



Latent profile analysis of PTSD and dissociation, and relations with anger

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Abstract

Demographic and traumatic event-related risk factors for PTSD and dissociative symptoms have been examined in prior research. However, less research has examined this issue from a person-centered statistical approach to report subgroups of clinical presentations identified based on endorsed symptoms. The present study examined the relationship between PTSD, dissociation, and anger using this approach. We utilized a sample ($N = 360$) of trauma-exposed adults recruited via Amazon's Mechanical Turk. Latent profile analysis (LPA) identified distinct profiles based on the indicators of PTSD subscale scores and a dissociation total score. The following latent profiles were identified: 1) low PTSD/low dissociation, 2) moderate PTSD/moderate dissociation, and 3) high PTSD/high dissociation. Additional analyses found differential relationships between the three profiles and anger, with individuals in the high PTSD/high dissociation profile exhibiting more anger. Results shed light on the high co-occurrence between anger and PTSD symptoms.

Keywords Posttraumatic stress disorder · Anger · Dissociation · Latent profile analysis

Dissociation is a posttraumatic sequela that is gaining increased empirical attention. The literature is mixed with regard to the relationship between trauma and dissociation (e.g., Armour et al. 2014; Spiegel 1986; van der Hart and Dohary 2009). Posttraumatic stress disorder (PTSD) underwent several changes in *DSM-5* including, the inclusion of the dissociative subtype of PTSD (American Psychiatric Association 2013). Given these diagnostic changes, examining PTSD and dissociation symptoms in relation with additional constructs is warranted.

Dissociation has a longstanding existence in the literature (Spiegel 1986; Spiegel and Cardeña 1990). *DSM-5*, and prior iterations of DSM formally described dissociative disorders as a disruption in consciousness, memory, identity, perception, body, motor control, or behavior (American Psychiatric Association 2013). It is also noteworthy that dissociative features are conceptualized within the reexperiencing symptom cluster of PTSD through flashbacks (American Psychiatric Association 2013; van der Hart et al. 2005). For example, in acute stress disorder (ASD), dissociation is a form of avoidance (American Psychiatric Association 2013; van der Hart et al. 2005).

Generally speaking, high levels of dissociation have been found in individuals who have a history of trauma exposure, particularly interpersonal trauma, and furthermore those with PTSD (Carlson and Putnam 1993; van der Hart et al. 2005). For example, a prior study using latent profile analysis (LPA) found Veterans with severe PTSD and dissociation symptoms were more likely to report childhood sexual abuse (Wolf et al. 2012). Despite compelling results, some empirical literature is inconsistent. For example, in a sample of Canadian Veterans, Armour et al. (2014) used LPA and the results did not demonstrate sexual assault, demographic variables (i.e., gender and marital status), or clinical variables (i.e., depression and anxiety) to be predictive of PTSD and dissociation. These mixed results warrant further LPA investigations of additional clinical variables that may be related to PTSD and dissociation symptoms.

Tory A. Durham and Brianna M. Byllesby was collected online while the first and second authors were affiliated with the University of Toledo.

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The present study aimed at examining the relationship between PTSD, dissociation, and anger specifically. There are several theoretical and empirical reasons for examining how anger relates to dissociation and PTSD. Although anger and dissociation may seem somewhat conceptually distinct, it has been proposed that they are two forms of emotional disengagement or avoidant coping strategies that impede successful recovery from PTSD (Feeny et al. 2000; Putnam 1989). Given the potential implications of emotional disengagement on treatment outcomes, gaining a better empirical understanding of these constructs is important. This theoretical similarity between anger and dissociation forms part of the rationale for including them in the present analyses.

There is research to suggest a relationship between trauma exposure and psychopathological variables, such as substance use, hostility (Tsai et al. 2015), anxiety/depression, alexithymia (Boyd et al. 2018) and anger (Feeny et al. 2000; Kulkarni et al. 2012; Ross et al. 2018). Feeny et al. (2000) examined if anger and dissociation would predict later PTSD symptomatology and functional impairment. This research hypothesis was partially supported, such that anger and dissociation concurrently predicted later functioning at one-month post-trauma. A more recent study with Veterans demonstrated that anger and dissociation predicted PTSD's hyperarousal and avoidance/numbing symptoms, while dissociation alone predicted intrusions (Kulkarni et al. 2012). One other prior study using latent profile analysis (LPA) examined PTSD and dissociations in relation with several constructs including anger and found anger to be a significant predictor of severe PTSD and dissociation but did not differentiate between profiles of PTSD severity without dissociation (Ross et al. 2018). This relationship was not found with the other constructs in the study (e.g., depression, substance use) and demonstrate the specificity of anger and PTSD with dissociation.

Current Study Aims

The broad aim of this study was to examine whether latent profiles of individuals with PTSD and dissociation also report increased anger. Latent profile analysis (LPA) was used to identify distinct profiles of individuals presenting with PTSD and dissociation symptoms. LPA is a statistical technique used to identify possible latent or unobserved subgroups of individuals using continuous indicator variables, thus creating quantitative profiles. Profile analysis can potentially identify different subgroups and subsets of symptoms (e.g., high PTSD/high dissociation vs. high PTSD/low dissociation), thus making it an alternative to using a dichotomous presence/absence criterion or cut-scores, which may limit the implications of findings. Prior research has also used this type of analysis in alternative samples (e.g., Armour et al. 2014; Ross et al. 2018; Wolf et al. 2012).

Based on prior research of these constructs using LPA in a Veteran sample (Wolf et al. 2012), we expected three distinct profiles to emerge in our sample of adults: high PTSD and dissociation symptomatology; moderate PTSD and low dissociation symptomatology; and low PTSD and dissociation symptomatology. Also, based on prior research demonstrating that anger demonstrates specificity to PTSD and dissociation (Ross et al. 2018), we hypothesized that anger symptomatology would differ by profile membership. More specifically, it was hypothesized that the high symptomatology profile would evidence the strongest anger symptoms. We additionally aimed to identify if profile membership would demonstrate a relationship with anger, an externalizing construct commonly associated with PTSD. Given dissociation is conceptualized as an internalizing construct, examining both internalizing and externalizing symptoms could help us better understand their relation to PTSD.

Methods

Participants and Procedures

Participants were adults recruited in July 2015 via Amazon's Mechanical Turk (Mturk), an online labor marketplace (Landers and Behrend 2015; Paolacci and Chandler 2014; Shapiro et al. 2013). Participants completed a series of anonymous questionnaires online. Participants were awarded 50 cents for their participation. Participants completed four surveys for the present study (66 questions) as part of a larger study of PTSD and related constructs. Average completion time for the totally survey was 19 min. Inclusion criteria required that participants were at least 18 years old, maintained United States or Canada residency, and received ratings of high quality work on previous Mturk tasks, which Amazon specifies to be greater than 90% ratings on Human Intelligence Tasks (HIT). The study also included validity items (e.g., "Name the color of an object you see in front of you?" and "What is your shoe size?") to ensure high quality data. Previous studies have used similar methods to assess PTSD symptom severity using Mturk (Müllerová et al. 2016; Price and van Stolk-Cooke 2015), and a recent study found PTSD symptom severity comparable to other more traditional methods of data collection (van Stolk-Cooke et al. 2018). Finally, participants were screened to ensure that they had experienced a qualifying *DSM-5* Criterion A traumatic event; those who did not endorse a Criterion A trauma were excluded from the analyses. Informed consent was obtained prior to survey initiation, and the university's Institutional Review Board approved all procedures.

Measures

The following questions were utilized to gather background and demographic information on each participant: “What is your gender?”, “What is your current age?”, “What is the highest level of education you’ve completed?”, “What is your ethnic background?”, “What is your racial background? (check all that apply)”, “Are you currently a student?”, “What is your current employment status?”, “What is your current relationship status?”, “What is your current annual household income?”, and “Do you regard yourself as a veteran (someone who has served in the armed forces)?”

Stressful Life Events Screening Questionnaire (SLESQ) The SLESQ (Goodman et al. 1998) is a 13-item questionnaire that assesses lifetime exposure to Criterion A traumatic events. To be consistent with *DSM-5*, a modified version of the SLESQ (Elhai et al. 2012) was used that included questions about repeated or extreme exposure to gruesome or horrific details of trauma and inquiry, and whether witnessed trauma was experienced solely through electronic media or one’s occupation, used previously (Durham et al. 2016; Elhai et al. 2012). Individuals who experienced multiple traumatic events were asked to designate a most distressing event to keep in mind while rating PTSD symptoms (see below). As aforementioned, participants who did not indicate a most distressing trauma were excluded from the rest of the survey and informed that they did not meet the criteria for participation. The SLESQ has demonstrated good test-retest reliability (median kappa of .73) and good concurrent validity ($r = .77$) with a longer, more extensive, interview of trauma exposure (Goodman et al. 1998).

PTSD Checklist for DSM-5 (PCL-5) The PCL-5 (Weathers et al. 2013) is a 20-item, questionnaire that assesses PTSD symptom severity. The PCL-5’s items map directly onto the diagnostic symptom criteria for PTSD. Participants endorse symptom severity based on a five-point Likert-type scale (0 = “Not at all” to 4 = “Extremely”). Recent psychometric evaluations of the PCL-5 demonstrate the measure has excellent reliability (alpha = .91) and convergent validity compared to the PCL for DSM-IV, $r = .90$ in a military population (Wortmann et al. 2017). The PCL-5 has also demonstrated strong internal consistency (alpha = .94) and convergent validity ($r_s = .74$ to $.85$; Blevins et al. 2015).

Dissociative Experiences Scale (DES-II) The DES-II (Carlson and Putnam 1993) is a 28-item, questionnaire used to assess for aberrant, dissociative experiences. The DES-II contains 3 subscales: amnesic dissociation, depersonalization/derealization, absorption and imaginative involvement. The current paper utilized the depersonalization and derealization subscales which includes items 7, 11–13, 27, and 28. The updated

version utilized the original DES (Bernstein and Putnam 1986) reliability and validity statistics. For example, in a sample of college students, Frischholz et al. (1990) demonstrated that the DES has excellent internal consistency (alpha = .95). In the same study, the DES revealed good discriminant validity in regard to differentiating healthy controls, individuals with dissociative disorder NOS, and individuals with multiple personality disorder.

Dimensions of Anger Reactions (DAR-5) The DAR-5 (Forbes et al. 2014) is a short, questionnaire that assesses anger reactions. Items are rated on a five-point Likert-type scale ranging from 0 = “Not at all” to 4 = “Very much.” Validity was demonstrated between the DAR-5 and the PCL’s assessing anger/irritability: Spearman correlations were in the .5–.6 range at intake, and .7–.8 range at follow-up (Forbes et al. 2004). The original DAR demonstrated good internal consistency with item-total correlations ranging from .72 to .89 (Forbes et al. 2004). Finally, the DAR also demonstrated good discriminant validity with the Hospital Anxiety and Depression Scale (Forbes et al. 2014).

Data Screening

Data were screened using SPSS software version 20. Of the 394 participants who completed the SLESQ, we excluded participants based on the following reasons. Ten participants did not endorse a qualifying worst traumatic event on the SLESQ. Twenty participants missed the entire PCL-5 (additional missing data on the PCL-5 were nominal including two or fewer items missing per participant). Seven participants were missing the entire DES-II measure. No participants were missing more than one item on the DAR-5. Five individuals answered validity questions in illogical and untrustworthy ways. For example, one participant answered “Whale” when asked “What is your shoe size?” After excluding these participants, the effective sample size was 360 participants. Remaining instances of missing data were estimated in SPSS using the Missing Value Analysis module prior to conducting the latent profile analysis. We used the expectation maximization method with a pairwise present approach, which is the preferred method for estimating ordinal data (Asparouhov and Muthén 2010). A pairwise present approach uses multiple iterations of missing data estimation of individual data points instead of estimating the entire dataset in one attempt and is more efficient for estimating missing values for ordinal data relative to other methods that rely on listwise deletion methods. Expectation maximization (EM) estimation is an iterative procedure consisting of two steps to estimate missing data. The first step, uses the current estimate of the parameter to find the missing data, and the second step uses the updated data to

find a maximum likelihood estimate of the parameter. EM estimation provides reliable and efficient estimation parameters (Bennett 2001; Enders 2001).

Analyses

Mplus 7 software was used to examine multiple LPAs to determine the best profile solution. Profiles were estimated using PCL-5 subscale scores and the DES-II depersonalization/derealization subscale score as indicators to create dimensional profiles instead of categorical indicators. LPA was used, as it is the preferred method for identifying subgroups of individuals based on continuous items (Muthén 2008; McLachlan and Peel 2000). LPA is a technique used to identify statistically similar subgroups of individuals within a sample. Using data from the effective sample, latent profile models were specified and estimated increasingly until a statistically non-significant solution was produced. Number of traumas was included as a covariate due to evidence to suggest that trauma severity influences PTSD. The best profile solution was determined based on the following indices: log-likelihood, Bayesian Information Criterion (BIC) values, Lo-Mendell-Rubin adjusted likelihood ratio test (LMR-A), bootstrapped likelihood ratio test (BLRT), and associated p value, and entropy. Lower BIC values indicate improved latent profile model fit. The LMR test compares a model with k profiles against a model with $k - 1$ profiles. A p value $< .05$ indicates that the specified model provides a better fit to the data than the model with one fewer profile. Entropy, an additional measure of classification, ranges in value from 0 to 1. Latent profile models with entropy values approaching one indicate superior classification.

We used a three-step approach for estimating the latent profile variables with posterior probabilities (Asparouhov and Muthén 2014). Logistic regression analysis was used to examine the relationship between latent profiles and a covariate, number of experienced traumas. Number of experienced traumas has previously been associated with dissociation (e.g., Briere 2006), and thus we entered the number of traumas, identified using the SLESQ, as a covariate in our analyses. Thus, after the most parsimonious latent profile model (without covariates) was identified, the relationship between anger and class membership probabilities was examined using multinomial logistic regression analysis (Vermunt 2010).

Results

Demographics and Descriptive Statistics

Of the effective sample size ($N = 360$), a slight majority identified as female ($n = 129$, 62.8%), followed by male ($n = 226$, 35.8%), and those identifying as other ($n = 1$, 0.3%). The majority of participants were Caucasian ($n = 272$, 75.6%),

followed by Hispanic ($n = 54$, 15.0%), Asian ($n = 36$, 10.0%), African American ($n = 28$, 7.8%), Native American ($n = 25$, 6.9%), other ($n = 23$, 6.4%), and Hawaiian/Pacific Islander ($n = 4$, 1.1%) (these responses were not mutually exclusive). The age range was 18–74 and the mean age was 35.95 ($SD = 12.67$). The majority of participants reported being married ($n = 156$, 43.4%), followed by single/never married ($n = 67$, 18.6%), in a relationship and cohabitating ($n = 57$, 15.8%), in a non-cohabitating relationship ($n = 37$, 10.3%), divorced ($n = 29$, 8.1%), or separated ($n = 6$, 1.7%). The majority reported being employed full-time ($n = 186$, $n = 51.7%$), followed by unemployed ($n = 69$, 19.2%), part-time ($n = 48$, 13.3%), student ($n = 28$, 7.8%), or retired ($n = 26$, 7.2%). The most commonly reported index traumas were close family member or friend died by accident, homicide, or suicide ($n = 76$, 21.1%), life threatening illness ($n = 50$, 13.9%), and life threatening accident ($n = 42$, 11.7%). The average number of traumas reported was four ($SD = 2.5$).

The average PCL-5 score was 32.28 ($SD = 20.76$). A cutoff score of 33 on the PCL-5 is indicative of probable PTSD diagnosis (Bovin et al. 2016). Based on this criterion, 175 (48.6%) of these trauma-exposed participants met a probable PTSD diagnosis. Although this proportion might seem high, the sample was a trauma-exposed and thus at-risk for PTSD sample, and research suggests that MTurk participants may have a higher prevalence of psychiatric disorders such as PTSD (Shapiro et al. 2013). The average DAR-5 score was 11.53 ($SD = 5.36$). A cutoff score of 12 is recommended for differentiating high and low anger scores (Forbes et al. 2014). Nearly half the sample ($n = 161$, 44.7%) reported high anger. The DES-II contains 3 subscales and the present study utilized only the depersonalization/derealization subscales, to be consistent with the dissociative subtype of PTSD. The average score for the depersonalization/derealization subscale was 12.28 ($SD = 16.69$).

Latent Profile Analysis

A series of competing latent profile models was specified and estimated using four symptom cluster subscales of PTSD and one symptom cluster scale of dissociation, until the best fitting but parsimonious model was identified. Two, three, four, and five-profile solutions converged, and Table 1 presents fit indices from competing latent profile models. Although entropy was slightly higher for the four-profile solution, LMR-A was not statistically significant ($p > .05$) for the four-profile solution. The four-profile and five-profile solutions also resulted in small profiles with only 7% of participants in one of the profiles. Additionally, the BLRT values remained statistically significant for all four of the profile solutions tested. Thus, only the three-profile solution was retained for subsequent analyses because it was more parsimonious, it had a statistically significant LMR-A value, and each profile accounted for >10% of the participants.

Table 1 Fit indices for competing latent profile models

Model	Log-Likelihood	BIC	Entropy	LMR-A	BLRT
Two-profile	−5493.53	11,087.12	0.89	897.08**	918.85**
Three-profile	−5311.43	10,764.12	0.90	355.58**	364.21**
Four-profile	−5218.68	10,617.83	0.92	181.09	185.49**
Five-profile	−5133.84	10,491.34	0.90	165.67	169.69**

BIC, Bayesian Information Criterion; *LMR-A*, Lo-Mendell-Rubin adjusted ratio test; *BLRT*, bootstrapped likelihood ratio test.

* $p < .05$, ** $p < .01$

The proportion of individuals per profile in the three-profile solution was as follows: 43.3% of participants were placed in profile 1; 42.5% in profile 2; 14.2% in profile 3. As noted in Fig. 1, profile 3 portrayed high PTSD and dissociative symptomatology. This profile can be differentiated from profile 2 which demonstrated moderate PTSD symptomatology and lower dissociative symptoms. Finally, both profiles can be differentiated from profile 1 which demonstrated low PTSD and dissociative symptomatology. Based on these profiles, the three profiles were identified as follows: 1) low PTSD and low dissociation, 2) moderate PTSD and moderate dissociation, and 3) high PTSD and high dissociation. Table 2 displays the means for each symptom cluster per profile. For the three-class solution, number of traumas was significant in predicting profile 3 versus profile 1, $B = .35$, $SE = 0.071$, $p < .001$, $OR 1.42$. Number of traumas also significantly predicted profile 2 versus profile 1, $B = .77$, $SE = 0.124$, $p < .001$, $OR 2.16$.

Class Relationships with Anger

Results from the multinomial logistic regression are presented in Table 3, using Profile 1 (low PTSD and low dissociation) as the reference class. Compared to the low PTSD and low

dissociation profile, anger scores were significantly higher in both moderate PTSD/moderate dissociation and the high PTSD/high dissociation groups. Each additional point for anger was associated with almost 29% increased probability of being in Profile 2 compared to Profile 1, and each added point on the DAR-5 was associated with 77% increased likelihood of being in Profile 3 compared to Profile 1.

Discussion

The present study examined the association between PTSD, dissociation, and anger using latent profile analysis in a sample of trauma-exposed community adults. The LPA results identified three distinct profiles, 1) low PTSD and low dissociation, 2) moderate PTSD and moderate dissociation and 3) high PTSD and high dissociation. Furthermore, self-reported anger levels were significantly different between all three profiles. Specifically, Profile 1 had the lowest self-reported anger, Profile 2 had moderate self-reported anger, and Profile 3 reported highest anger. These differences in profiles also included number of traumas as a covariate, indicating an association between these constructs and trauma exposure. These findings

Fig. 1 Latent Profile Analysis. Note. Profile 1 = low PTSD and low dissociation; Profile 2 = moderate PTSD and moderate dissociation; Profile 3 = high PTSD and high dissociation; INT = intrusions; AV = avoidance; NACM = negative changes in mood and thinking; AAR = alterations in arousal and reactivity; DEPPER = depersonalization/ derealization; Y-axis represents standardized scores on each subscale.

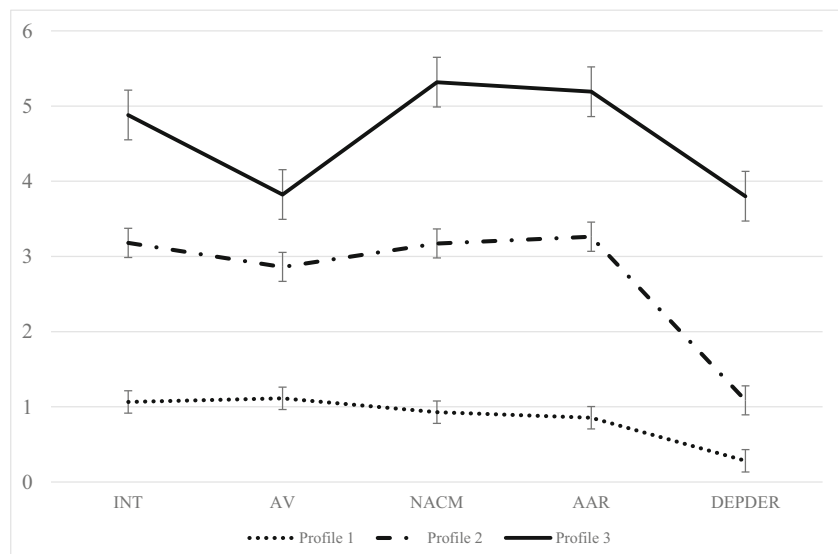


Table 2 Symptom cluster/scale means for the three-profile solution

Symptom cluster	Profile 1	Profile 2	Profile 3
Intrusions	1.07 (0.11)	3.18 (0.18)	4.88 (0.34)
Avoidance	1.11 (0.12)	2.86 (0.19)	3.82 (0.26)
NACM	0.93 (0.10)	3.17 (0.22)	5.32 (0.38)
AAR	0.85 (0.11)	3.26 (0.28)	5.19 (0.46)
Dep/Der	0.28 (0.05)	1.09 (0.13)	3.80 (0.53)
Anger	8.53 (3.45)	12.573 (4.62)	17.755 (5.17)

Above scores, with the exception of anger as measured by the DAR-5, are reported as standardized scores. Standard errors are in parentheses

NACM, negative alterations in cognitions and mood; *AAR*, alterations in arousal and reactivity; *Dep/Der*, depersonalization/derealization; Profile 1 = low PTSD and low dissociation; Profile 2 = moderate PTSD and moderate dissociation; Profile 3 = high PTSD and high dissociation.

add to the current literature on the constructs of PTSD, dissociation, and anger.

Several prior empirical investigations have examined the profiles of individuals with PTSD and dissociation (e.g., Armour et al. 2014; Ross et al. 2018; Wolf et al. 2012). Specifically, Wolf et al. (2012) concluded that the experience of childhood sexual trauma may be more prevalent in individuals with PTSD and dissociation symptoms than PTSD alone. Additionally, Armour et al. (2014) were unable to reveal significant demographic or clinical covariates with PTSD and dissociation. These mixed results laid the foundational basis for the present study, which further examined anger's relation to PTSD and dissociation. Indeed, self-reported anger was shown to differ between the proposed profiles in the present study. Gaining a better empirical and theoretical understanding of PTSD's relation with anger is important given their high co-occurrence and potential clinical implications. These results indicate that a relationship exists between PTSD, dissociation, and anger. Future research is warranted to examine this relationship.

The majority of literature has examined two-profile (Hansen et al. 2016) and three-profile (e.g., Armour et al. 2014; Wolf et al. 2012) models of PTSD and dissociation. The present study further supports prior literature that proposes three-profile models including high PTSD/dissociation, moderate

PTSD/low dissociation, and finally a profile consisting of individuals with low symptomatology. Further supporting the notion of three-profile models will allow researchers to investigate other correlates of these profiles of individuals. For example, if anger differs between profiles, then perhaps other externalizing correlates of PTSD and dissociation, such as substance use, warrant empirical investigations.

Results are somewhat mixed with regard to the clinical treatment of PTSD, dissociative symptoms, and anger. For example, high levels of anger prior to treatment has been associated with less emotional engagement during imaginal exposure and overall poorer treatment outcomes than did less angry patients (Foa et al. 1995). However, more recent research demonstrates that anger (and guilt) do not negatively affect PTSD treatment engagement or outcome (Clifton et al. 2017). These results are promising and suggest that anger is not an impediment to successful completion of PTSD treatment. Though, pre-treatment dissociative symptoms can interact with treatment variables during trauma-focused treatment (Resick et al. 2012).

Limitations and Future Directions

The present study is not without limitations. The study utilized an online sample of trauma-exposed adults. It will be important to replicate these results in clinical and Veteran samples, where the relationship between PTSD, anger, and dissociation may differ. The present study also relied on a cross-sectional design, so future research should consider how these variables are related across time. It is also noteworthy that some of the differences detected in the profiles may be quantitative severity-based differences. However, Profile 3 appears to be qualitatively different due to the endorsement of dissociative symptoms when the other profiles endorsed these symptoms to a significantly lesser extent. Prior research examining correlates of PTSD and dissociation has focused primarily on demographic variables. Although the present analyses included the anger/irritability item of PTSD, prior research demonstrates that removal of said item does not significantly alter the factor analysis of the PCL-5 (Forbes et al. 2014). Future research should examine other clinical variables that may also contribute to this relationship, paying particular attention to

Table 3 Logistic regression results for covariates predicting latent class membership, using the least severe profile (Profile 1) as a reference

	Probability of higher anger in Profile 2 compared to Profile 1			Probability of higher anger in Profile 3 compared to Profile 1		
	<i>B</i>	<i>SE</i>	<i>OR</i>	<i>B</i>	<i>SE</i>	<i>OR</i>
Anger	0.25	.04	1.29**	0.57	.09	1.77**
Number of traumas	0.77	.12	2.16**	0.35	.07	1.42**

Profile 1 = low PTSD and low dissociation; Profile 2 = moderate PTSD and moderate dissociation; Profile 3 = high PTSD and high dissociation; *SE*, standard error; *OR*, odds ratio

** $p < .01$

disorders such as depression and substance use disorders given the high comorbidity between these and PTSD. Additional clinical attention may be warranted to examine if anger and dissociation together impede treatment. Finally, the present study utilized a four-factor classification of PTSD based on the *DSM-5* symptom clusters. Other models of PTSD have been proposed (Armour et al. 2015) and future research could examine if utilizing alternative models of PTSD result in classification variations.

Conclusions

In conclusion, these results demonstrate a relationship between PTSD, dissociation, and anger, such that individuals presenting with high PTSD and dissociation tended to report higher levels of anger than individuals with moderate PTSD and low dissociation, and individuals with low PTSD and dissociation. Future research should build upon these results by examining additional clinical constructs that may be empirically and theoretically related to PTSD and dissociation symptoms. It is also recommended that future research examine causal mechanisms and potential consequences associated with PTSD and internalizing and externalizing factors.

Compliance with Ethical Standards

Conflicts of Interest The authors have no financial disclosures.

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