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Peritraumatic Reactions and Posttraumatic Stress Disorder in Psychiatrically Impaired Youth

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Although peritraumatic dissociation and other subjective peritraumatic reactions, such as emotional distress and arousal, have been shown to affect the relationship between a traumatic event and the development of posttraumatic stress disorder (PTSD) in adults, systematic studies with youth have not been done. In a mixed ethnic and racial sample of 90 psychiatrically impaired youth (ages 10–18, 56% boys), we investigated the contributions of peritraumatic dissociation, emotional distress, and arousal to current PTSD severity after accounting for the effects of gender, trauma history, trait dissociation, and psychopathology (attention-deficit/hyperactivity disorder and depression). Peritraumatic dissociation emerged as the only peritraumatic variable associated with current PTSD severity assessed both by questionnaire and interview methods ($\beta = .30$ and $.47$ $p < .01$). Peritraumatic dissociation can be rapidly assessed in clinical practice and warrants further testing in prospective studies as a potential mediator of the trauma-PTSD relationship in youth.

Psychological trauma and clinically significant posttraumatic stress disorder (PTSD) symptoms are prevalent among children in community samples (Copeland, Keeler, Angold, & Costello, 2007; Costello, Erkanli, Fairbank, & Angold, 2002) and children with psychiatric disorders (Mueser & Taub, 2008). Empirically validated risk moderators for PTSD in youth include female gender, exposure to abuse or interpersonal violence, physical injury, caregiver exposure to threat and distress, and diminished protective factors before and after traumatic exposure (Brom, Pat-Horenczyk, & Ford, 2008; Fairbank, Putnam, & Harris, 2007).

Peritraumatic reactions, including dissociation, have predicted PTSD in adult studies (Breh & Seidler, 2007; Lensvelt-Mulders et al., 2008; Ozer, Best, Lipsey, & Weiss, 2003), and studies with healthy children have found peritraumatic dissociation to predict PTSD following serious accidents (Schafer, Barkmann, Riedesser, & Schulte-Markwort, 2004), terrorism (Pfefferbaum et al., 2002), and injury-related hospitalization (Bui et al., 2010; Daviss et al., 2000; Kassam-Adams & Winston, 2004). Peritraumatic dissociation, however, has not been studied with psychiatrically impaired children. Therefore, the present study examined the relationship between peritraumatic reactions and PTSD in a sample of psychiatrically impaired youth.

Peritraumatic dissociation is the most extensively studied peritraumatic reaction in adults, defined as "alterations in perception of time, place, and person, which reflect a sense of unreality," during or immediately following a traumatic event (Zoellner, Alvarez-Conrad, & Foa, 2002, p. 49). Peritraumatic dissociation involves a range of reactions from confusion, disorientation, or emotional shock to loss of reality orientation and fragmentation of consciousness and self (Lensvelt-Mulders et al., 2008). Peritraumatic dissociation is conceived as a mental state occurring close to a traumatic event, then diminishing, while trait dissociation is conceptualized as a stable and persistent disruption of normally integrated experience (Spitzer et al., 2006). Although distinct constructs, peritraumatic and trait dissociation may be correlated (Giesbrecht, Smeets, & Merckelbach, 2008). Although peritraumatic dissociation has been described as an epiphenomenon of trait dissociation (Lensvelt-Mulders et al., 2008), even if correlated, trait and peritraumatic dissociation may each independently contribute to PTSD. Trait dissociation assessed in preservice law enforcement training predicted both subsequent peritraumatic dissociation and PTSD severity, but after accounting for prior trauma history, peritraumatic dissociation independently predicted PTSD severity (McCaslin et al., 2008). A study in an adult community sample added the concept of "ongoing dissociation" to describe dissociation that begins peritraumatically and persists, and did not find a primary role for peritraumatic dissociation alone (Briere, Scott, & Weathers, 2005).

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Prospective studies with adults have not always supported peritraumatic dissociation as a predictor of PTSD severity (van der Velden & Wittmann, 2008). Similarly, a prospective study of hospitalized injured children found that although severity of peritraumatic emotional distress and prior traumatization and psychopathology predicted posthospitalization PTSD, peritraumatic dissociation did not (Daviss et al., 2000). In another prospective study of hospitalized injured children, both peritraumatic arousal and dissociation predicted PTSD, but neither low peritraumatic arousal nor low peritraumatic dissociation identified children who did not develop PTSD; that is, they had low specificity (Kassam-Adams & Winston, 2004). Peritraumatic dissociation has been shown to correlate with other peritraumatic responses, including peritraumatic emotional distress (Fikretoglu et al., 2006; Marmar, Weiss, & Metzler, 1998) and arousal (Fikretoglu et al., 2007; Sterlini & Bryant, 2002). Dyb et al. (2008) found peritraumatic dissociation, arousal, and emotional distress scores in traumatized adolescents were intercorrelated and each strongly correlated with current PTSD severity. Peritraumatic dissociation and emotional distress were the strongest unique correlates of PTSD severity. In studies with adult accident and terrorism survivors, peritraumatic dissociation, arousal (assessed by elevated heart rate), and initial PTSD severity were independent prospective predictors of PTSD severity (Shalev & Freedman, 2005; Shalev, Peri, Canetti, & Schreiber, 1996). Prospective studies of law enforcement personnel (McCaslin et al., 2008) and industrial disaster survivors (Birmes, Daubisse, & Brunet, 2008) have shown that peritraumatic dissociation and independently predict subsequent PTSD severity. Therefore, in addition to assessing peritraumatic dissociation's relationship to PTSD, it is important to examine effects of peritraumatic arousal and emotional distress.

Moreover, other factors, both pre- and posttraumatic, including psychopathology, trait dissociation, and prior trauma exposure (Ozer, Best, Lipsey, & Weiss, 2008) have consistently correlated with subsequent PTSD severity, and thus may account for much of the observed relationship between peritraumatic dissociation and PTSD (Ozer et al., 2008; van der Velden & Wittmann, 2008). In addition to the internalizing disorders commonly identified in studies of childhood peritraumatic dissociation and PTSD, externalizing disorders (Ford & Connor, 2009; Ford et al., 2000) and severe psychiatric disorders (e.g., bipolar disorder, psychosis; Mueser & Taub, 2008) are also either highly comorbid with PTSD or associated with PTSD severity in children.

Childhood sexual abuse is the trauma exposure most consistently associated both with child psychopathology (Mueser & Taub, 2008) and with trait dissociation in adults (Briere & Elliott, 2003), adolescents (Plattner et al., 2003), and children (Putnam, Helmers, & Trickett, 1993). Retrospectively recalled childhood peritraumatic dissociation was associated with risk of adult sexual and physical victimization and PTSD severity, and peritraumatic dissociation was the unique correlate of PTSD severity, depression, and dissociative symptoms among women survivors of childhood sexual abuse (Johnson, Pike, & Chard, 2001). Peritraumatic dissociation in sexually abused girls was related to self-harm and sexual revictimization 9 years later (Noll, Horowitz, Bonanno, Trickett, & Putnam, 2003). Sexual abuse victims report elevations of both trait and peritraumatic dissociation (Noll et al., 2003; Putnam, 2003). Physical abuse is less consistently associated with dissociative symptomatology, but physically abused children (Pelcovitz et al., 1994) and chronically ill adults with histories of childhood physical abuse (Spinhoven et al., 2004) reported elevated trait dissociation. Parental emotional abuse in childhood has been equally—or more strongly—associated with trait dissociation in young adults than either physical or sexual abuse (Teicher, Samson, Polcari, & McGreenery, 2006). Despite these strong associations with trait dissociation, after accounting for physical and sexual abuse, peritraumatic dissociation in a sample of college women remained associated with PTSD severity (Hetzel & McCanne, 2005).

In addition to abuse, childhood exposure to other traumatic stressors is associated with psychopathology including PTSD. Witnessing domestic (Teicher et al., 2006) or community violence (McKelvey et al., 2011), and exposure to traumatic accidents (Schafer, Barkmann, Riedesser, & Schulte-Markwort, 2006) are associated with PTSD. Therefore, these additional exposures were included in this study.

Female gender is consistently associated both with peritraumatic dissociation severity and prevalence in adults (Olff, Langeland, Draijer, & Gersons, 2007; Seedat, Stein, & Carey, 2005). Among children, girls report more severe peritraumatic dissociation (Dyb et al., 2008; van der Velden & Wittmann, 2008) and more prevalent and severe PTSD (Copeland et al., 2007) than boys. Gender may also influence the moderating effect of family conflict on the relationship between community violence exposure and child psychopathology (McKelvey et al., 2011).

Taken together, the literature suggests that peritraumatic dissociation and other peritraumatic reactions may be associated with subsequent PTSD, but studies need to examine all peritraumatic reactions simultaneously and account for effects of gender, trauma history, trait dissociation, and psychopathology. Although there is good support for a correlation between peritraumatic dissociation and PTSD in children, the specific predictive power of peritraumatic dissociation remains uncertain. Based on this review of variables associated with PTSD, we tested the hypothesis that peritraumatic dissociation will be associated with PTSD severity among psychiatrically impaired children after accounting for effects of gender, trauma history, trait dissociation, psychopathology, and other peritraumatic reactions. To determine if these relationships were robust across measurement methods, PTSD symptom severity was assessed separately by interview and questionnaire measures.

Method

Participants

With approval from the UCLA Institutional Review Board and input from specialists on research with vulnerable children, youth ($N = 90$) ages 10–18 ($M = 14.7$, $SD = 3.6$) placed in a residential treatment facility in Los Angeles County as wards of the court between 2000 and 2004 were enrolled with consent from the presiding judge of the Los Angeles Juvenile Court and the director of the Los Angeles County Department of Children and Family Services, as well as written youth assent. The assent form was read to each youth who was encouraged to ask questions about anything unclear. Exclusion criteria were active psychosis or IQ < 70. Participants included 50 boys (56%), 27 (30%) of all participants of Hispanic background, 26 (29%) White non-Hispanic, 24 (27%) African American, and 13 (14%) of other ethnocultural backgrounds.

Measures

Master's- or doctoral-level clinicians performed all assessments, reading self-report items to subjects as the subjects followed the written material, and assisting children if they had difficulties with comprehension. Measures selected have demonstrated psychometric reliability and validity with psychiatrically impaired youth.

Diagnoses were ascertained by the Children's Interview for Psychiatric Syndromes (ChIPS; Weller, Weller, Fristad, Rooney, & Schecter, 2000). The Substance Abuse and Dependence sections of the Schedule for Affective Disorders and Schizophrenia for school-age children (K-SADS; Ambrosini, 2000) replaced the ChIPS Substance Abuse section.

The Traumatic Events Screening Inventory for Children (TESI-C; Ford et al., 2000), identified the following experiences meeting *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) Criterion A for a traumatic stressor: physical abuse, sexual abuse, emotional abuse, family violence, community violence, and noninterpersonal trauma (i.e., serious accident or disaster).

The UCLA PTSD Reaction Index (UCLA-RI; Steinberg, Brymer, Decker, & Pynoos, 2004) was used as the questionnaire assessment of PTSD severity (Cronbach's α in this study = .93). Trait dissociation was assessed with the Dissociation subscale of the Traumatic Symptom Checklist for Children (TSCC; Wolpaw, Ford, Newman, Davis, & Briere, 2005; $\alpha = .81$). Peritraumatic dissociation was assessed by the 5-item peritraumatic dissociation subscale of the UCLA-RI (as described in Dyb et al., 2008; $\alpha = .73$). Peritraumatic arousal was assessed by a 3-item composite from the UCLA-RI ($\alpha = .82$). Peritraumatic emotional distress was assessed by a 4-item composite from the UCLA-RI-($\alpha = .80$).

The Children's PTSD Inventory (CPTSD; Saigh et al., 2000) was used as the structured interview assessment of PTSD severity. The CPTSD assesses the 17 symptoms in the diagnosis of PTSD with internal consistency, interrater reliability, and retest reliability (Saigh et al., 2000) as well as with sensitivity and specificity at the symptom cluster and diagnostic level, and convergent and discriminant validity in relation to other validated measures of PTSD and other psychiatric symptoms (Yasik et al., 2001).

Data Analysis

All analyses were conducted with SPSS Version 15.0 (SPSS, 2006). Bivariate associations were calculated with *t* tests for dichotomous variables (i.e., gender, diagnoses, trauma history) and Pearson correlations for pairs of ordinal variables (two-tailed). A corrected *p* value of .008 (.05/6) was used for statistical significance to account for multiple tests, based on grouping the variables by type: diagnosis (six variables), trauma history (six variables), and peritraumatic/posttraumatic symptoms (six variables). Missing data were handled by pairwise deletion in the analyses. Multiple linear regressions (with listwise deletion) were next conducted with PTSD severity (separately for the UCLA-RI and CPTSD total scores) as the dependent variable and stepwise entry by blocks that included (a) gender, (b) trauma history variable(s), (c) psychiatric diagnoses, (d) trait dissociation, and (e) peritraumatic arousal, emotional distress, and dissociation. Based on the corrected *p* threshold, only variables significantly ($p \leq .008$) associated with PTSD severity (with either the UCLA-RI or CPTSD) on a bivariate basis were included in the regressions.

Results

As might be expected in a facility whose referral sources were the child welfare and juvenile justice systems, psychopathology, especially externalizing disorders, and trauma exposure were both common. Eighty-nine percent of the sample qualified for one or more of the diagnoses of attention-deficit hyperactivity disorder (ADHD), oppositional defiant disorder, or conduct disorder. Internalizing disorder diagnoses were less common but prevalent: almost half of the participants (47%) met criteria for an anxiety disorder or major depressive disorder or both. Bipolar or psychotic disorders were less common, diagnosed in <10% of participants (see Table 1). More than one in three participants reported physical abuse, family violence, and sexual abuse. Emotional abuse was reported by more than one in four, and serious accidents by almost one in five. Exposure to community violence was less prevalent, but was reported by one in 12.

Examining bivariate relationships**,** three diagnosis and trauma history variables were positively associated with PTSD severity on the UCLA-RI (Table 2): major depression, ADHD, and emotional abuse. Bipolar disorder, accident trauma, and sexual abuse were associated (p = .02–.04) with PTSD severity (the former two on both the UCLA-RI and CPTSD), but did not reach the conservative $p \leq .008$ significance criterion. Female gender was associated (p = .007–.008) with PTSD severity on both the UCLA-RI and CPTSD.

Table 1
Clinical Characteristics of the Sample of Psychiatrically Impaired Children

Variable	*n* or *M*	% or *SD*
Psychiatric diagnosis (*N*,%)		
Attention deficit hyperactivity disorder	44	49
Conduct disorder	53	59
Oppositional defiant disorder	43	48
Major depressive disorder	28	31
Bipolar or psychotic disorder	7	8
Trauma history (*N*,%)		
Physical abuse	39	40
Sexual abuse	33	34
Emotional abuse	27	28
Family violence	35	36
Community violence	8	8
Accident trauma	18	19
TSCC-Dissociation (*M*, *SD*)	53.5	10.6
Peritraumatic reactions (*M*, *SD*)		
Peritraumatic dissociation	7.0	5.4
Peritraumatic arousal	8.6	4.6
Peritraumatic emotional distress	8.8	4.7
PTSD Severity		
UCLA PTSD Reaction Index	24.4	15.1
Child PTSD Interview	5.9	5.0

Note. TSCC = Trauma Symptom Checklist for Children; PTSD = posttraumatic stress disorder.

The peritraumatic variables and trait dissociation (TSCC-Dis) were strongly (i.e., $\geq$ 10% shared variance) associated with PTSD severity as measured by both the UCLA-RI and CPTSD (Table 3). All of these correlations were statistically significant at the conservative $p \leq .008$ level, with one exception: the correlation of peritraumatic arousal and CPTSD was $p = .02$ (see Table 3). The peritraumatic variables and trait dissociation were strongly intercorrelated, except that peritraumatic emotional distress was uncorrelated with peritraumatic dissociation or trait dissociation and peritraumatic arousal was uncorrelated with trait dissociation.

In stepwise linear regression analyses, female gender was associated with PTSD severity in the first step (Table 4). Adding emotional abuse (step 2), major depressive disorder and ADHD (step 3), trait dissociation (step 4), peritraumatic arousal and emotional distress (step 5), and dissociation (step 6) accounted for significantly more variance in all but one instance (adding emotional abuse did not account for variance in CPTSD scores). In the final model for each PTSD severity score, peritraumatic dissociation contributed significant unique variance after accounting for the effects of all other variables. In the final model for the UCLA-RI severity score, peritraumatic emotional distress, major depressive disorder, and trait dissociation also contributed significant variance, but in the final model for the CPTSD only peritraumatic dissociation was significant. Regressions were repeated with all variables that were significantly correlated with PTSD severity at the conventional $p < .05$ level, and the pattern of results was unchanged (results available from the second author).

Discussion

As hypothesized, peritraumatic dissociation was consistently associated with PTSD severity after accounting for the effects of gender, trauma history, and current psychopathology. Peritraumatic dissociation, emotional distress, and arousal all correlated with PTSD severity on a bivariate basis. However, only peritraumatic dissociation was associated both with self-reported and interview-assessed PTSD severity after accounting for the effects of gender, trauma exposure, trait dissociation, and psychopathology. Consistent with prior studies' findings, both trait dissociation and major depressive disorder were associated with PTSD severity when the model contained gender, trauma exposure, and peritraumatic reactions, but only as assessed by self-report, not with the interview measure.

Peritraumatic dissociation was the most consistent independent correlate of PTSD severity, although peritraumatic emotional distress and trait dissociation each independently contributed to PTSD severity in other studies (Daviss et al., 2000; Hetzel & McCanne, 2005). Despite their correlation in earlier studies, the present study found peritraumatic dissociation and peritraumatic emotional distress to be largely independent, consistent with more recent studies (Fikretoglu et al., 2006, 2007). Both peritraumatic emotional distress and dissociation might be related to perceived, but not necessarily actual (Kaufman et al., 2002) peritraumatic arousal (Kassam-Adams & Winston, 2004), that has itself been associated with PTSD severity (Daviss et al., 2000; Schafer, Harfst, et al., 2006). Consistent with this finding, in our study peritraumatic dissociation and emotional distress were correlated with peritraumatic arousal, but peritraumatic arousal was less strongly associated with PTSD severity than peritraumatic dissociation or emotional distress.

Our findings are consistent with prior work with adults suggesting peritraumatic dissociation does not buffer against extreme peritraumatic emotional distress (Fikretoglu et al., 2006, 2007). Unlike two prior prospective studies, peritraumatic dissociation remained associated with PTSD severity when peritraumatic emotional distress (Daviss et al., 2000) and initial PTSD severity (Schafer, Harfst, et al., 2006) were included in the multivariate analyses. The finding is consistent with a prospective study of hospitalized injured children in which both peritraumatic dissociation and arousal predicted PTSD (Kassam-Adams & Winston, 2004). Thus, although the present findings highlight the relationship of peritraumatic dissociation to PTSD severity in psychiatrically impaired children, it is premature to rule out a predictive role for peritraumatic emotional distress or arousal based on their bivariate relationships to PTSD severity, and given the theoretical links between peritraumatic

Table 2
Association of PTSD Severity with Gender, Diagnosis, and Trauma History

	UCLA PTSD Index ($n = 78$)				Childhood PTSD Interview ($n = 49$)			
Variable	*n*	*M*	*SD*	*d*	*n*	*M*	*SD*	*d*
Gender				0.62**				0.78**
Female	38	29.5	16.7		24	7.6	5.1	
Male	40	20.5	12.1		25	3.9	4.3	
ADHD				0.19				0.53*
Present	47	26.4	14.9		30	7.2	5.3	
Absent	31	23.6	15.3		19	3.3	3.6	
Conduct disorder				0.05				−0.21
Present	47	24.4	15.3		34	5.4	5.0	
Absent	31	25.6	15.1		15	6.5	5.2	
ODD				0.23				−0.12
Present	37	26.7	15.4		27	5.4	5.0	
Absent	41	23.2	14.9		22	6.0	4.5	
MDD				1.00***				0.72**
Present	25	34.3	14.1		17	8.0	5.1	
Absent	53	20.4	13.6		32	4.5	4.6	
Anxiety disorder				0.39				0.29
Present	22	29.1	15.1		14	6.8	5.2	
Absent	56	23.2	15.0		35	5.3	5.0	
BPD/PD				1.26**				1.14**
Present	7	38.9	8.6		4	10.8	5.0	
Absent	71	23.5	15.0		45	5.2	4.8	
Physical abuse				0.01				−0.16
Present	39	24.3	15.1		23	5.4	5.1	
Absent	46	24.2	15.2		29	6.2	5.0	
Sexual abuse				0.53*				0.48
Present	33	29.3	16.8		21	7.3	5.3	
Absent	52	21.3	13.1		31	4.9	4.6	
Emotional abuse				0.61**				0.78*
Present	27	30.6	15.7		17	8.4	4.9	
Absent	58	21.5	13.9		35	4.7	4.6	
Community violence				0.30				0.30
Present	8	28.0	10.4		4	7.5	7.0	
Absent	77	24.0	15.5		48	5.7	4.9	
Family violence				0.03				0.04
Present	35	24.6	16.9		23	6.0	5.2	
Absent	50	24.2	13.9		29	5.8	5.0	
Accident trauma				0.64*				0.72*
Present	17	32.1	15.8		10	9.0	5.5	
Absent	68	22.4	14.4		42	5.1	4.6	

Note. ADHD = Attention deficit hyperactivity disorder; ODD = oppositional defiant disorder; MDD = major depressive disorder; BPD/PD = bipolar or psychotic disorder.

*$p < .05$. **$p < .01$. ***$p < .001$.

emotional distress and posttraumatic depression or anxiety, and between peritraumatic arousal and posttraumatic hyperarousal.

Our finding that peritraumatic dissociation was more consistently and strongly associated with PTSD severity than peritraumatic emotional distress stands in contrast to some findings with injured children (Daviss et al., 2000; Schafer, Harfst, et al., 2006) and with assaulted or victimized adults (Jehel, Paterniti, Brunet, Louville, & Guelfi, 2006; Schafer, Harfst, et al., 2006; Simeon, Yehuda, Knutelska, & Schmeidler, 2008), that suggested peritraumatic emotional distress was associated with PTSD, whereas peritraumatic dissociation was only marginally related. Further research is needed to replicate the present findings prospectively, to determine if peritraumatic dissociation is particularly useful in predicting PTSD severity with interpersonally traumatized and psychiatrically impaired children.

Table 3
Correlations of Peritraumatic Dissociation, Arousal, Emotional Distress, Trait Dissociation, and PTSD Symptoms

Variables	1[a]	2[a]	3[a]	4[a]	5[b]
1. PTA					
2. PED	.42***				
3. PTD	.39***	.12			
4. TSCC-Dis	.21	.89	.40***		
5. UCLA PTSD	.42***	.58***	.68***	.43***	
6. CPTSD	.32*	.38**	.63***	.51***	.69***

Note. PTA = Peritraumatic arousal; PED = peritraumatic emotional distress (Criterion A2); PTD = peritraumatic dissociation; TSCC-Dis = Trauma Symptom Checklist for Children-Dissociation subscale; UCLA = UCLA PTSD Index; CPTSD = Children's PTSD Interview.

[a]$n = 85$, [b]$n = 52$.

*$p < .05$. **$p < .01$. ***$p < .001$.

As hypothesized, peritraumatic dissociation was associated with PTSD severity independent of trait dissociation. However, trait dissociation was related to questionnaire-assessed PTSD severity on a multivariate basis, suggesting that trait and peritraumatic dissociation may each independently contribute to PTSD severity. These results contrast with findings in adults that trait dissociation fully accounts for the relationship between peritraumatic dissociation and PTSD (Daviss et al., 2000; Schafer, Barkmann, et al., 2006). Whereas Briere and colleagues' (2005) finding that trait dissociation accounted for the effects of peritraumatic dissociation was based on categorical PTSD diagnosis, another study with adults that used a continuous measure of PTSD severity (Hetzel & McCanne, 2005) found that peritraumatic dissociation was predictive independent of trait dissociation. Thus, peritraumatic dissociation may be associated with PTSD severity in both children and adults, but PTD may not necessarily be a predictor of categorical PTSD.

Table 4
Multiple Linear Regression Identifying Correlates of PTSD Severity

	UCLA PTSD Reaction Index ($N = 78$)					Childhood PTSD Interview ($N = 49$)				
Step and variables	*B*	*SE*	β	*t*	R^2	*B*	*SE*	β	*t*	R^2
1. Female	9.36	3.3	.31	2.82**	.08**	3.23	1.3	.32	2.32*	.08*
2. Female	7.63	3.4	.25	2.27*	.12*	2.49	1.4	.25	1.78	.14*
EA	7.36	3.7	.22	1.98*		3.17	1.5	.29	2.07*	
3. Female	6.60	3.1	.21	2.12*	.26**	2.32	1.3	.23	1.75	.23*
EA	5.39	3.4	.16	1.56		2.75	1.5	.25	1.86	
MDD	13.00	3.3	.29	3.90*		3.24	1.4	.30	2.27*	
ADHD	2.25	1.2	.19	1.87		0.98	0.5	.25	1.90	
4. Female	6.45	2.8	.21	2.30*	.26***	2.29	1.3	.23	1.80	.30*
EA	4.19	3.1	.13	1.34		2.45	1.4	.22	1.74	
MDD	9.31	3.1	.29	2.98		2.32	1.4	.22	1.64	
ADHD	0.54	1.2	.05	0.47		0.45	0.5	.14	1.05	
TSCC-Dis	0.58	0.1	.14	4.23***		0.15	0.1	.31	2.32	
5. Female	2.62	2.6	.09	1.02	.57***	1.95	1.3	.14	1.45	.33
EA	1.20	2.7	.04	.45		1.96	1.3	.18	1.38	
MDD	8.20	2.7	.25	3.06*		2.31	1.3	.22	1.63	
ADHD	0.68	1.0	.06	0.69		0.65	0.5	.16	1.24	
TSCC-Dis	0.50	0.1	.35	4.18*		0.12	0.1	.06	2.56	
PTA	0.61	0.3	.17	1.94			0.2			
A2	1.17	0.3	.36	3.89***		0.10	0.2	.09	0.64	
6. Female	1.17	2.5	0.8	0.47	.61**	1.20	1.3	.12	0.95	.40**
EA	1.03	2.6	.03	0.40		1.86	1.3	.17	1.48	
MDD	7.17	2.6	.22	2.78**		1.77	1.3	.17	1.35	
ADHD	1.21	1.0	.10	1.25		0.92	0.5	.23	1.88	
TSCC-Dis	0.36	0.1	.25	2.87**		0.05	0.1	.10	0.79	
PTA	0.48	0.3	.13	1.58		0.16	0.2	.13	1.68	
A2	0.79	0.3	.24	2.48*		−0.10	0.2	.09	−0.63	
PTD	0.08	0.3	.30	2.89**		0.40	0.1	.47	2.96**	

Note. EA = Emotional abuse; MDD = major depressive disorder; TSCC-Dis = Trauma Symptom Checklist for Children-Dissociation subscale; ADHD = attention deficit hyperactivity disorder; PTA = peritraumatic arousal; A2 = Criterion A2 peritraumatic distress; PTD = peritraumatic dissociation. All R^2 are adjusted. *p* values are for ΔR^2 at each step.

*$p < .05$. **$p < .01$. ***$p < .001$.

Strengths of the study include assessing a sample of ethnically diverse youth with severe psychiatric impairment and extensive trauma histories in residential treatment. PTSD severity was assessed on a multimethod basis with psychometrically validated measures, demonstrating consistent findings for peritraumatic dissociation across both the questionnaire and interview measures. The finding that peritraumatic dissociation was the sole peritraumatic variable associated both with questionnaire- and interview-assessed PTSD severity suggests that peritraumatic dissociation may be uniquely related both to what clinicians detect when assessing PTSD and to what children directly self-report regarding PTSD symptoms. The inclusion of trauma history, psychiatric diagnoses, and trait dissociation in analyses permitted examination of the effects of peritraumatic reactions while accounting for those possible confounds.

Limitations include the retrospective cross-sectional design, small and different sample sizes, inclusion only of psychiatrically impaired children in residential care, and absence of assessment of other adversities (e.g., severe neglect; Neigh, Gillespie, & Nemeroff, 2009; Vogel et al., 2009) that may lead to dissociation and PTSD. Neglect was not included as a potential contributor to peritraumatic reactions and PTSD because it does not meet *DSM-IV-TR* criteria for trauma. Subsequent studies should include neglect, given current knowledge of its profound impact including out-of-home placement. Prospective studies could rule out the possibility that a portion of the observed relationships between peritraumatic variables and PTSD severity are due to state-dependent reporting bias (van der Velden & Wittmann, 2008).

The small sample size, particularly for CPTSD analyses, limited statistical power. With larger samples, the complex interrelationships among PTSD and its mediators and moderators could be studied. Factors excluded from the present study due to the small sample size could also be added such as subtypes of peritraumatic dissociation and trait dissociation (e.g., continuous vs. taxon; somatoform vs. psychoform). Prospective studies are also needed to clarify the relationship between peritraumatic and trait dissociation, and to determine if the present finding that peritraumatic dissociation was a more robust predictor of PTSD than trait dissociation can be replicated when trait dissociation is assessed at more than one time point—given the instability of trait dissociation both in childhood (Putnam et al., 1993) and adulthood (Maaranen et al., 2008).

Study findings have several implications. Research replication with larger samples—both similar to ours and from other populations—and prospective as well as retrospective assessment of peritraumatic dissociation, arousal, emotional distress, and psychopathology, is needed. Empirical research must elucidate the structure of peritraumatic dissociation, especially its relationship to peritraumatic arousal and emotional distress, acute stress disorder, and acute PTSD. Overall, our study findings suggest peritraumatic dissociation may play a more prominent role in PTSD in childhood than in adulthood. Early interpersonal traumas may cause pathological dissociation that could interact with attachment difficulties to disrupt cognitive and emotional development in youth (Lyons-Ruth, Dutra, Schuder, & Bianchi, 2006). Further research is needed to determine if peritraumatic dissociation differs in adults and children. For example, research is needed to clarify the developmental trajectories of peritraumatic dissociation and trait dissociation in PTSD and dissociative disorders.

The robust and consistent relationship of peritraumatic dissociation to current PTSD severity suggests that brief clinical measures of peritraumatic reactions, trauma history, and PTSD warrant inclusion in the assessment of psychiatrically impaired youth. Measuring peritraumatic dissociation provides an efficient assessment of peritraumatic reactions that may help identify youth who experience the most complex dysregulation in the wake of traumatic exposure (Putnam et al., 1993). Finding peritraumatic dissociation could alert clinicians to conduct a thorough trauma history and assessment of PTSD and dissociative symptoms—an assessment too often overlooked with psychiatrically and behaviorally impaired youth. Schore (2009) has hypothesized that peritraumatic dissociation serves to isolate traumatic material from normal information processing beginning as early as infancy. Thus, peritraumatic dissociation should alert clinicians to assess dissociative impairments in cognitive processing. Finally, when peritraumatic dissociation co-occurs with heightened trait dissociation clinicians might consider trauma-focused interventions even if traditional symptoms of PTSD are absent—as they may be with complex forms of PTSD (Ford & Cloitre, 2009). The relationship of peritraumatic dissociation to complex PTSD in childhood has not been studied and warrants further investigation.

References

Ambrosini, P. J. (2000). Historical development and present status of the schedule for affective disorders and schizophrenia for school-age children (K-SADS). *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 49–58. doi:10.1097/00004583-200001000-00016

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Birmes, P. J., Daubisse, L., & Brunet, A. (2008). Predictors of enduring PTSD after an industrial disaster. *Psychiatric Services*, *59*, 116. doi:10.1176/appi.ps.59.1.116

Breh, D. C., & Seidler, G. H. (2007). Is peritraumatic dissociation a risk factor for PTSD? *Journal of Trauma and Dissociation, 8*, 53–69. doi:10.1300/J229v08n01_04

Briere, J., & Elliott, D. M. (2003). Prevalence and psychological sequelae of self-reported childhood physical and sexual abuse in a general population sample of men and women. *Child Abuse and Neglect*, *27*, 1205–1222. doi:10.1016/j.chiabu.2003.09.008

Briere, J., Scott, C., & Weathers, F. (2005). Peritraumatic and persistent dissociation in the presumed etiology of PTSD. *American Journal of Psychiatry*, *162*, 2295–2301. doi: 10.1176/appi.ajp.162.12.2295

Brom, D., Pat-Horenczyk, R., & Ford, J. D. (2008). *Treating traumatized children: Risk, resilience, and recovery*. London, England: Routledge.

Bui, E., Brunet, A., Allenou, C., Camassel, C., Raynaud, J. P., Claudet, I.,. . . Birmes, P. (2010). Peritraumatic reactions and posttraumatic stress symptoms in school-aged children victims of road traffic accident. *General Hospital Psychiatry*, *32*, 330–333, doi: 10.1016/j.genhosppsych.2010.01.014

Copeland, W. E., Keeler, G., Angold, A., & Costello, E. J. (2007). Traumatic events and posttraumatic stress in childhood. *Archives of General Psychiatry*, *64*, 577–584.

Costello, E. J., Erkanli, A., Fairbank, J. A., & Angold, A. (2002). The prevalence of potentially traumatic events in childhood and adolescence. *Journal of Traumatic Stress*, *15*, 99–112. doi:10.1023/A:1014851823163

Daviss, W. B., Mooney, D., Racusin, R., Ford, J. D., Fleischer, A., & McHugo, G. J. (2000). Predicting posttraumatic stress after hospitalization for pediatric injury. *Journal of the American Academy of Child & Adolescent Psychiatry*, *39*, 576–583. doi:10.1097/00004583-200005000-00011

Dyb, G., Rodriguez, N., Brymer, M., Saltzman, W., Steinberg, A., & Pynoos, R. (2008). Emotional reactions, peritraumatic dissociation, and posttraumatic stress reactions in adolescents. *Journal of Child and Adolescent Trauma*, *1*, 63–74. doi:10.1080/19361520801934423

Fairbank, J. A., Putnam, F. W., & Harris, W. W. (2007). The prevalence and impact of child traumatic stress. In M. J. Friedman, T. M. Keane & P. A. Resick (Eds.), *Handbook of PTSD* (pp. 229–251). New York, NY: Guilford Press.

Fikretoglu, D., Brunet, A., Best, S., Metzler, T., Delucchi, K., Weiss, D. S.,. . .Marmar, C. (2006). The relationship between peritraumatic distress and peritraumatic dissociation: An examination of two competing models. *Journal of Nervous and Mental Disease*, *194*, 853–858. doi:10.1097/01.nmd.0000244563.22864.f1

Fikretoglu, D., Brunet, A., Best, S. R., Metzler, T. J., Delucchi, K., Weiss, D. S.,. . .Marmar, C. R. (2007). Peritraumatic fear, helplessness and horror and peritraumatic dissociation: Do physical and cognitive symptoms of panic mediate the relationship between the two? *Behaviour Research and Therapy*, *45*, 39–47. doi:10.1016/j.brat.2006.01.008

Ford, J. D., & Cloitre, M. (2009). Best practices in psychotherapy for children and adolescents. In C. Courtois & J. D. Ford (Eds.), *Treating Complex Traumatic Stress Disorders* (pp. 59–81). New York: Guilford.

Ford, J. D., & Connor, D. (2009). ADHD and posttraumatic stress disorder (PTSD). *Current Attention Disorder Reports*, *1*, 61–66. doi:10.1007/s12618-009-0009-0

Ford, J. D., Racusin, R., Ellis, C. G., Daviss, W. B., Reiser, J., Fleischer, A., & Thomas, J. (2000). Child maltreatment, other trauma exposure, and posttraumatic symptomatology among children with oppositional defiant and attention deficit hyperactivity disorders. *Child Maltreatment*, *5*, 205–217.

Giesbrecht, T., Smeets, T., & Merckelbach, H. (2008). Dissociative experiences on ice—peritraumatic and trait dissociation during the cold pressor test. *Psychiatry Research*, *157*, 115–121. doi:10.1016/j.psychres.2006.12.012

Hetzel, M. D., & McCanne, T. R. (2005). The roles of peritraumatic dissociation, child physical abuse, and child sexual abuse in the development of posttraumatic stress disorder and adult victimization. *Child Abuse and Neglect*, *29*, 915–930. doi:10.1016/j.chiabu.2004.11.008

Jehel, L., Paterniti, S., Brunet, A., Louville, P., & Guelfi, J. D. (2006). L'intensité de la détresse péritraumatique prédit la survenue des symptômes post-traumatiques parmi des victimes d'agressions [Peritraumatic distress prospectively predicts PTDS symptoms in assault victims]. *Encephale*, *32*, 953–956. doi:10.1016/S0013-7006(06)76272-8

Johnson, D. M., Pike, J. L., & Chard, K. M. (2001). Factors predicting PTSD, depression, and dissociative severity in female treatment-seeking childhood sexual abuse survivors. *Child Abuse & Neglect*, *25*, 179–198. doi:10.1016/S0145-2134(00)00225-8

Kassam-Adams, N., & Winston, F. K. (2004). Predicting child PTSD: The relationship between acute stress disorder and PTSD in injured children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *43*, 403–411. doi:10.1097/00004583-200404000-00006

Kaufman, M. L., Kimble, M. O., Kaloupek, D. G., McTeague, L. M., Bachrach, P., Forti, A. M., & Keane, T. M. (2002). Peritraumatic dissociation and physiological response to trauma-relevant stimuli in Vietnam combat veterans with posttraumatic stress disorder. *Journal of Nervous and Mental Disease*, *190*, 167–174.

Lensvelt-Mulders, G., van der Hart, O., van Ochten, J. M., van Son, M. J., Steele, K., & Breeman, L. (2008). Relations among peritraumatic dissociation and posttraumatic stress: A meta-analysis. *Clinical Psychology Review*, *28*, 1138–1151. doi:10.1016/j.cpr.2008.03.006

Lyons-Ruth, K., Dutra, L., Schuder, M. R., & Bianchi, I. (2006). From infant attachment disorganization to adult dissociation: Relational adaptations or traumatic experiences? *Psychiatric Clinics of North America*, *29*, 63–86. doi:10.1016/j.psc.2005.10.011

Maaranen, P., Tanskanen, A., Hintikka, J., Honkalampi, K., Haatainen, K., Koivumaa-Honkanen, H., Viinamäki, H. (2008). The course of dissociation in the general population: A 3-year follow-up study. *Comprehensive Psychiatry*, *49*, 269–274. doi:10.1016/j.comppsych.2007.04.010

Marmar, C. R., Weiss, D. S., & Metzler, T. (1998). Peritraumatic dissociation and posttraumatic stress disorder. In J. D. Bremner & C. R. Marmar (Eds.), *Trauma, memory, and dissociation* (pp. 229–247). Washington, DC: American Psychiatric Association.

McCaslin, S. E., Inslicht, S. S., Metzler, T. J., Henn-Haase, C., Maguen, S., Neylan, T. C.,. . .Marmar, C. R. (2008). Trait dissociation predicts posttraumatic stress disorder symptoms in a prospective study of urban police officers. *Journal of Nervous and Mental Disease*, *196*, 912–918. doi:10.1097/NMD.0b013e31818ec95d

McKelvey, L. M., Whiteside-Mansell, L., Bradley, R. H., Casey, P. H., Conners-Burrow, N. A., & Barrett, K. W. (2011). Growing up in violent communities. *Journal of Abnormal Child Psychology*, 39(1), 95-107 doi:10.1007/s10802-010-9448-4

Mueser, K. T., & Taub, J. (2008). Trauma and PTSD among adolescents with severe emotional disorders involved in multiple service systems. *Psychiatric Services*, *59*, 627–634. doi: 10.1176/appi.ps.59.6.627

Neigh, G. N., Gillespie, C. F., & Nemeroff, C. B. (2009). The neurobiological toll of child abuse and neglect. *Trauma Violence & Abuse*, *10*, 389–410. doi:10.1177/1524838009339758

Noll, J. G., Horowitz, L. A., Bonanno, G. A., Trickett, P. K., & Putnam, F. W. (2003). Revictimization and self-harm in females who experienced childhood sexual abuse: Results from a prospective study. *Journal of Interpersonal Violence*, *18*, 1452–1471. doi: 10.1177/0886260503258035

Olff, M., Langeland, W., Draijer, N., & Gersons, B. P. R. (2007). Gender differences in posttraumatic stress disorder. *Psychological Bulletin*, *133*, 183–204. doi:10.1037/0033-2909.133.2.183

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2003). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Bulletin*, *129*, 52–73. doi:10.1037/0033-2909.129.1.52

Ozer, E. J., Best, S. R., Lipsey, T. L., & Weiss, D. S. (2008). Predictors of posttraumatic stress disorder and symptoms in adults: A meta-analysis. *Psychological Trauma: Theory, Research, Practice, and Policy*, *1*, 3–36. doi:10.1037/1942-9681.S.1.3

Pelcovitz, D., Kaplan, S., Goldenberg, B., & Mandel, F. (1994). Posttraumatic stress disorder in physically abused adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 33*, 305–312. doi:10.1097/00004583-199403000-00002

Pfefferbaum, B., Doughty, D. E., Reddy, C., Patel, N., Gurwitch, R. H., Nixon, S. J., & Tivis, R. D. (2002). Exposure and peritraumatic response as predictors of posttraumatic stress in children following the 1995 Oklahoma City bombing. *Journal of Urban Health*, *79*, 354–363. doi:10.1093/jurban/79.3.354

Plattner, B., Silvermann, M. A., Redlich, A. D., Carrion, V. G., Feucht, M., Friedrich, M. H., & Steiner, H. (2003). Pathways to dissociation: Intrafamilial versus extrafamilial trauma in juvenile delinquents. *Journal of Nervous and Mental Disease*, *191*, 781–788. doi: 10.1097/01.nmd.0000105372.88982.54

Putnam, F. W. (2003). Ten-year research update review: Child sexual abuse. *Journal of the American Academy of Child and Adolescent Psychiatry*, *42*, 269–278. doi: 10.1097/01.CHI.0000037029.04952.72

Putnam, F. W., Helmers, K., & Trickett, P. K. (1993). Development, reliability, and validity of a child dissociation scale. *Child Abuse and Neglect*, *17*, 731–741. doi:10.1016/S0145-2134(08)80004-X

Saigh, P. A., Yasik, A. E., Oberfield, R. A., Green, B. L., Halamandaris, P. V., Rubenstein, H.,. . .McHugh, M. (2000). The Children's PTSD Inventory: Development and reliability. *Journal of Traumatic Stress*, *13*, 369–380. doi:10.1023/A:1007750021626

Schafer, I., Barkmann, C., Riedesser, P., & Schulte-Markwort, M. (2004). Peritraumatic dissociation predicts posttraumatic stress in children and adolescents following road traffic accidents. *Journal of Trauma & Dissociation*, *5*(4), 79–92.

Schafer, I., Barkmann, C., Riedesser, P., & Schulte-Markwort, M. (2006). Posttraumatic syndromes in children and adolescents after road traffic accidents—a prospective cohort study. *Psychopathology*, *39*, 159–164. doi:10.1159/000092676

Schafer, I., Harfst, T., Aderhold, V., Briken, P., Lehmann, M., Moritz, S.,. . .Naber, D. (2006). Childhood trauma and dissociation in female patients with schizophrenia spectrum disorders: An exploratory study. *Journal of Nervous and Mental Disease*, *194*, 135–138. doi:10.1097/01.nmd.0000198199.57512.84

Schore, A. (2009). Attachment trauma and the developing right brain: Origins of pathological dissociation. In P. F. Dell & J. A. O'Neil (Eds.),

Dissociation and the dissociative disorders: DSM-V and beyond (pp. 107–141). New York, NY: Routledge.

Seedat, S., Stein, D. J., & Carey, P. (2005). Post-traumatic stress disorder in women: Epidemiological and treatment issues. *CNS Drugs*, *19*, 411–427.

Shalev, A. Y., & Freedman, S. (2005). PTSD following terrorist attacks: A prospective evaluation. *American Journal of Psychiatry*, *162*, 1188–1191.

Shalev, A. Y., Peri, T., Canetti, L., & Schreiber, S. (1996). Predictors of PTSD in injured trauma survivors: A prospective study. *American Journal of Psychiatry*, *153*, 219–225.

Simeon, D., Yehuda, R., Knutelska, M., & Schmeidler, J. (2008). Dissociation versus posttraumatic stress: Cortisol and physiological correlates in adults highly exposed to the World Trade Center attack on 9/11. *Psychiatry Research*, *161*, 325–329. doi:10.1016/j.psychres.2008.04.021

Spinhoven, P., Roelofs, K., Moene, F., Kuyk, J., Nijenhuis, E., Hoogduin, K., & Van Dyck, R. (2004). Trauma and dissociation in conversion disorder and chronic pelvic pain. *International Journal of Psychiatry in Medicine*, *34*, 305–318. doi:10.2190/YDK2-C66W-CL6L-N5TK

Spitzer, C., Barnow, S., Freyberger, H., & Grabe, J. (2006). Recent developments in the theory of dissociation, *World Psychiatry, 5*, 82–86.

SPSS (2006). *Statistical Package for the Social Sciences version 15.0*. Chicago, IL: SPSS Inc.

Steinberg, A. M., Brymer, M. J., Decker, K. B., & Pynoos, R. S. (2004). The University of California at Los Angeles Post-Traumatic Stress Disorder Reaction Index. *Current Psychiatry Reports*, *6*, 96–100. doi:10.1007/s11920-004-0048-2

Sterlini, G. L., & Bryant, R. A. (2002). Hyperarousal and dissociation: A study of novice skydivers. *Behaviour Research and Therapy*, *40*, 431–437. doi:10.1016/S0005-7967(01)00021-3

Teicher, M. H., Samson, J. A., Polcari, A., & McGreenery, C. E. (2006). Sticks, stones, and hurtful words: Relative effects of various forms of childhood maltreatment. *American Journal of Psychiatry*, *163*, 993–1000. doi:10.1176/appi.ajp.163.6.993

van der Velden, P. G., & Wittmann, L. (2008). The independent predictive value of peritraumatic dissociation for PTSD symptomatology after type I trauma: A systematic review of prospective studies. *Clinical Psychology Review*, *28*, 1009–1020. doi:10.1016/j.cpr.2008.02.006

Vogel, M., Spitzer, C., Kuwert, P., Moller, B., Freyberger, H. J., & Grabe, H. J. (2009). Association of childhood neglect with adult dissociation in schizophrenic inpatients. *Psychopathology*, *42*, 124–130. doi:10.1159/000204763

Weller, E. B., Weller, R. A., Fristad, M. A., Rooney, M. T., & Schecter, J. (2000). Children's Interview for Psychiatric Syndromes (ChIPS). *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 76–84.

Wolpaw, J., Ford, J. D., Newman, E., Davis, J. L., & Briere, J. (2005). Trauma Symptom Checklist for Children. In T. Grisso, G. Vincent, & D. Seagrave (Eds.), *Mental health screening and assessment in juvenile justice* (pp. 152–165). New York, NY: Guilford Press.

Yasik, A., Saigh, P., Oberfield, R., Green, B., Halamandaris, P., & McHugh, M. (2001). The validity of the Children's PTSD Inventory. *Journal of Traumatic Stress*, *14*, 81–94. doi:10.1023/A:1007887615685

Zoellner, L. A., Alvarez-Conrad, J., & Foa, E. B. (2002). Peritraumatic dissociative experiences, trauma narratives, and trauma pathology. *Journal of Traumatic Stress*, *15*, 49–57. doi:10.1023/A:1014383228149

