a specific number of symptoms belonging to four symptom clusters of intrusion (B1-B5), avoidance (C1-C2), negative alternations in cognitions and mood (D1-D7), and alterations in arousal and reactivity (E1-E6) qualify for a PTSD diagnosis. In order to meet the criteria for the dissociative subtype, individuals must additionally report persistent or recurrent symptoms of depersonalization (e.g. feelings of disconnectedness or detachment from self or body) and/or derealization (e.g. feelings of unreality of surroundings).

Dissociation has often been defined as “an experienced loss of information or control over mental processes that, under normal circumstances, are available to conscious awareness, self- attribution, or control, in relation to the individual’s age and cognitive development” (Cardeña & Carlson, 2011, p. 251). This definition is in line with the DSM-5 definition of dissociation as “The splitting off of clusters of mental contents from conscious awareness” (APA, 2013, p.820). The importance of both peritraumatic and more persistent dissociative responses in connection to both acute and long term posttraumatic symptoms in the aftermath of traumatic exposure has been long
A review of research on six different theoretical models (i.e. fantasy-proneness, mediation, comorbidity, interactional comorbidity, component, and subtype) found that the component and subtype models have gathered the most empirical support compared to others (Dalenberg & Carlson, 2012). Both models assume that dissociation can be, but is not necessarily, a component of a traumatic response. All four other models however have different assumptions about the relationship between traumatic exposure, PTSD, and dissociation. The Fantasy Proneness Model assumes that people who are prone to fantasy and dissociation will tend to exaggerate traumatic events or fantasize that they have been exposed to them. The Mediation model assumes that dissociation is a prerequisite for PTSD, whereas the Comorbidity Model assumes that dissociation and PTSD are co-occurring symptoms in connection to traumatic exposure. Finally, the Interactional Comorbidity Model assumes that traumatic exposure can result in both PTSD and dissociative symptoms and these symptoms can interact. However, according to the Component Model, dissociative symptoms are more likely to occur alongside the core symptoms of PTSD. Symptoms of dissociation are associated with all PTSD symptom clusters and both are expected to follow the same longitudinal course (i.e. immediate symptom increase following traumatic exposure and afterwards a more slowly decrease) (Dalenberg & Carlson, 2012). On the other hand, the Subtype Model assumes that individuals with dissociative PTSD (D-PTSD) and individuals with non-dissociative PTSD (non-D-PTSD) are qualitatively different from each other (Dalenberg & Carlson, 2012). This means that individuals with dissociative symptoms are likely to display different patterns of PTSD symptoms and/or severity than individuals without
dissociative symptoms. Specifically, severe dissociation is expected to result in more severe PTSD symptoms. Thus, according to the dissociative Subtype Model, dissociation changes the phenomenology of PTSD (Amour, Elklit, Lauterbach & Elhai, 2014a).

Several studies have identified the D-PTSD construct (cf. Armour et al., 2014a; Wolf et al., 2012a). The early studies in this area have provided preliminary evidence for the dissociative subtype by examining the distribution of dissociation scores and by using taxometric and signal detection analyses (Ginzburg et al., 2006; Putman et al., 1996; Waelde, Silvern, & Fairbank, 2005). More recently, studies implementing latent profile analysis (LPA) or latent class analysis (LCA) emerged (cf. Armour et al., 2014a; Wolf et al., 2012a; 2012b). LCA and LPA are both person-centered explorative techniques used to uncover underlying latent classes or profiles of individuals who endorse the same symptom pattern (Muthén, 2004). In other words, individuals responding in a similar way to questions on PTSD and dissociation are grouped together. LCA uses categorical indicators to identify patterns of responses and assign individuals to classes based on these patterns, whereas LPA uses continuous scores to categorize individuals to latent profiles (Bartholomew, Knott, & Moustaki, 2011). Both techniques are ideal for investigating the D-PTSD construct, because they take into account the heterogeneity in PTSD and dissociation symptom endorsements across individuals. Unlike the earlier methods of taxometric and signal detection analyses, which are only able to uncover two latent groups within a sample (i.e. individuals with and without dissociative symptoms), the LCA and LPA allow researchers to specify models with different numbers of classes/profiles and compare these using a combination of fit indices. Considering the large number of PTSD symptoms in the DSM-5 and the potential heterogeneity in symptom presentation (Galatzer-Levy & Bryant, 2013), these techniques are better than their predecessors for examining trauma-exposed samples. Rather than identifying two
groups, one with and one without dissociation, LCA and LPA can identify latent groups differing not only in the presence or absence of certain symptoms, but also the degree of probability of assignment to a particular class (LCA) and in the severity (mean symptom scores within profiles) of those symptoms (LPA).

Research on the D-PTSD construct is important from the clinical perspective, because studies have found that dissociative symptoms in the context of PTSD may interfere with treatment course or outcome (Bae, Kim, & Park, 2016; Cloitre, Petkova, Wang, & Lu, 2012; Resick, Suvak, Johnides, Mitchell, & Iverson, 2012). Indeed, dissociative symptoms may interfere with the emotional processing of trauma-related information (Foa & Kosak, 1986). However, a recent study demonstrated that prolonged exposure therapy may work equally well for clients with and without D-PTSD (Wolf, Lunney, & Schnurr, 2016). Thus, it is unclear if there is only clinical utility in identifying dissociative symptoms in victims of traumatic exposure in some treatment forms. As mentioned above, studies using LCA or LPA to investigate the support of the dissociative PTSD construct are rapidly emerging which highlights the need for a systematic overview of the results. Additionally, research on the risk factors or covariates associated with the development of the D-PTSD may help to guide treatment planning and best practice for treating trauma survivors with D-PTSD. Indeed, several studies have investigated and identified covariates of the D-PTSD (cf. Wolf et al., 2012b). However, there is a need to systematically review these studies in order to investigate whether common risk factors or covariates can be identified across studies. The present study therefore had two aims: to systematically review research investigating the support of the D-PTSD construct using LCA or LPA; and to review the associated research on the risk factors or covariates of D-PTSD in the identified studies.

2. Method
2.1. Eligible studies

This systematic review aimed to include all the existing LPA/LCA studies on the D-PTSD subtype in clinical as well as community samples regardless of the specific traumatic exposure in question. Studies that included participants with or without probable or diagnosed PTSD were all eligible for inclusion. The inclusion criteria were studies that used either LCA or LPA to examine the support for the D-PTSD construct. Additionally, PTSD symptoms had to have been assessed using a standardized measurement instrument reflecting either the DSM-IV or the DSM-5 criteria for PTSD. Since there is currently no agreed upon standardized self-report instrument for assessing the symptoms of dissociation in the D-PTSD subtype, there were no restrictions on how dissociation was assessed in the included studies. To ensure a high-quality review, only studies published in peer-reviewed journals were included. Moreover, the studies had to be published in English, German, Slovak, Czech or a Scandinavian language (i.e. languages interpretable to the authors) between 1st January 2006 and 13th September 2016, when the literature search was conducted. The language restriction was not included in the search, but was included as a requirement for inclusion in the review. Although, the D-PTSD was firstly formally introduced with the release of the DSM-5 in 2013, the date range was set to include the past 10 years of research to ensure the capturing of all potentially relevant studies.

2.2. Literature search

The literature search was conducted on 13th September 2016 in six literature databases: Pubmed, Web of Science (Core collection), Scopus, PILOTS, PsycInfo, and Embase. The search terms were “(PTSD OR posttraumatic OR “post-traumatic”) AND (dissociat*) AND (latent OR LPA OR LCA OR subtype* OR class* OR profile* OR “multivariate analys*” OR “mixture model*”)” and
were applied to titles, abstracts and keywords of articles published between 1st January 2006 and 13th September 2016. Initially, the search returned 1,309 hits. The references of these were imported into the referencing software Mendeley, in which 789 articles were excluded as duplicates. Two authors reviewed the titles and abstracts of the remaining 520 articles and independently excluded 492 of these articles for not meeting the inclusion criteria. The remaining 28 articles were identified by one or both reviewers as potentially relevant and were subsequently examined in full. At this stage, both reviewers independently excluded 16 articles. One more article was excluded upon a discussion between the two authors, where it was made clear that the article did not meet the inclusion criteria, leaving a total of 11 studies for inclusion in the review.

All 11 studies were in English. No studies were excluded due to language. Searching the reference lists of the relevant articles, we did not identify any additional studies for inclusion (Figure 1 summarizes the literature search and study selection). To shed light on the existence of any unpublished studies, we contacted all first or corresponding authors of the 11 identified studies. This way we identified only one unpublished study. This study did not identify D-PTSD; however, this study is currently under review elsewhere and thus not eligible for inclusion in the present review. At the next stage, two authors independently extracted data from the relevant studies. This included information about the country, sample, assessment, prevalence of PTSD, statistical analysis used, number and nature of classes/profiles extracted, investigated and significant risk factors, and the statistical method for investigating the risk factors. The two extraction tables were then compared and synthesized.

3. Results
3.1. Studies included in the review

Eleven studies examining a total of thirteen independent samples across 5,277 participants ($R = 134$-697) were included in the review. The sex ratios varied ranging from male only to female only studies (females 0-100%, $M = 58.6\%$). The mean age across the thirteen samples was 41.08 years. As shown in table 1 the first study in this area was conducted by Wolf et al. in 2012 (study 9). Five studies were conducted using data from US participants (studies 3, 4, and 9-11), two from Canadian participants (studies 2, and 8), one using data from both US and Canadian participants (study 7), and three using data from Danish participants (studies 1, 5, and 6). According to table 1 seven studies used the DSM-IV diagnostic criteria for PTSD (studies 1-3, 5, 8, 9, and 10) and four studies used the DSM-5 diagnostic criteria for PTSD (studies 4, 6, 7, and 11). PTSD symptoms were measured by different measurement instruments which were either self-reports or diagnostic interviews (see Table 1). The exact estimated PTSD prevalence was unknown in one study, but according to the authors it was below 100 % (study 1). The estimated PTSD prevalence rates in the remaining 12 samples ranged from 2 % to 100 % depending on the nature of the sample and the inclusion criteria of each study ($M = 64.94\%$). The mean estimated PTSD prevalence rate in the six samples with stated prevalence rates below 100 % was 29.9 % ($R = 2.0 – 63.9\%$).

Four of the thirteen included samples consisted of veterans and active duty military personnel (studies 2, 9, and 11). Three samples consisted of survivors of different forms of interpersonal violence: victims of sexual assault (study 1), victims of incest (study 6), and victims of bank robbery (study 5). One sample was of motor vehicle accident (MVA) victims suffering from whiplash (study 6), whereas
three samples included individuals exposed to a variety of traumatic experiences: trauma-exposed college students (30.4% violent or unexpected death, 21.8% accident, 17.9% assault, study 3), a civilian PTSD sample (73.6% childhood abuse, study 8), and a trauma exposed community sample collected through Amazon Mechanical Turk (25.6% violent or unexpected death, 14.9% life threatening illness, and 9.7% being physically forced to have sex, study 7). One sample consisted of both veterans (73%) and their intimate partners (study 10) and the traumatic nature of the last remaining sample collected through Amazon Mechanical Turk was unknown (study 4). See Table 1 for further details.

### 3.2. Measurement of dissociation

The studies used a number of different measurement instruments for the D-PTSD subtype (see Table 1). In six out of the thirteen included samples, the authors only included the dissociative symptoms of depersonalization and derealization in their LCA or LPA. These were assessed either with a single item each (studies 4-6, and 8) or with multiple items per symptom (study 3, and 9: female only sample). An additional dissociative symptom of ‘reduction in awareness’ was assessed in four samples. In two studies (studies 1 and 2) the mean endorsement of this item was higher in the D-PTSD class than the non-D-PTSD class which had comparable levels of PTSD. However, Armour et al. (2014b) did not report whether this was a significant difference. In the other two remaining samples the two groups did not differ significantly in relation to the endorsement of ‘reduction’ in awareness (study 9: male only sample, and 10). Overall, the visual inspection of the profile plots (where available) appears to suggest that the depersonalization symptom may differentiate better between the severe D-PTSD class and the severe non-D-PTSD class than the symptoms of derealization and reduction in awareness. This conclusion will, however, have to be tested empirically.
Two studies conducted by Wolf et al. (2015) and Müllero, Hansen, Contractor, Elhai, and Armour (2016) used a different analytical approach when conducting the LPA. Prior to the analysis, Wolf et al. (2015) created mean scores for three domains of dissociation (depersonalization/derealization, loss of awareness, and psychogenic amnesia) and used these as indicators in the LPA. They found that both the symptom groups of depersonalization/derealization and loss of awareness were significantly elevated in the dissociative PTSD profile compared to the non-dissociative PTSD profile, although the Cohen’s $d$ effect size was largest for the depersonalization/derealization symptom group. The endorsements of psychogenic amnesia were not significantly different between the two groups. Müllero et al. (2016) also created mean scores for their four domains of dissociation (depersonalization/derealization, gaps in awareness and memory, sensory misperceptions, and cognitive and behavioural re-experiencing) prior to conducting the LPA. However, they found that all symptom groups were significantly elevated in the dissociative profile compared to the PTSD profile, with the largest effect size (Cohen’s $d$) found for the symptom group of cognitive and behavioural re-experiencing.

3.3. Results of LPA and LCA

According to table 1, nine of the included studies used LPA and identified between 3 and 5 distinct profiles differing in levels of PTSD and/or dissociation (studies 1-4, 7-11), whereas two studies used LCA and identified 2 distinct classes differing in levels of PTSD and/or dissociation (studies 5, and 6). All studies except for one (study 5) identified at least one D-PTSD profile described as high severity on PTSD symptoms as well as dissociative symptoms. The Frewen, Brown, Steuwe, and Lanius (2015) study was the only one that identified two dissociative PTSD profiles: severe
dissociative PTSD (10.2 %) and moderate dissociative PTSD (22.6 %). The latter one was characterized by moderate levels of both PTSD and dissociation.

Across the different studies, which did identify the dissociative subtype, the size of the dissociative PTSD profile/class ranged from 6 % in the sample of military veterans and their intimate partners (study 10) to 44.6 % in victims of incest meeting the diagnostic criteria for PTSD (study 6). The mean estimated prevalence rate of D-PTSD across the twelve different samples that identified D-PTSD was 20.26 % (study 4: severe D-PTSD only) and the mean was 20.35 % including all subsamples (studies 3, and 10).

Additionally, all the studies except for the bank robbery study (study 5) identified a high severity PTSD profile characterized by high levels of PTSD symptoms but moderate to low levels of dissociative symptoms, with estimated prevalence rates ranging from 18.5 % in a representative sample of US veterans (study 11) to 62.6 % in victims of MVA suffering from Whiplash (study 6). The mean estimated prevalence rate of high severity PTSD profile across the twelve samples was 34.54 %. In terms of the differences in the specific PTSD symptoms between the high and the D-PTSD profiles, the results of the studies were too heterogeneous to draw any definite conclusions. For example, Study 3 found no differences in any of the PTSD symptoms between the two profiles, whereas studies 4 and 6 found significant differences on the majority of PTSD symptoms, with the dissociative profile scoring significantly higher. Others (study 1, 8, 9, 10) found differences on only some of the PTSD symptoms, for example, the symptoms of flashbacks (study 10).

Finally, all studies except for the two LCA studies (studies 5, and 6) identified between 1 and 3 additional profiles: low PTSD severity profiles and/or intermediate severity profiles, all of which had
low mean dissociation scores. Indeed, the Hansen, Hyland, and Armour (2016a) study only identified two classes: a symptomatic class and a non-symptomatic class, whereas the Hansen, Müllerová, Elklit, and Armour (2016b) study only identified a dissociative PTSD class and a high PTSD severity class. All the samples with an estimated PTSD prevalence rate below 100 % ($M = 29.9 \%$, studies 2, 3,5,7,10, and 11) identified at least one low symptom severity profile or class with estimated prevalence rates ranging from 13.7 % (study 2: lowest severity of the two low severity classes) to 81.9 % (study 5) with a mean prevalence rate of 50.47 % and two studies identified one intermediate PTSD severity profile (study 1 and 2). None of the six samples with estimated PTSD prevalence rates of 100 % identified low severity profiles/classes (studies 4, 6, 8, and 9). However, all of these studies except for the Hansen et al. (2016b) study identified 1 to 2 intermediate PTSD severity profiles with estimated prevalence rates of 19.0 % (study 4) to 49 % (study 10: subsample meeting diagnostic criteria for PTSD).

### 3.4. Risk factors

All the studies (except for study 5) investigated risk factors or covariates of membership in the D-PTSD relative to the non-D-PTSD profiles or classes. Of note, none of the studies which identified the D-PTSD construct used a prospective design, thus causality cannot be established across these studies. Although, several studies did include independent variables (i.e. risk factors) with a clear separation in time to the dependent variable D-PTSD (e.g. sex, and prior traumatic exposure) only risk factors investigated in a prospective design can truly be said to establish causality. To avoid confusion this means that in the following the investigated independent variables across the studies will be referred to as covariates of and not as risk factors for D-PTSD.
Please note that the main focus of this review was on identifying the covariates of the D-PTSD relative to the non-D-PTSD with comparable levels of PTSD severity. Thus, we did not analyze the results of covariates of the D-PTSD relative to other non-D-PTSD profiles with lower levels of PTSD severity. The reason for this is to provide a clearer picture of the constructs related to the D-PTSD subtype. When the D-PTSD is compared to a non-D-PTSD profile with comparable levels of PTSD severity, it becomes possible to disentangle the specific constructs differentiating between the two types of PTSD. However, when the D-PTSD profile is compared to other non-D-PTSD profiles with lower levels of PTSD severity, the differences between the profiles may be a result of the differences in severity of PTSD, rather than the presence/absence of dissociation.

A wide range of covariates were investigated across the studies (see Table 1). Of note, the significant results shown in Table 1 are not directly comparable due to the use of different statistical analyses, but as shown in Table 1 the following results were found across the studies. Within the demographics category, sex (male) was found to be significantly associated with D-PTSD relative to the non-D-PTSD in one (study 7) out of six studies (studies 2, 6-8, 10, 11). Age was significantly higher in the D-PTSD profile in one (study 11) out of six studies (studies 6-11). Three (studies 7, 9 clinical subsample only, 11) out of four studies (studies 7, 9-11) identified different aspects of racial background as significantly associated with D-PTSD and one study (study 7) out of two studies (studies 7, 8) identified being employed as significantly associated with D-PTSD. Ethnicity (studies 7, 10), education level (study 7) and relationship status (studies 2, 7, 10), were not significantly associated with D-PTSD in any studies.

Prior traumatic exposure was examined as a covariate of D-PTSD in seven studies (studies 2-4, 8-11), three of which (studies 4, 8, 10) found it to be significant. More specifically, two studies (studies...
4, 8) found childhood sexual and physical abuse to be associated with D-PTSD and one study (study 10) found sexual abuse in both childhood and adulthood to be associated with D-PTSD.

Several different aspects of psychological distress/psychopathology were also investigated as covariates of D-PTSD across the studies. The most commonly examined were anxiety, depression and dissociative experiences. Five studies (studies 1-3, 7, 8) investigated anxiety, three of which (studies 1, 3, 7) found it to be significantly associated with D-PTSD. Depression was significantly associated with D-PTSD in three (studies 1, 3, 8) out of five studies (studies 1-3, 7, 8). Additional dissociative experiences were examined in three studies (studies 3, 4, 8), all of which found them to be covariates for D-PTSD.

The remaining covariates (hostility, sleeping difficulties, different aspects of psychopathology, emotional regulation, interpersonal problems, emotional suffering, juvenile victimization, coping style, social support, attachment anxiety, number of lifetime / present diagnoses, personality disorders, veteran status, era of service, mental health service utilization) were examined in one or two samples only (see Table 1) and the analyses will have to be replicated in future studies before any reliable conclusions can be made.

4. Discussion

The aim of the present study was twofold: to systematically review research investigating the D-PTSD subtype using LCA or LPA; and to review the associated research on the risk factors or covariates of D-PTSD in the identified studies. Through a systematic search of six databases, we identified eleven eligible studies. Most of these studies investigated the D-PTSD using the DSM-IV criteria in samples with estimated PTSD prevalence rates ranging from 2 % to 100 % (M = 64.9 %).
Indeed, only Frewen et al. (2015), Hansen et al. (2016b), Müllerová et al. (2016), and Wolf et al. (2015) investigated the D-PTSD subtype using the DSM-5 criteria for PTSD. All studies except one (Hansen et al., 2016a) identified the dissociative subtype. Thus, in accordance with the Subtype Model, ten studies identified at least one D-PTSD subtype (i.e. latent profile or class) that could be differentiated from the other identified classes or profiles based on the severity of the dissociative symptoms. The size of the D-PTSD in eligible studies in the present review ranged from 6 % to 44.6 % ($M = 20.35\%$).

The majority of the studies were conducted with survivors of different kinds of interpersonal violence and/or military-related trauma. Several of the studies included participants who had experienced one or more potentially traumatic events, but did not necessarily meet the diagnostic criteria for PTSD. Considering the fact that a diagnosis of the D-PTSD can only be given to individuals who meet the full criteria for PTSD and thus are likely to display more severe overall PTSD symptoms (APA, 2013), it could be expected that studies with higher estimated PTSD prevalence rates would find more prevalent D-PTSD profiles. Although the results indicate that there is a tendency for this being the case, the interpretation of the results is not as straightforward as this may indicate. This pointe is highlighted in the study conducted by Wolf et al. (2015), who found that despite an estimated past-month PTSD prevalence of only 2% in their sample, 8.3 % of the participants were assigned to the D-PTSD profile. This means that not all participants in the D-PTSD profile met the diagnostic criteria for PTSD and would therefore not meet the diagnostic criteria for D-PTSD. There are several possible explanations for the notion the D-PTSD is not just a function of the estimated PTSD rate. First, PTSD could be considered a dimensional construct, which means that individuals with PTSD can display rather different symptom patterns. At the same time, individuals without a full PTSD diagnosis may
still display severe symptoms which can be captured in a LCA or LPA. Thus, the results of LCA and LPA do not have to correspond to the diagnostic criteria. Second, the results (i.e. very varying rates) may also indicate that the rate of D-PTSD is not constant across traumatic exposure types; instead, the rate of D-PTSD may depend on the specific traumatic exposure. Third, dissociative symptoms can exist outside the context of PTSD, which may also affect the results. Combined, this suggests that the D-PTSD prevalence rate relates to those with high PTSD, but it does not correspond consistently with the rate of PTSD. However, more studies are needed to investigate this. Furthermore, only four studies investigated D-PTSD using DSM-5 criteria and not all studies used DSM-5 validated measurements (Hansen et al., 2016 b). LCA and LPA are explorative modelling procedures, thus the identification of classes or profiles is affected by the available information. The D-PTSD is a construct meant to be associated with the DSM-5 PTSD criteria and not the DSM-IV PTSD criteria. The results are therefore more precise in relation to the analyses using the DSM-5 criteria. However, the results do suggest that the D-PTSD construct can also be identified in relation to the previous three symptom clusters of the DSM-IV PTSD criteria.

Of note, one study of bank robbery victims did not identify the D-PTSD (Hansen et al., 2016a). The lack of a positive result in the bank robbery study does not appear to be attributed to the low estimated prevalence rate (6.5 %) of PTSD, the specific diagnostic criteria, the specific questionnaires utilized, or the use of the more conservative LCA instead of LPA. Indeed, the dissociative subtype has been identified in samples with an estimated PTSD prevalence rate of only 2 % (Wolf et al., 2015), in studies using DSM-IV criteria (cf. Armour et al., 2014a; Armour, Karstoft, & Richardson, 2014b; Blevins, Weathers, & Witte, 2014), with the same measurement instruments (Armour, et al., 2014a; Hansen et al., 2016b), and with the use of LCA (Hansen et al., 2016b). Rather, the results may be
connected to the specific traumatic exposure as bank robbery can be argued to be a clearly defined event compared to more complex and less defined forms of traumatic exposures reported across the other studies. However, more studies are needed to shed light on this.

A wide range of risk factors for or covariates of the D-PTSD class/profile membership were investigated across the studies using either ANOVAs, Chi-square tests for independence, or logistic regressions. However, not all the results were consistent across the studies and for certain covariates there did not appear to be a specific pattern explaining the results thus making it difficult to derive consistent conclusions across the studies. There were, for instance, mixed results in relation to several of the investigated demographic covariates. Sex and age were investigated across the majority of the studies, but male sex (Müllerová et al., 2016) and higher age (Wolf et al., 2015) only emerged as significant covariates in two studies. In a similar vein, the self-identification of Caucasian race resulted in a decreased risk of dissociative PTSD profile membership across three samples (Müllerová et al., 2016; Wolf et al., 2012a (females only); Wolf et al., 2015), but not in two other samples (Wolf et al., 2012a: males only; Wolf et al., 2012b).

Prior traumatic exposure was investigated across the majority of the studies in several different forms, but only the rates of sexual abuse (childhood and adulthood) and childhood physical abuse were found to be significantly higher in dissociative PTSD compared to high PTSD severity class in three studies (Frewen et al., 2015; Steuwe, Lanius, & Frewen, 2012; Wolf et al, 2012b), but not in four other studies (Armour et al., 2014b; Blevins et al., 2014; Wolf et al., 2012a; 2015). However, there does appear to be a tendency pointing towards significant results in relation to childhood exposure as only one study did not identify childhood exposure as a significant covariate (Wolf et al., 2015). Furthermore, the lack of a significant result in the Wolf et al. (2015) may be attributed to the fact that
childhood trauma appears to be measured very broadly with a general measurement of traumatic exposure (i.e. National Stressful Events Survey) rather than with more specific childhood trauma measurements as applied in the three other studies (Frewen et al., 2015; Steuwe et al., 2012; Wolf et al, 2012b). In a similar vein, different aspects of psychopathology, especially anxiety and depression, were found to be significantly associated with D-PTSD class/profile membership in some studies (depression and anxiety: Armour et al., 2014a; Blevins et al., 2014; anxiety: Műllerová et al., 2016; depression: Steuwe et al., 2012), but not in others (depression and anxiety: Armour et al., 2014b; anxiety: Steuwe et al., 2012; depression: Műllerová et al. 2016).

Finally, three studies found that the levels and numbers of additional dissociative symptoms were significantly higher in the identified D-PTSD profiles/classes (Blevins et al., 2014; Frewen et al., 2015; Steuwe et al., 2012). This could indicate that the dissociative symptoms are too narrowly described in the DSM-5 diagnostic criteria. However, as mentioned previously, this may only be an associated feature. The remaining investigated covariates were only investigated across few studies yet a few of them showed promising results. For instance, emotional coping (Hansen et al., 2016b: both samples), and borderline personality disorder features (Blevins et al., 2014; Wolf et al., 2012b: clinical sample only) were found to be significant covariates of D-PTSD.

Of note, childhood physical and sexual assault do appear to be a more valid covariate of D-PTSD. This is in accordance with the betrayal trauma theory, which emphasizes the role of betrayal by someone trusted rather than solely perceived stress (i.e. the specific traumatic exposure) in the development of posttraumatic distress (Freyd & Birrel, 2013). Furthermore, a recent study showed that a high betrayal trauma history (i.e. survivors of abuse perpetrated by someone, trusted, close or depended on) increases the risk of developing a wide range of dissociative symptoms including
depersonalization and derealization among female college students following exposure to interpersonal threat images (Platt & Freyd, 2015). Indeed, this is mirrored by the high proportion of individuals with the D-PTSD found in the incest sample compared to the other included samples (Hansen et al., 2016b). Future research is therefore needed to shed more light on this and it is important that this research seeks to investigate the relationship between risk factors and D-PTSD using multivariate techniques.

Two major methodological issues concerning the studies included in the present review need mentioning. These concern the definition and measurement of dissociation and the selection of optimal models across the studies. First of all, considering the broad range of experiences that could be defined as dissociative (Spiegel & Cardeña, 1991), it may appear surprising that the DSM-5 diagnosis of D-PTSD is limited to the experience of the symptoms of depersonalization and derealization. Indeed, a number of studies have demonstrated that the dissociative and non-dissociative PTSD profiles differ in mean levels of alternative dissociation symptomatology with higher symptom levels reported for the dissociative subtypes (Blevins et al., 2014; Frewen et al., 2015; Steuwe et al., 2012, see Table 1). Some authors have even argued that depersonalization and derealization “are a restricted and non-representative reflection of dissociative symptoms in general and dissociative symptoms in PTSD in particular” (Dorahy & van der Hart, 2015; p. 23). All studies in the present review included symptoms of depersonalization and derealization, and some studies included additional dissociative symptoms. Regardless of the number or nature of the assessed dissociative symptoms, all included studies (except for Hansen et al., 2016a) identified at least two profiles, both consisting of individuals with high PTSD, but differing in the severity of their dissociation. Nevertheless, the results from the existing studies appear to suggest that the D-PTSD may best be differentiated from other PTSD profiles by the symptom of depersonalization. As mentioned earlier, depersonalization refers to experiences of
unreality, detachment or out-of-body experiences, where one has a feeling as if they were an observer of their own thoughts, feelings, body or actions. Interestingly, the PTSD depersonalization symptom, as defined in DSM-5, is very similar to the depersonalization symptom characterizing the depersonalization/derealization disorder, which can also be observed in the aftermath of trauma, particularly childhood trauma (APA, 2013). Experiences of depersonalization are very common in psychiatric in-patients, as reported by Brauer et al. (1970) who found that 80% of their psychiatrically diverse in-patient sample admitted to current or past experiences of depersonalization. As more studies examining alternative dissociative symptoms in the D-PTSD emerge, it will be important to establish which ones of these symptoms are integral and perhaps specific to the diagnosis of D-PTSD. Thus, it is possible that there are alternative and not yet examined symptoms of dissociation that are able to differentiate better between individuals with D-PTSD and those with non-D-PTSD. Following the identification of the specific dissociative symptoms integral with D-PTSD, it is equally important that a uniform standardized measurement of these dissociative symptoms is developed. This could for instance be done by adding dissociative items to existing measurements of PTSD symptoms (i.e. The PCL-5, Frewen et al., 2015) or seeking to develop a separate measurement of dissociative symptoms connected to D-PTSD (Wolf et al., 2015).

The second methodological issue that should be addressed concerns the selection of an optimal model in the LPA and LCA studies. When deciding on the optimal number of profiles or classes, all included studies used a combination of different fit indices (e.g. the Bayesian information criterion [BIC], Akaike’s information criterion, Bootstrapped likelihood ratio test [BLRT], or the Lo-Mendell-Rubin-adjusted likelihood ratio test [LMR-A]). Furthermore, entropy values, the size of the smallest extracted profile, ease of interpretation, generalizability, parsimony and visual inspection of profile
plots were also used by some of the authors, especially when the fit indices provided ambiguous results (e.g., Blevins et al., 2014). There was only one study in which the results of the reported fit indices were ambiguous and did not point clearly to one solution, yet the authors relied solely upon these fit indices when selecting the optimal model (Steuwe et al., 2012). Specifically, the entropy and the BIC values pointed to the 3-class model, although the difference in BIC from the 4-class model was minimal, the LMR-A test pointed to the 2-class model and the BLRT test was significant for all class solutions. However, it should be noted that this was one of the first studies conducted in the area and the authors did not have many studies to compare their results with. In the study by Müllerová et al. (2016), the fit indices pointed to the 6-class model as optimal, however, the authors opted for the 3-class model based on parsimony, meaningfulness and interpretability. These results highlight the subjectivity inherent in this area of research and point to the need for further replications.

The results of the present review have important clinical implications. It should be noted that all studies included in the present review (except for one) identified at least one D-PTSD profile/class, thus supporting the D-PTSD construct as described in the DSM-5. Contrary to the DSM-5, the proposed 11th edition of the International Classification of Diseases (ICD-11; World Health Organization, 2016) does not include a D-PTSD construct. Of note the proposed Complex PTSD (CPTSD) diagnosis in the ICD-11 does include dissociative symptoms (included in the affective dysregulation – deactivation symptom cluster), however dissociative symptoms are not included in the proposed ICD-11 description of PTSD (Cloitre, Roberts, Bisson, & Brewin, in prep; Karatzias et al., 2016). Thus, the following comments are primarily meant in relation to the PTSD and not CPTSD. Although, it appears that the simple ICD-11 description of PTSD (i.e. 6-7 symptoms) can describe the latent structure of PTSD following a wide range of traumatic exposures (Hansen, Hyland, Armour,
Shevlin, & Elklit, 2015), such a significant omission of an empirically supported construct may have consequences for individuals presenting with the symptoms of D-PTSD.

The specific consequences of potentially leaving out the dissociative symptoms are unknown, but as mentioned earlier, research indicates that not all treatments for PTSD may be suitable for individuals with dissociative PTSD (Bae et al., 2016; Cloitre et al., 2012; Resick et al., 2012). Thus, leaving out dissociative symptoms from the diagnostic criteria may result in poorer treatment outcomes. For example, Resick et al. (2012) found that individuals with high levels of dissociation show better outcomes with full manual Cognitive processing therapy (CPT), whereas those with low levels of dissociation show better outcomes with the Cognitive therapy only (without the Written accounts component). By being aware of the fact that dissociative symptoms may interfere with treatment, clinicians may optimize the treatment and reduce the suffering more quickly by first targeting the dissociative symptoms in their patients and/or by providing treatments that dissociative symptoms do not interfere with. One such treatment may be prolonged exposure therapy as indicated by the Wolf et al. (2016) study. At the same time, future research in risk factors for dissociative PTSD may facilitate preventive actions and early identification of trauma survivors who are particularly at risk of developing D-PTSD.

4.1. Limitations

The limitations of the present review relate to the state of the current literature. First, we only identified 11 eligible studies, which emphasizes the need for further studies in this area in order to draw more reliable conclusions about D-PTSD. Second, the majority of the studies were based on self-report, used DSM-IV diagnostic criteria and/or DSM-IV measurements of PTSD. Third, the identified classes
and profiles were named by the authors of each study making the names more subjective and relative. In a similar vein, the authors decided themselves on the optimal model and this decision may have, in some cases, been subjective as well. Fourth, the vast majority of the studies identified a D-PTSD class/profile. Although, this can be seen as evidence in support of D-PTSD construct, a possible file drawer problem cannot be ruled out. Unfortunately, it is impossible to fully uncover potential file drawer problems and thus more research on D-PTSD is needed. Fifth, the majority of the studies assessed current rather than life-time PTSD. Thus, it is unclear, if and how this may have affected the results. Sixth, there were no studies conducted outside of the Western countries and only one study included participants under the age of 18, thus generalizability beyond Western countries and adult populations is unknown. Seventh, the majority of the studies were cross-sectional making the direction of causality between the covariates and D-PTSD difficult to establish. Additionally, numerous associated features of D-PTSD have been investigated. However, only about half of the studies investigated the risk factors or covariates using the logistic regression analysis, whereas the remaining studies used ANOVAs and Chi-square tests, making the results more questionable in relation to the mutual importance of the risk factors or covariates. Similarly, only few studies (Hansen et al., 2016b; Müllerová et al., 2016) used the recommended three-step approach (Asparouhov & Muthén, 2014) for conducting multinomial logistic regressions in the context of LPA/LCA studies. The advantage of using the three-step approach is that it considers the individuals’ probability of belonging to all latent classes/profiles, which eliminates the bias associated with assuming that each individual can only be in one latent class/profile. Finally, it is important to acknowledge the limitations associated with the use of LCA/LPA. These statistical techniques are person-centered and the results are dependent on the rates of PTSD and dissociative symptom endorsements in a given sample. Consequently, the risk factors or covariates of the D-PTSD subtype may likewise be sample-specific. Indeed, this could explain the
heterogeneous results in relation to certain covariates examined across the studies. More research in this area is warranted and in the meantime, generalizations should only be made with caution.

5. Conclusion

In conclusion, the present study is the first to systematically review the research on D-PTSD introduced in the DSM-5. Despite the limitations associated with the only eleven identified studies, the results of the present review were supportive of the D-PTSD construct. The dissociative PTSD subtype was identified across all trauma samples, except for one, regardless of the measurement instrument used. Furthermore, the results suggest that the dissociative subtype can be identified from symptoms of depersonalization and derealization only. Several different covariates of the D-PTSD have been investigated with mixed results. From the more frequently investigated covariates only childhood sexual assault and physical assault emerged as potential risk factors. Further research is needed to investigate D-PTSD and associated risk factors using the DSM-5 criteria, DSM-5 measurement instruments, and diagnostic interviews following a wider range of traumatic exposures. It is imperative that future research into risk factors for D-PTSD applies a prospective study design so that the direction of causality can be established. It is also important that future research assess whether D-PTSD prevalence rates are influenced by the nature of diagnostic status (i.e. current vs. life-time PTSD) or not. This research is needed to shed more light on the possibilities of facilitating preventive actions, screening, and implications on treatment effect.
References


Figure 1 Database search and selection of studies

Database search on 13th September 2016: $N = 1,309$

Duplicates removed: $n = 789$

Review of titles and abstracts: $n = 520$

Studies not meeting the review aims and/or inclusion criteria: $n = 492$

Full text review: $n = 28$

Excluded: $n = 17$
- Study did not use LCA/LPA: $n = 7$
- Model did not include dissociative symptoms: $n = 6$
- Model did not include PTSD symptoms: $n = 1$
- Theoretical paper: $n = 2$
- Treatment effect study: $n = 1$

Articles meeting the inclusion criteria: $n = 11$
<table>
<thead>
<tr>
<th>Authors</th>
<th>Country</th>
<th>Sample characteristics</th>
<th>Assessed PTSD system</th>
<th>Estimated PTSD prevalence rate*</th>
<th>Measurement of PTSD and Dissociation</th>
<th>No. and nature of identified profiles/classes</th>
<th>Investigated covariates (Questionnaires)</th>
<th>Significant risk factors/covariates (Statistical analysis used)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study 1. Armour et al. (2014a)</td>
<td>DK</td>
<td>Sexual assault survivors ($N = 313$)</td>
<td>DSM-IV</td>
<td>-</td>
<td>PTSD: HTQ</td>
<td>4 profiles:</td>
<td>Depression, Anxiety, Hostility, Sleeping difficulties (TSC)</td>
<td>Depression, Anxiety, Hostility, Sleeping difficulties significantly higher in D-PTSD than High PTSD severity (Pseudo class draws for ANOVA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100% females</td>
<td></td>
<td></td>
<td>Dissociation: TSC-33 (3 items)</td>
<td>D-PTSD (13.1%)</td>
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<td></td>
<td></td>
<td>Age: $M = 22.38$, $SD = 9.42$</td>
<td></td>
<td></td>
<td></td>
<td>High PTSD severity (25.8%)</td>
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<td>Intermediate PTSD severity (33.3%)</td>
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<td></td>
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<td></td>
<td></td>
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<td>Low PTSD severity (27.8%)</td>
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<tr>
<td>Study 2. Armour et al. (2014b)</td>
<td>Canada</td>
<td>Treatment seeking military veterans ($N = 432$)</td>
<td>DSM-IV</td>
<td>63.9% ($n = 276$)</td>
<td>PTSD: CAPS</td>
<td>5 profiles:</td>
<td>Demographics: Sex, Marital status</td>
<td>No significant differences between D-PTSD and High PTSD severity (LPA including covariates, Logistic regression)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>94% males ($n = 406$)</td>
<td></td>
<td></td>
<td>Dissociation: CAPS (3 items)</td>
<td>D-PTSD (13.7%)</td>
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<tr>
<td></td>
<td></td>
<td>Age: $M = 54.0$, $SD = 19.04$</td>
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<td></td>
<td></td>
<td>High PTSD severity (30.5%)</td>
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<td>Intermediate PTSD severity (22.1%)</td>
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<td>Low PTSD severity (20.0%)</td>
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<td></td>
<td></td>
<td></td>
<td>Lowest PTSD severity (13.7%)</td>
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</tr>
</tbody>
</table>

1 This is the effective sample size, the full size was 351
2 This is the effective sample size, the full size was 471
<table>
<thead>
<tr>
<th>Study</th>
<th>US</th>
<th>Trauma-exposed college students (N = 541)</th>
<th>DSM-IV 24.4% (n = 132)</th>
<th>PTSD: PCL-S</th>
<th>3 profiles: D-PTSD (12.1%)</th>
<th>Trauma exposure (LEC)</th>
<th>Dissociative experiences, Somatic complaints (except health concerns), Anxiety, Anxiety-related disorders, Depression, Mania, Paranoia, Schizophrenia, Borderline features, Alcohol problems significantly higher in D-PTSD than High PTSD severity (Chi-square tests)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>67.1% females</td>
<td>Age: M = 20.21, SD = 1.64</td>
<td>Dissociation: MDI (10 items)</td>
<td>High PTSD severity (25.8%)</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Low PTSD severity (62.1%)</td>
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<tr>
<td>Study 3.</td>
<td>US</td>
<td>Subsample of 123 students meeting PTSD diagnostic criteria</td>
<td>DSM-IV 100%</td>
<td>PTSD: PCL-S</td>
<td>3 profiles: D-PTSD (30.3%)</td>
<td></td>
<td>-</td>
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<td></td>
<td></td>
<td>Dissociation: MDI (10 items)</td>
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<td></td>
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<td>Class 2 (N/A)</td>
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<td></td>
<td></td>
<td></td>
<td>Class 3 (N/A)</td>
<td></td>
<td></td>
<td>-</td>
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<tr>
<td>Study 4.</td>
<td>US</td>
<td>Community sample collected through AMT (N = 557)</td>
<td>DSM-5 100%</td>
<td>PTSD: PCL-5</td>
<td>5 profiles: Severe D-PTSD (10.2%)</td>
<td>Dissociative experiences (TRASC, CDS, MDI, MID)</td>
<td>CTQ Sexual abuse, CTQ-S Physical and Sexual abuse, Specific dissociative experiences (all subscales on CDS, MDI, MID except MDI emotional constriction) significantly higher in Severe D-PTSD than High PTSD severity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>70.9% females (n = 395)</td>
<td></td>
<td>Dissociation: TRASC (2 items)</td>
<td>Moderate D-PTSD (22.6%)</td>
<td></td>
<td>CTQ-S Sexual abuse, MDI Depersonalization and derealization, MID depersonalization, derealization, trance significantly higher in Severe D-PTSD than Moderate dissociative PTSD</td>
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<td></td>
<td></td>
<td>Age: M = 33.10, SD = 10.80</td>
<td></td>
<td>High PTSD severity (23.0%)</td>
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<td></td>
<td></td>
<td>Intermediate PTSD severity – emotional numbing (25.1%)</td>
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<td></td>
<td></td>
<td>Intermediate PTSD severity – hyperarousal (19.0%)</td>
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</tbody>
</table>
### Study 5. Hansen, et al. (2016a)

<table>
<thead>
<tr>
<th>Victims of bank robbery (N = 371)</th>
<th>DSM-IV 6.5%</th>
<th>PTSD: HTQ</th>
<th>2 classes: Symptomatic PTSD (18.1%)</th>
<th>Demographics: Sex, Age</th>
<th>MID depersonalization, derealization, trance and time loss significantly higher in Moderate D-PTSD than High PTSD severity (ANOVA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>61.5 % females (n = 228)</td>
<td>HTQ</td>
<td>Low PTSD severity class (81.9%)</td>
<td></td>
<td></td>
<td>Increased neuroticism, negative cognitions of self and high ASD class membership significantly predicted Symptomatic PTSD class membership rather than Low PTSD severity class membership (Logistic regression).</td>
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<td>Age:</td>
<td></td>
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<tr>
<td>M = 42.11</td>
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<tr>
<td>SD = 12.47</td>
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</table>

### Study 6. Hansen et al. (2016b)

<table>
<thead>
<tr>
<th>Sample 1 MVA whiplash (N = 476)</th>
<th>DSM-5 100%</th>
<th>PTSD: HTQ and TSC-33</th>
<th>2 classes: D-PTSD (37.4%)</th>
<th>Demographics: Sex, Age</th>
<th>Increased emotional coping and reduced social support significantly predicted D-PTSD class membership rather than high severity PTSD class membership (Logistic regression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>77.7 % females (n = 370)</td>
<td></td>
<td>TSC-33 (2 items)</td>
<td>High PTSD severity (62.6%)</td>
<td></td>
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<td>Age:</td>
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<tr>
<td>M = 43.57</td>
<td></td>
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<tr>
<td>SD = 10.35</td>
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</table>

<table>
<thead>
<tr>
<th>Incest (N = 311)</th>
<th>DSM-5 100%</th>
<th>PTSD: HTQ and TSC-33</th>
<th>2 classes: D-PTSD (44.6%)</th>
<th>Demographics: Sex, Age</th>
<th>Increased emotional coping significantly predicted D-PTSD class membership rather than high severity PTSD class membership (Logistic regression)</th>
</tr>
</thead>
<tbody>
<tr>
<td>87.8 % females (n = 273)</td>
<td></td>
<td>TSC-33 (2 items)</td>
<td>High PTSD severity (55.4%)</td>
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<td>Age:</td>
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<tr>
<td>M = 35.90</td>
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<td>SD = 10.98</td>
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</tbody>
</table>
# REVIEW OF PTSD SUBTYPES

<table>
<thead>
<tr>
<th>Study 7. Müllерová et al. (2016)</th>
<th>US/Canada</th>
<th>Trauma exposed community sample collected through AMT ($N=309$)</th>
<th>DSM-5</th>
<th>40.5%</th>
<th>PTSD: PCL-5</th>
<th>3 profiles: D-PTSD (26.8%)</th>
<th>Demographics: Sex, Age, Attachment anxiety (RAAS)</th>
<th>Male sex, racial minority, full- or part-time employment, and increased anxiety significantly predicted D-PTSD compared to high PTSD severity profile. (Logistic regression)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>56.0% females ($n=173$)</td>
<td></td>
<td></td>
<td>Dissociation: DSS (20 items)</td>
<td>High PTSD severity (29.7%)</td>
<td>Low PTSD severity (43.5%)</td>
<td>Anxiety &amp; depression (DASS-21)</td>
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<tr>
<td></td>
<td></td>
<td>Age: $M=35.18$, $SD=11.90$</td>
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<tr>
<td>Study 8. Steuwe et al. (2012)</td>
<td>Canada</td>
<td>Civilian PTSD sample ($N=134$)</td>
<td>DSM-IV</td>
<td>100%</td>
<td>PTSD: CAPS</td>
<td>3 profiles: D-PTSD (25.4%)</td>
<td>Demographics: Sex, Employment status, Age</td>
<td>Dissociative experiences, Physical abuse, Sexual abuse, Major depression, Specific phobia significantly higher in D-PTSD than High PTSD severity (ANOVA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>90.3% females ($n=121$)</td>
<td></td>
<td></td>
<td>Dissociation: CAPS (2 items)</td>
<td>High PTSD severity (26.9%)</td>
<td>Dissociative experiences (DES)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Age: $M=37.87$, $SD=9.40$</td>
<td></td>
<td></td>
<td>Moderate PTSD severity (47.8%)</td>
<td>Childhood trauma history (CTQ-SF)</td>
<td></td>
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</tr>
<tr>
<td>Study 9. Wolf et al. (2012a)</td>
<td>US</td>
<td>Sample 1: Vietnam Veterans ($N=360$)</td>
<td>DSM-IV</td>
<td>100%</td>
<td>PTSD: CAPS</td>
<td>3 profiles: D-PTSD (15.6%)</td>
<td>Demographics: Race, Age</td>
<td>No significant differences between D-PTSD and High PTSD severity (ANOVA, Logistic regression)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100% males</td>
<td></td>
<td></td>
<td>Dissociation: CAPS (3 items)</td>
<td>High PTSD severity (45.8%)</td>
<td>Personality disorders (SCID)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Combat exposure (CES)</td>
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</tbody>
</table>
### REVIEW OF PTSD SUBTYPES

#### Sample 2:
- **Age:**
  - $M = 50.61$, $SD = 3.61$
- **Mild PTSD severity (38.6%)**
- **PTSD:** CAPS
- **Dissociation:** TSI (4 items)
- **3 profiles:**
  - D-PTSD (29.9%)
  - High PTSD severity (27.5%)
  - Moderate PTSD severity (42.6%)

#### Demographics:
- Race, Age
- Comorbid personality disorders (SCID)

#### Rates of comorbid Avoidant and Borderline personality disorder significantly higher in D-PTSD than High PTSD severity

#### Study 10. Wolf et al. (2012b)
- **US Subsample of 206 veterans and their intimate partners meeting PTSD diagnostic criteria (life-time prevalence = 63%)**
- **US Subsample**
  - 64% males ($n = 406$)
  - Age: $M = 51.3$, $SD = 19.04$

- **PTSD:** CAPS (3 items)
- **3 profiles:**
  - D-PTSD (11.5%)
  - High PTSD severity (40%)

- **Demographics:**
  - Childhood sexual abuse,
  - Adult sexual abuse rate significantly higher in D-PTSD than High PTSD severity (ANOVA, Chi-square tests)

#### Demographics:
- Race, Age, Marital status, Veteran status, Era of service, Involvement in mental health counseling or use of psychiatric medication

#### Prior traumatic exposure (TLEQ)

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3 Effective sample size, the full sample was 526.
## REVIEW OF PTSD SUBTYPES

<table>
<thead>
<tr>
<th>Study 11. US Military veterans $(N = 697)^4$</th>
<th>Moderate PTSD severity (49%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wolf et al. (2015)</td>
<td></td>
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<tr>
<td>DSM-5 Moderate PTSD severity</td>
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</tr>
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<td>PTSD: NSES Dissociation: DSPS (15 items)</td>
<td>3 profiles:</td>
</tr>
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<td>Demographics: Race, Age, Sex</td>
<td>Caucasian race identification significantly lower and Age significantly higher in D-PTSD than High PTSD severity (ANOVA, Chi-square tests)</td>
</tr>
<tr>
<td>Prior traumatic exposure: History of childhood trauma, Sexual trauma, No. of different trauma types</td>
<td></td>
</tr>
</tbody>
</table>

- **Study 11.** US Military veterans $(N = 697)^4$
- **Wolf et al. (2015)**
- **DSM-5 Moderate PTSD severity:** 2% (Life-time prevalence = 13.1%)
- **PTSD: NSES Dissociation:** DSPS (15 items)
- **3 profiles:**
  - D-PTSD (8.3%)
  - High PTSD severity (18.5%)
  - Low PTSD severity (73.3%)
- **Demographics:** Race, Age, Sex
- **Caucasian race identification significantly lower and Age significantly higher in D-PTSD than High PTSD severity (ANOVA, Chi-square tests)**

### Abbreviations:
- Acute stress disorder (ASD),
- Amazon Mechanical Turk (AMT),
- Beck Anxiety Inventory (BAI),
- Cambridge Depersonalization Scale (CDS),
- Childhood Trauma Questionnaire (CTQ),
- Childhood Trauma Questionnaire-Screen (CTQ-S),
- Childhood Trauma Questionnaire Short Form (CTQ-SF),
- Clinician Administered PTSD Scale (CAPS),
- Combat Exposure Scale (CES),
- Coping style Questionnaire (CSQ),
- Crisis Support Scale (CSS).
- Depression Anxiety Stress Scales (DASS-21),
- Difficulty in Emotion Regulation Scale (DERS),
- Dissociative Experiences Scale (DES),
- Dissociative Subtype of PTSD scale (DSPS),
- Dissociative Symptoms Scale (DSS),
- Hamilton Depression Scale (HAM-D),
- Harvard Trauma Questionnaire (HTQ),
- Inventory of Interpersonal Problems (IIP-32),
- Juvenile Victimization Questionnaire (JVQ),
- Life Events Checklist (LEC),
- Multidimensional Inventory of Dissociation (MID),
- Multiscale Dissociation Inventory (MDI),
- National Stressful Events Survey (NSES),
- Physical Reaction Scale (PRS),
- Personality Assessment Inventory (PAI),
- Posttraumatic Cognitions Inventory (PTCI),
- PTSD Checklist for DSM-5 (PCL-5),
- PTSD Checklist Specific version (PCL-S),
- Revised Adult Attachment Scales (RAAS),
- Structured Clinical Interview for DSM-IV (SCID),
- Symptom Checklist revised (SCL-90-R),
- Traumatic Life Events Questionnaire (TLEQ),
- Trauma-related altered states of consciousness (TRASC),
- Trauma Symptom Checklist (TSC),
- Trauma Symptom Inventory (TSI).

*All estimated prevalence rates are current unless something else is stated.

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4 Effective sample size, the full sample was 860.