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Psychoform and Somatoform Dissociation and PTSD in Deaf Adults

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Both deafness and dissociation disconnect people from certain aspects of the external environment. Dissociation among the deaf population has been largely neglected as an area of scientific investigation. The purpose of this study was twofold: first, to examine the psychometrics of 2 dissociation measures—the Dissociation scale of the Trauma Symptom Inventory (TSI) and the Somatoform Dissociation Questionnaire–20 (SDQ-20); and second, to evaluate the relationship between dissociation and posttraumatic stress disorder (PTSD) in deaf adults. A diverse sample of 79 deaf adults was assessed using the Clinician-Administered PTSD Scale, the TSI, and the SDQ-20. Results provided support for the concept of psychoform dissociation, as measured by the TSI Dissociation scale, in deaf adults. However, somatoform dissociation, as measured by the SDQ-20, showed lower internal consistency. The SDQ-5, a shortened version of the SDQ-20, was unreliable in the current sample. Deaf adults were significantly higher on psychoform dissociation than the norm samples of hearing adults. As in hearing samples, dissociation—both psychoform and somatoform—was significantly related to PTSD symptoms. In addition, those with dissociative PTSD displayed significantly more symptoms of depression, anger, impaired self-reference, tension reduction behavior, and somatoform dissociation than did the nondissociative PTSD group.

KEYWORDS dissociation, psychoform dissociation, somatoform dissociation, dissociative PTSD, PTSD subtypes, deafness

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Dissociation is often understood to be a trauma-related avoidance symptom (Briere, 1995; Cardeña & Weiner, 2004; Carlson, Dalenberg, & McDade-Montez, in press). The word *dissociate* comes from the Latin *dissociare* and literally means "to separate" or "to disunite" (Maldonado & Spiegel, 1998). As a psychological concept, however, it is not easily defined, and over the years it has come to describe a variety of symptoms and phenomena. The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* defines *dissociation* as a "disruption in the usual integration functions of consciousness, memory, identity, or perception" (American Psychiatric Association, 2000, p. 519). Two types of dissociation are generally discussed: psychoform dissociation and somatoform dissociation. *Psychoform dissociation* refers to the separation or compartmentalization of mental content that under normal, nontraumatic circumstances would be integrated or processed together (Maldonado & Spiegel, 1998); and *somatoform dissociation* refers to physical symptoms, suggesting a general medical condition that appears upon on the reactivation of dissociative states (Nijenhuis, 2004; Van der Hart, Van Dijke, Van Son, & Steele, 2000).

A number of researchers (e.g., Cardeña & Weiner, 2004; Waller, Putnam, & Carlson, 1996) also make a distinction between taxonic dissociation (viewed as pathological) and nontaxonic or continuous dissociation (typically measured by the Absorption scale and often viewed as nonpathological; Allen, Fultz, Huntoon, & Brethour, 2002; Dalenberg & Paulson, 2009; Stockdale, Gridley, Balogh, & Holtgraves, 2002). Although absorption and conscious defensive disconnection are not always seen as dissociation (Dell, 2008; Steele, Dorahy, van der Hart, & Nijenhuis, 2009), Dalenberg and Paulson (2009) reviewed the literature showing that "normal dissociation" correlates extremely highly with pathological dissociation, is virtually always present in clients with dissociative disorders, and appears to relate in theoretically meaningful fashion to other behaviors that should be predicted by dissociation. We are therefore arguing from the mainstream view (Briere, 1995; Carlson et al., in press) that the range of dissociative symptoms represented by the Trauma Symptom Inventory (TSI), the instrument used in this study—specifically depersonalization, derealization, numbing, absorption, and changes in self-awareness—are dissociative symptoms.

Dissociation is also highly correlated with posttraumatic stress disorder (PTSD) in hearing people (Carlson et al., 2001; Carlson et al., in press; Nijenhuis, Van der Hart, & Kruger, 2002) and appears to be a marker for severe psychopathology (Waelde, Silvern, & Fairbank, 2005). Waelde et al. (2005) found that 32% of a sample of veterans with PTSD were taxon members, arguing for a dissociative PTSD subtype. Trauma survivors who met criteria for this subtype were more symptomatic in terms of both dysthymia and general PTSD symptoms.

The enhanced vulnerability of the deaf population to trauma exposure (Schild & Dalenberg, 2012; Vernon & Miller, 2002) and the possibility of a longer window of vulnerability during childhood for deaf individuals due to slower development of language ability raises the likelihood of dissociation in addition to other traumatic symptoms. As Freyd (1994) argued, the process of sharing information helps to organize and represent that information into more conscious, discrete, and readily assessable units. Those who are unable to share their experiences—because of either a lack of language ability, social isolation, or inaccessible professional support—are at higher risk for dissociative responses (Freyd, 1994). Furthermore, insecure attachment relationships, emotional neglect, neurobiological disturbance, panic attacks, and substance abuse have been identified as possible risk factors for dissociation (Briere, 2006), and all may be more prevalent within the deaf population (Gallaudet Research Institute, 2008; Marschark & Clark, 1998). Given the general lack of valid and reliable psychological measures for use with this population, research with the deaf community is extremely difficult to conduct and limited. Lewis, Dorahy, Lewis, and Baker (2010) have emphasized the need for research in this area.

Despite their increased vulnerability, the construct of dissociation has not yet been validated with the deaf population. Using data from the California Deaf Trauma Study (Schild, 2007), Schild and Dalenberg (2012) found that psychoform dissociation, as measured by the Dissociation scale of the TSI, was significantly correlated with somatoform dissociation, as measured by the Somatoform Dissociation Questionnaire–20 (SDQ-20). Interestingly, this deaf sample scored significantly higher on psychoform dissociation independent of their level of traumatization than the hearing standardization sample. However, both the TSI Dissociation scale and the SDQ-20 correlated significantly with the amount of trauma experienced (Schild & Dalenberg, 2012). To gain a deeper understanding of dissociation and its specific relationship to PTSD in deaf adults, previously unpublished data from the California Deaf Trauma Study (Schild, 2007) were analyzed.

For the present study, the Dissociation scale of the TSI, a measure of psychoform dissociation, and the SDQ-20, a measure of somatoform dissociation, were analyzed psychometrically. In keeping with the hypothesis of a dissociative subtype of PTSD (Lanius et al., 2010), it was predicted that dissociation would be associated with higher levels of PTSD symptoms and that those with both psychoform dissociation and PTSD would show higher levels of depression, impaired self-reference, somatoform dissociation, anger/irritability, and substance abuse. Because no specific cutoff for dissociation has been put forth for defining dissociative PTSD, high and low PTSD symptoms were defined by a median split, and high dissociative symptoms was defined by a T score greater than 50 on the TSI.

METHOD

Description of the Sample

A total of 45 women and 34 men participated in this study. Their mean age was 40.80 years, with a range of 18 to 83 years ($SD = 16$). Most of the participants were White (58.20%), followed by Hispanic (19%), Black (11.40%), and other races (11.40%). Four fifths of the sample (82.30%) was heterosexual. The majority of this sample reported profound hearing losses ($n = 44$), with the rest reporting hearing losses in the severe ($n = 23$) or moderate to severe ($n = 12$) range. Moreover, 87% ($n = 69$) of the hearing losses had been sustained prelingually. A total of 75 of the 79 participants had a preference for sign language communication over oral communication methods. The vast majority (95%) had grown up in hearing families in which no sign language was used. The respondents' median income ranged from $15,000 to $30,000; 38% were employed, and an additional 17.7% were on disability. About a third of the sample (34.2%) reported a high school education or less.

Translation Procedure

Written measures were translated into American Sign Language (ASL) and videotaped. A glossed version of all written items was created for the test administration. A native ASL user unfamiliar with the original written tests translated the videotaped original version back into English. The back-translation revealed that most items had been translated correctly, with a few exceptions that were revised. A second bilingual ASL user translated the improved ASL translations back into English until both versions were semantically equivalent.

No knowledge of written English was required for participation in this study. Participants were signed the standardized ASL translation by the first author with the option of looking at the original English sentence. The live ASL translation provided to the participants may have had additional benefits, as suggested by Schild and Dalenberg (2012), including (a) allowing participants to ask for clarifications, (b) allowing adjustment to the participants' idiosyncratic language use, (c) providing the potential for faster response time for those with more highly developed language skills, and (d) reducing the likelihood of skipped items.

Procedure

The study was advertised in southern and central California at various deaf organizations and social events. To ensure an unbiased population sample, each participant was informed about the trauma focus of the study after his or her initial contact with the primary investigator. There were no dropouts.

After consent was obtained, sign language comprehension was assessed. Those who displayed little or no signing ability were dismissed from the study without losing the study incentive. Subsequently, each remaining participant was administered the Clinician-Administered PTSD Scale (CAPS), the TSI, the SDQ-20, and a sociodemographic questionnaire.

Measures

CAPS. Blake et al. (2000) developed the CAPS to assess the 17 PTSD symptoms outlined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*. The CAPS is currently considered the gold standard for PTSD assessment (Briere & Scott, 2006). Overall alpha coefficients have been reported at or above .94 for hearing samples (Blake et al., 1995; Hyer, Summers, Boyd, Litaker, & Boudewyns, 1996) and at .87 for the current deaf sample (Schild & Dalenberg, 2012).

TSI. Briere (1995) developed the TSI to assess acute and chronic trauma symptoms in adults. The TSI is a 100-item self-report measure that consists of 10 clinical scales and 3 validity scales. The 10 clinical scales are Anxious Arousal, Depression, Anger/Irritability, Intrusive Experiences, Defensive Avoidance, Dissociation, Sexual Concerns, Dysfunctional Sexual Behavior, Impaired Self-Reference, and Tension Reduction Behavior. The validity scales are Response Level, unusual or bizarre symptoms (Atypical Response), and inconsistent or random response patterns (Inconsistent Response). The reliability coefficients for the clinical scales are excellent, ranging from .74 to .91 (Briere, 1995).

SDQ-20. Nijenhuis, Spinhoven, Van Dyck, Van der Hart, and Vanderlinden (1996) developed the SDQ-20 to assess the dimensional construct of somatoform dissociation. The 20-item self-report scale has excellent reliability, ranging from .95 to .96. One item from the SDQ-20 was reworded and two items were eliminated for content reasons. The two eliminated items referred to changes in hearing (Item 3 and Item 11). The modified item (Item 18) referred to effortful or blocked ability to speak. This item was changed to "I cannot sign (or only with great effort)." In addition, the time frame assessed was shortened to the past 6 months, and the response options were changed from 1 (*not at all*) to 5 (*extremely*) to a scale ranging from 0 (*never*) to 3 (*often*).

The SDQ-5 is a shortened version of the SDQ-20. Items are insensitivity to pain, the sensation of disappearance of the body, reduction of the visual field, problems speaking, and pain while urinating. The SDQ-5 has an internal consistency of .80 in hearing populations and correlates highly ($r = .92$) with the SDQ-20 total (Nijenhuis, Spinhoven, Van Dyck, Van der Hart, & Vanderlinden, 1997).

Sociodemographic questionnaire. This questionnaire was developed to obtain sociodemographic information, including general demographics, deafness-related information, and information on substance use.

RESULTS

The 79 participants were divided into two groups based on their score on the TSI Dissociation scale (below and above a *T* score of 50). The 31 low dissociative individuals and 48 high dissociative individuals did not differ on any of the demographic variables.

Internal Consistency of the TSI and SDQ-20

Internal consistency was calculated using Cronbach's alpha. As shown in Table 1, alpha coefficients for the 10 clinical TSI scales were in the expected range. The alpha coefficient for the TSI Dissociation scale was .77. All TSI dissociation items were significantly correlated with the dissociation total scores, with *r*s ranging from .42 to .68 ($p < .001$; see Table 2).

Cronbach's alpha for the altered SDQ-20 was .69, which was lower than the published alpha of .95 but still in the acceptable range. Two items—seizures (Item 7) and paralysis (Item 19)—were not endorsed. As can be seen in Table 3, the items also varied considerably as to their correlation with the total scale. The SDQ-5 was not internally consistent ($\alpha = .38$) and did not improve when Item 18, which was modified for this study, was removed. The five most predictive items in a stepwise regression of SDQ items on total SDQ-20 score had almost no overlap with the items on the SDQ-5. The most predictive items were Item 5 (body numbness), Item 8 (pain insensitivity), Item 12 (vision deficit), Item 14 (change in sense of smell), and Item 17 (problem sleeping). These items accounted for 88.5% of the variance. The TSI and the SDQ-20 were also positively correlated ($r = .53$, $p < .001$).

TABLE 1 Cronbach's Alpha Coefficients for the Trauma Symptom Inventory Scales

Scale	California Deaf Trauma Study sample ($n = 79$)	Briere (1995) standardization sample ($n = 828$)
Atypical Response	.75	.75
Response Level	.82	.80
Inconsistent Response	.59	.51
Anxious Arousal	.79	.86
Depression	.88	.91
Anger/Irritability	.91	.90
Intrusive Experiences	.85	.89
Defensive Avoidance	.87	.90
Dissociation	.77	.82
Sexual Concerns	.86	.87
Dysfunctional Sexual Behavior	.87	.85
Impaired Self-Reference	.88	.88
Tension Reduction Behavior	.74	.74
Mean clinical scale reliability	.84	.86

TABLE 2 Item–Total Correlations, Endorsement Rates, and Relationship to SDQ and CAPS for TSI Dissociation Items ($n = 79$)

TSI Dissociation item	TSI Dissociation	SDQ	Endorsement[a] *n* (%)	CAPS PTSD
10. Out of body experience	.58***	.51***	20 (25.3%)	.36**
20. Blank mind	.65***	.23*	40 (50.6%)	.18
26. Watching oneself	.59***	.33**	25 (31.6%)	.13
29. Changes in self-awareness	.56***	.39**	41 (51.9%)	.26*
38. Lack of emotions	.56***	.23*	36 (45.6%)	.23*
42. Absentmindedness	.58***	.22	55 (69.6%)	.27*
84. Things appear unreal	.57***	.32**	35 (44.3%)	.29**
85. Dreamlike state	.68***	.59***	45 (57%)	.23*
88. Daydreaming	.42***	.34**	55 (69.6%)	.22*

Notes: SDQ = Somatoform Dissociation Questionnaire–20 total score; CAPS = Clinician-Administered PTSD Scale total score; TSI = Trauma Symptom Inventory; PTSD = posttraumatic stress disorder.
[a]Items with a score of 1 or higher.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

TABLE 3 Item–Total Correlations, Endorsement Rates, and Relationship to TSI and CAPS for SDQ Dissociation Items ($n = 75$)

SDQ item	SDQ	TSI Dissociation	Endorsement[a] *n* (%)	CAPS PTSD
1. Problem urinating	.21	.15	1 (1.3%)	.05
2. Disliking tastes	.43***	.12	8 (10.7%)	.22
3. Hearing sounds[b]				
4. Pain urinating[c]	.34**	.15	3 (4%)	.28*
5. Body numbness[c]	.39***	.35**	12 (16%)	.12
6. Objects appear bigger[c]	.49***	.26**	6 (8%)	.28*
7. Seizures[d]			0 (0%)	
8. Pain insensitivity	.55***	.22	5 (6.7%)	.21
9. Dislike smells	.58***	.25**	13 (17.3%)	.20
10. Genital pain	.61***	.25**	8 (10.7%)	.43**
11. Cannot hear[b]				
12. Cannot see	.30**	.24**	4 (5.3%)	.32**
13. Objects appear different	.46***	.34**	9 (12%)	.30**
14. Sense of smell changed	.65***	.31**	16 (21.3%)	.29**
15. Body disappeared[c]	.33**	.22	3 (4%)	.03
16. Problems swallowing	.12	.29**	6 (8%)	.10
17. Problems sleeping	.62***	.18	24 (32%)	.38**
18. Inability to sign[c]	.12	.17	5 (6.7%)	.01
19. Being paralyzed[d]			0 (0%)	
20. Growing stiff	.30**	.15	8 (10.1%)	.15

Notes: TSI = Trauma Symptom Inventory; CAPS = Clinician-Administered PTSD Scale total score; SDQ = Somatoform Dissociation Questionnaire–20 total score; PTSD = posttraumatic stress disorder.
[a]Items with a score of 1 or higher. [b]Item eliminated because of hearing bias. [c]Items for the Somatoform Dissociation Questionnaire–5. [d]Zero endorsement.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Dissociation and PTSD

The TSI Dissociation scale was significantly correlated with the CAPS total score ($r = .42$, $p < .001$) and with actual PTSD presence, as determined by the original CAPS scoring rule ($r = .31$, $p < .005$). According to this scoring rule, 15 people (19.5%) were classified as PTSD positive ($n = 77$). Somatoform dissociation was also significantly correlated with PTSD symptoms ($r = .53$, $p < .001$) and PTSD presence ($r = .35$, $p < .005$).

Individual TSI items correlated with the CAPS total score, with a range of .13 to .36. Seven of the nine items were significantly correlated with the CAPS total score (see Table 2). In contrast, only 7 of the 18 SDQ-20 items were significantly correlated with the CAPS total score (see Table 3).

Anxious Arousal, Intrusive Experiences, and Defensive Avoidance on the TSI were intercorrelated, yielding an average correlation of .61 ($p < .001$). The TSI Dissociation scale was correlated .56 with Anxious Arousal, .66 with Intrusive Experiences, and .59 with Defensive Avoidance, with an average correlation of .63 ($p < .001$). Thus, dissociation was correlated as strongly with the PTSD clusters as the clusters were with one another.

Using CAPS as the criterion, we found that TSI Dissociation correlated .44 with CAPS Arousal, .37 with CAPS Intrusive Experiences, and .32 with CAPS Avoidance for an average correlation of .37. The CAPS cluster scores correlated with the corresponding TSI cluster scores with an average correlation of .55 ($p < .001$). The two average correlations were not significantly different ($z = 1.34$, *ns*).

The Interactive Contribution of Dissociation to PTSD Symptoms

The significant correlation between dissociation and PTSD as well as the low base rate for PTSD would have resulted in an unacceptably low sample size in the Low Dissociation/PTSD absent cell. Therefore, to test the interaction of dissociation and PTSD symptoms, we dichotomized the CAPS total symptom cluster based on a median split and crossed it with the low/high TSI dissociation groups. The relevant TSI scales, alcohol and drug use, and the SDQ-20 total score were used as dependent variables (see Table 4). A two-way multivariate analysis of variance (MANOVA) and a follow-up two-way analysis of variance (ANOVA) were conducted.

A main effect for PTSD presence appeared for the MANOVA and each of the individual TSI scales, with effect sizes ranging from .08 to .29. There was also a main effect for PTSD presence on the SDQ-20, $F(1, 74) = 10.5$, $p < .001$, accounting for 12.9% of the variance. There was no main effect for PTSD presence on the substance use variable. The main effect for dissociation appeared in the MANOVA and on all TSI scales tested, with effect sizes ranging from .13 to .21. The main effect for dissociation also appeared for the SDQ-20, $F(1, 74) = 15.37$, $p < .001$, accounting 17.8% of the variance; and drug use, $F(1, 74) = 6.70$, $p < .01$, accounting for 8.3%

TABLE 4 Simple Effect Results for CAPS PTSD × Level of Dissociation Analysis of Variance

Variable	Low CAPS *M* (*SD*)	High CAPS *M* (*SD*)	Simple effect *F*	Partial η^2
Low dissociation group	$n = 20$	$n = 11$		
Anxious Arousal	43.30 (3.08)	50.18 (5.27)	6.12*	.054
Depression	45.25 (4.34)	48.45 (7.17)	0.99	.008
Anger/Irritability	43.85 (5.44)	48.00 (6.62)	1.40	.012
Intrusive Experiences	45.60 (4.45)	52.09 (6.95)	4.33*	.038
Defensive Avoidance	45.50 (5.48)	55.45 (8.86)	11.56**	.086
Impaired Self-Reference	47.65 (5.28)	50.73 (7.42)	0.71	.006
Tension Reduction Behavior	49.30 (5.74)	52.82 (10.31)	0.58	.005
Alcohol use	4.60 (0.68)	4.09 (1.14)	1.23	.015
Drug use	6.90 (0.31)	6.64 (0.67)	0.24	.002
Somatoform dissociation	0.67 (1.50)	0.82 (1.40)	0.02	.001
High dissociation group	$n = 18$	$n = 30$		
Anxious Arousal	48.94 (6.71)	56.40 (9.99)	11.39**	.133
Depression	50.39 (8.67)	60.53 (10.70)	21.09***	.008
Anger/Irritability	50.11 (8.28)	60.57 (12.26)	14.13***	.119
Intrusive Experiences	51.22 (7.61)	60.10 (10.72)	12.85***	.113
Defensive Avoidance	51.22 (7.02)	62.13 (9.04)	22.02***	.165
Impaired Self-Reference	54.78 (8.08)	64.47 (13.02)	11.14**	.096
Tension Reduction Behavior	57.17 (9.65)	68.97 (16.78)	10.21**	.096
Alcohol use	4.00 (1.28)	3.66 (1.47)	0.88	.011
Drug use	6.06 (1.92)	5.69 (1.71)	0.71	.008
Somatoform dissociation	1.28 (1.27)	5.50 (4.12)	25.49***	.213

Notes: CAPS = Clinician-Administered PTSD Scale; PTSD = posttraumatic stress disorder.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

of the variance. The interaction between dissociation and PTSD presence appeared in the MANOVA and for the SDQ-20 variable, $F(1, 74) = 9.09$, $p < .001$, accounting for 11.4% of the variance. The interaction appeared because of low somatoform dissociation in both low psychoform dissociation cells but a large magnitude difference ($\eta^2 = .213$) between low and high CAPS scores for high psychoform dissociation. Furthermore, the contrast between the high dissociation/high CAPS group and the weighted average of the remaining groups was significant for all variables with Fs$(1, 75) > 20.22$, $p < .001$, with the exception of drug use, $F(1, 75) = 5.43$, $p < .024$; and alcohol use, $F(1, 75) = 3.31$, $p < .076$.

Table 4 includes the means and standard deviations for the low and high dissociation groups. As can be seen, the simple effects for PTSD presence in the low dissociation group appeared only for Anxious Arousal, Intrusive Experiences, and Defensive Avoidance, the three variables that define PTSD within the CAPS. In the high dissociation group, simple effects appeared for these three scales but also for Depression, Anger/Irritability, Impaired Self-Reference, and Tension Reduction Behavior on the TSI. The simple effect for SDQ-20 was also highly significant, $F(1, 74) = 25.49$, $p < .001$. The

effect sizes for PTSD presence were markedly higher in the high dissociation group in each case. SDQ-20 is the clearest example, with less than 1% of the variance accounted for by PTSD presence in the low dissociation group and 21.3% of the variance accounted for by this variable in the high dissociation group.

DISCUSSION

Psychoform dissociation in this sample of deaf adults appears to be measurable with validity by the TSI Dissociation scale. The internal consistency of the TSI Dissociation scale was excellent, and all dissociation items correlated significantly with the dissociation total score. In addition, the other nine clinical TSI scales showed adequate internal consistency, thus providing the first published evidence that the TSI is appropriate for use with deaf adults. However, the SDQ-20 as a measure of somatoform dissociation showed promise but would further require psychometric revision for use with deaf samples. The SDQ-20 and the TSI Dissociation scale were significantly correlated, thus providing evidence for convergent validity. However, the SDQ-20 scale appears to have somewhat lower internal consistency for this deaf sample ($\alpha = .69$ compared to .95 for hearing samples; Nijenhuis et al., 1996). The alpha coefficient of .38 for the SDQ-5 suggests that the shortened version may not be valid and thus should not be used as a measure of somatoform dissociation in deaf adults. The five items that emerged as most predictive of the overall SDQ-20 score in this study showed little overlap with the five items suggested by Nijenhuis et al. (1997).

Possible artifactual reasons for the lower alpha coefficient may include (a) alteration in the response format and time frame assessed, (b) elimination or rewording of items, and (c) potential translation error. The last two explanations are less likely given that the alpha coefficient did not increase significantly when the altered or non-endorsed items were eliminated and given that strict translation procedures were followed. Alternatively, there are a number of reasons why the relationship of an individual to his or her own body might be different for deaf and hearing individuals. For the deaf person, the body is a more complex means of communication, with touch functioning as a means of gaining attention, communicating ideas, and prodding another into action. Furthermore, a deaf child, particularly a child with hearing parents who do not sign (like the majority of deaf children in the United States; Marschark, 1993), is in a greater sense alone with his or her own body than is a hearing child. Without a fluent parent as an interpreter of the child's bodily sensations (e.g., your stomach hurts because you are hungry, you have a headache because you are not wearing your glasses), this bodily isolation might leave the deaf child with a greater vulnerability to misinterpretation of bodily sensations or misappropriation of bodily symptoms by psychological processes.

Because of potential differences between deaf and hearing people, the SDQ-20 as a measure of somatoform dissociation remains an instrument that warrants further study. In addition, many people may be more willing to acknowledge symptoms of somatoform dissociation than symptoms they believe are purely psychological (Nijenhuis, 2004). Therefore, the SDQ-20 may be useful for use with higher functioning deaf individuals who may be more defensive or lower functioning deaf individuals who may be able to identify physical symptoms but are unable to identify psychological symptoms, which requires a higher degree of insight and self-awareness. Because of the change in format and the elimination or modification of SDQ-20 items, it was not possible to compare this sample to hearing samples.

Is Deafness a Vulnerability Factor for Dissociation?

Theories of dissociation seem to fall into four basic theoretical camps that are not mutually exclusive: dissociation as a failure of integration (Janet, 1919), dissociation as a psychological defense (Freud, 1962), dissociation as mild cognitive impairment (Giesbrecht, Lynn, Lilienfeld, & Merckelbach, 2008), and ecological theories of dissociation as a response to failure in attachment or emotional regulation (Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997). The deaf population might be a particular useful subgroup for making differential predictions based on these models. The rates of mild neurological impairment are higher for deaf populations than for hearing populations (Gallaudet Research Institute, 2008), and it is quite possible that attachment might also be compromised at higher rates.

It also seems plausible that the psychological defense of dissociation is more available to the deaf individual than to the hearing one. One purpose or outcome of dissociation is the disconnection of the internal environment (thoughts, feelings, perceptions) from the external environment. Thus, the external environment might be perceived in a distorted manner (derealization), pain might be minimized (numbing) or aggravated (somatoform dissociation), or memory of external events might be disrupted (dissociative amnesia). Deafness, at its most basic level, disconnects people from their external environment by preventing them from receiving information auditorally. Hearing is a relatively passive, less effortful process than vision, which requires intention and more focus. Thus, the deaf person is less likely to be in a situation in which the environment can force itself onto him or her. By closing his or her eyes, a deaf person can more fully, consciously or unconsciously, refuse to know. The use of the body to consciously avoid knowledge may be an alternative to or an antecedent of dissociation (Stern, 1997). A comparison of deaf and blind samples, two groups that are similar in their lack of important sensory ability but different in their ability to control their remaining sensory ability, would be interesting. Studies are also

needed to evaluate the prevalence of the dissociative disorders among the deaf population.

Dissociative Symptoms and Dissociative PTSD

The PTSD prevalence rate of 19.5% in this sample was higher than reported prevalence rates in general community samples (Breslau et al., 1998) but lower than expected given the high trauma exposure in this multitraumatized deaf sample (Schild & Dalenberg, 2012). This study provides the first empirical evidence that PTSD presence is associated with psychoform and somatoform dissociation in deaf people. Furthermore, consistent with the theories of Lanius et al. (2010), those with PTSD who were positive for dissociation appeared to show more posttraumatic symptomatology, including more depression, anger, impaired self-reference, tension reduction behavior, and somatoform dissociation. It is important to note that these comorbidities, which are commonly reported in the PTSD literature (Breslau et al., 1998), appeared largely in the high dissociation group.

In clinical settings, recognition of the high likelihood of dissociative responses in deaf populations is quite important. Because the deaf individual is already disadvantaged in terms of information access, a dissociative motivation for avoidance of information or chances to process the trauma might be particularly harmful. A dissociative presentation in combination with the real-world likelihood of less resources available for the deaf client might lead to a ready acceptance of the hypothesis that a trauma-exposed deaf individual is resilient and does not need further services. The present findings highlight the importance of evaluating dissociative symptoms in the context of PTSD in deaf people.

We are in sympathy with some researchers (e.g., Montoya et al., 2004) who argue that the problems involved in creating a standardized instrument using written language or ASL may be insurmountable in the deaf population, given the great variability in language ability within the deaf community. No one measure will be consistently understood by all deaf people. Furthermore, the constructs being measured in the assessment of traumatic response (e.g., depersonalization or hyperarousal) are difficult to convey to an individual with limited language abilities, irrespective of the test chosen. The best compromise might be a structured interview of some type with a standardized set of instructions for adjusting the interview to the language needs of the client. Alternatively, a pictorial version of PTSD or dissociation might serve the purpose of assessment of trauma-related symptoms in children as well as adults with limited language skills.

Future studies may also use larger samples. Although the present sample was extremely culturally diverse, certain subgroups were still either underrepresented or simply not included. For example, specific ethnic groups

such as Asian Americans and Native Americans were underrepresented, as were deaf people from deaf families, postlingually deaf adults, and older deaf adults.

PTSD and dissociation were crossed in this study to define the dissociative PTSD group and to compare comorbidity to the non-PTSD and nondissociative groups based on median split. No decision has been made in the literature on the specific level of dissociation that should be used as a cutoff for the disorder or the specific instruments that should be used to measure these symptoms. Therefore, it is possible that the presently defined dissociative PTSD group contained some individuals who would not meet an eventually defined cutoff based on extreme symptoms. Alternatively, it could be that only certain types of dissociation would be seen as characteristic of dissociative PTSD. Depersonalization and derealization, for instance, have been linked to PTSD symptoms (Hunter, Sierra, & David, 2004), whereas severe identity fragmentation is generally seen as a sign of a more specific dissociative disorder (Dell, 2009). Given that the only consensus at present is that dissociative PTSD survivors should show more general dissociation than nondissociative survivors, no more specific definition was used in the present research. However, future research might identify the dissociative items most predictive of high impairment or high comorbidity within dissociative PTSD groups. Finally, it should be noted that an articulate minority of researchers have conceptualized PTSD itself as a dissociative disorder (Chu, 2011; Van der Hart, Nijenhuis, & Steele, 2006), begging the question of whether "nondissociative" PTSD itself is a meaningful construct. As Carlson et al. (in press) argued, dissociative PTSD as a subtype is meaningful only if the dissociation that defines the subgroup also brings with it other diagnostically relevant comorbidities or changes the severity level or treatment trajectory of PTSD itself.

Conclusions

Vernon and Rothstein (1968) called deafness an "experiment of nature" (p. 361) that allows the human scientist to evaluate what, if any, impact the lack of hearing has on various aspects of human development (e.g., social, emotional, linguistic, and cognitive). Beyond developmental aspects, however, the deaf population may also represent an intriguing subculture for the study of dissociation because both dissociation and deafness by their very nature disconnect people from certain aspects of their experiences. The limited availability of adequate measures of trauma-relevant symptoms for deaf populations, in combination with the theoretical likelihood of high vulnerability to dissociation among deaf people and empirical evidence of high exposure to trauma for deaf groups, creates a strong case for the need for future studies with this highly underserved population.

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