

Trauma Exposure and Traumatic Symptoms in Deaf Adults

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While existing research suggests vulnerability of the deaf community to trauma, very little data exists on prevalence, symptom manifestation, and/or unique characteristics of the response of deaf adults and children to traumatic events. In this research, 79 deaf adults were interviewed with the Clinician Administered PTSD Scale, the Life Event Checklist, the Trauma Symptom Inventory, the Peritraumatic Distress Scale, and the Somatoform Dissociation Questionnaire. The average number of unique trauma types experienced per participant was high, averaging 6.18 ($SD = 2.65$). Findings supported the dose-response model for trauma. Vulnerability factors included number of traumatic events, race/ethnicity, sexual orientation, additional disabilities, prior substance abuse, and low social support. Higher levels of trauma exposure were associated with more depression, anger, irritability, sexual concerns, tension reduction behaviors, and substance abuse problems. The unique trauma symptoms of deaf trauma survivors, including higher levels of dissociation, are discussed. A concept relevant to the deaf trauma community—information deprivation trauma—is introduced.

Keywords: trauma symptoms, Post-Traumatic Stress Disorder, dissociation, trauma exposure, deafness, Information Deprivation Trauma

Research findings of core, secondary, and associated symptoms of trauma (Carlson & Dalenberg, 2000) have led to the formulation and inclusion of trauma-related diagnoses such as Post-Traumatic Stress Disorder (PTSD) and Acute Stress Disorder (ASD) in the Diagnostic and Statistical Manual (DSM; American Psychiatric Association, 2000). While trauma responses are relatively well understood among individuals in mainstream society (Briere, 2004; Briere & Scott, 2006; Carlson, 1997), especially among white, middle- and upper-middle class Americans (Carlson & Dalenberg, 2000), very little is known about the consequences of trauma within the Deaf community. According to the National Center for Health Statistics, approximately 37 million adults in the United States have some type of hearing loss. Of this group, 3.3% (i.e., ~1.2 million) of adults 18 years and older are deaf or have significant difficulties understanding speech (Schoenborn & Heyman, 2008).

This community, as pointed out by Schein (1989), represents a remarkably diverse group which varies greatly with regard to general demographics (e.g., race, ethnicity, country of origin, religion, family background, gender, and sexual orientation) and deafness-related variables (e.g., degree of hearing loss, type, age at onset, and causes of hearing loss) (Padden & Humphries, 2005; Schein, 1989). Furthermore, a substantial number of deaf people have disabilities primary or secondary to their hearing loss (Gallaudet Research Institute, 2010). The most commonly used language among deaf people in the United States and Canada is

American Sign Language or ASL (Gulati, 2003). Within the deaf community, a large number of people (particularly people who are prelingually deaf) view their hearing loss not necessarily as a disability, but rather as a unique cultural identity. To denote this distinction, differences in spelling are frequently used, which will also be used throughout this article. The term *deaf* (lower case) is generally used to refer to the audiological condition of not being able to perceive sound, while uppercase *Deaf*, is used to refer “to a particular group of people who share a language and a culture” (Padden & Humphries, 1988, p. 2).

Carlson (1997) cautioned that research findings from mainstream America may not generalize to individuals from other cultures or distinct American subcultures. This problem is particularly severe in the Deaf community, where the validity and reliability of diagnosed disorders are highly questionable (Black & Glickman, 2006). This problem is due to a variety of different factors: (a) the extreme heterogeneity of deaf individuals, (b) a virtual absence of valid and reliable measures, (c) a general lack of research with Deaf individuals, and (d) a shortage of qualified, culturally and linguistically competent mental health professionals who provide services to this community. When working with culturally Deaf individuals, clinicians and researchers not only have to have an in-depth understanding of mental health issues and sign language fluency, but also, as pointed out by Glickman (2003) and Pollard (1996), knowledge of the biological, developmental, educational, vocational, legal, social, and cultural aspects of deafness.

Although definitive statements cannot be made at this time, some factors that increase a person’s vulnerability to trauma appear to be especially prevalent among deaf individuals (Gallaudet Research Institute, 2001; Gulati, 2003; Sullivan et al., 1987). For example, it has been well established in the scientific literature that deaf people are exposed to interpersonal traumas at a much higher rate than hearing people (Sullivan & Knutson, 1998; Sullivan,

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Vernon, & Scanlan, 1987; Vernon & Miller, 2002). Sexual abuse history has been identified in as many as 50% of deaf children as compared to 10% to 25% of hearing children (Sullivan et al., 1987; Vernon & Miller, 2002).

Other than a small number of studies that have examined trauma responses in deaf people (e.g., Dobosh, 1999; Sullivan & Knutson, 1998), most of the findings thus far are anecdotal in nature. No identifiable research exists that examines the core symptoms of psychological trauma or the appropriateness of the current criteria for the diagnosis of PTSD with people who are deaf. A review of the literature only located two studies on PTSD prevalence rate within the deaf adult population. Black and Glickman (2006) reviewed the hospital records of 64 deaf individuals who were psychiatrically institutionalized, finding a higher rate of PTSD in the deaf as opposed to the hearing community (29.7% vs. 6.6%, respectively) when clinical interview was used as the means for diagnosis. Dobosh (1999), in her unpublished dissertation evaluating 81 deaf individuals, 33 without and 48 with a sexual abuse history, reported greater severity of symptoms within the trauma-exposed deaf adults compared to published scale norms on the Trauma Symptom Inventory. Neither study provided a thorough investigation of trauma prevalence in general. Dobosh (1999) inquired solely about sexual trauma, while Black and Glickman (2006) were limited in their capacity to compare trauma histories by the lack of routine trauma assessment within their deaf sample. Therefore, while there is reason to suspect that both trauma prevalence and severity of traumatic symptoms might be higher in the deaf community, no research to date has specifically tested the exposure-symptom relationships.

Differences may exist in the manifestation of signs and symptoms of psychopathology in hearing and deaf individuals, as Pollard (1998) and Vernon and Andrews (1990) cautioned. Gulati (2003) has observed that many deaf trauma survivors display a range of unusual and bizarre symptoms, and the current diagnostic criteria for PTSD may not fully capture the symptoms displayed by deaf individuals. Thus, despite higher trauma exposure, it is possible that traditional PTSD scales, normed entirely on hearing adults, will underestimate traumatic symptoms in deaf individuals, leading to fewer total PTSD positive scores.

The role of dissociation in the deaf traumatized population has been entirely neglected as an area of study. Dissociation in hearing populations is highly correlated with PTSD (Carlson et al., 2001). Further, there is reason to believe theoretically that the deaf population might be at particular risk for dissociative symptoms. If information cannot be shared and must remain private, Freyd (1994) proposes that it is less likely to become represented and organized into more conscious, discrete, and readily accessible units. Thus, the person who lacks social confidants and expressive language skills, or who is incapable of accessing other social resources—all more likely to be descriptive of deaf adults relative to hearing adults—is at greater risk for developing dissociative symptoms (Freyd, 1994).

It was hypothesized that the current deaf adult sample would show more dissociative symptoms, but less PTSD as defined by traditional measures than would hearing samples. However, parallel to hearing samples, it was predicted that PTSD scales would show convergent validity and would relate to trauma exposure. Relationship among the PTSD clusters also was examined, with a

prediction of the positive contribution of each cluster to the full diagnosis.

Method

Translation Procedure

All written questions were translated according to established guidelines (Mason, 2005; Montoya et al., 2004). A glossed version of all written items was created. Subsequently, the ASL translations were videotaped and a bilingual research assistant, who was a native ASL user and unfamiliar with the original written measures, translated the videotaped version back into English. Since most test items conveyed simple concepts (e.g., nightmares and not feeling happy), the first back-translations revealed that most items were translated accurately. The few items that were either misunderstood or not clearly signed were revised. At the conclusion of this process, a second bilingual research assistant, who was also a native ASL user, translated the improved ASL translations back into English until both versions were semantically equivalent.

The translations were conducted to ensure that deaf research participants with poor reading abilities were able to comprehend each test item. Before responding to a test item, participants were asked to look at the standardized ASL translation, which was signed by the first author and investigator, who was a doctoral level clinician, with the option of looking at the original English sentence. The live ASL translation provided to the participants of this study may have also had additional benefits, including: (a) allowing participants to ask for clarifications if needed; (b) allowing the researcher to better adjust to the participants' language level; (c) quicker response speed, thus allowing for a shorter test administration times; and (d) reduction in the likelihood that participants skipped or left test items unanswered.

Recruitment. This study was advertised in the Deaf community as a validation study for a new psychological measure. In order to obtain an unbiased population sample, the type of measure to be validated was disclosed and explained to participants after they expressed interest in the study. There were no dropouts after disclosure of the trauma focus of the study. Recruitment occurred in Southern and Central California at various Deaf organizations, college campuses, Deaf social events, and other establishments where deaf individuals were known to congregate. Each participant received \$20 for his or her participation.

Testing procedures. After obtaining informed consent, participants' sign language comprehension was evaluated. Participants who reported little or no signing ability or who were observed to struggle to comprehend the Informed Consent Agreement were dismissed from the study without losing the study incentive. Participants completed the Life Event Checklist (LEC), the Clinician Administered PTSD Scale (CAPS), the Peritraumatic Distress Scale (PDST), the Trauma Symptom Inventory (TSI), the Somatoform Dissociation Questionnaire (SDQ), Peabody Individual Achievement Test—Revised (PIAT—R), the Interpersonal Support Evaluation List (ISEL) and a Socio-Demographic Questionnaire. Adjustments to these measures to accommodate deaf adults are listed below. Testing required between 2 [1/2] and 5 hours. The low trauma group in this research was defined as those who reported no *DSM-IV* criteria A1 traumas as measured by the LEC and the PDST (see later section).

Measures

The Life Events Checklist (LEC). The LEC is a 17-item self-report checklist that assesses direct and indirect exposure to a variety of potentially traumatizing events (Blake et al., 2000). For the purpose of this study, minor changes were made to the LEC. First, the 5-point nominal scale (1 = happened to me, 2 = witnessed it, 3 = learned about it, 4 = not sure, and 5 = doesn't apply) was changed to a 4-point nominal scale (1 = happened to me, 2 = saw it happening to someone else, 3 = learned that it happened to someone else, 4 = didn't happen). This change was implemented to avoid confusion. Second, participants were also asked to report the number of times each event occurred and his or her age at the time of the event.

Clinician Administered PTSD-Scale (CAPS). The CAPS is a structured clinical interview, which assesses the 17 PTSD symptoms as outlined in the *DSM-IV-TR*, in addition to 8 associated trauma features (Blake et al., 2000). Over the years, the CAPS has become the "gold standard" for PTSD assessment (Briere & Scott, 2006). Interrater reliability was assessed for 10 individuals by the first author and a licensed clinical psychologist—both of whom were fluent in American Sign Language. Reliability coefficients were .99 for the three PTSD clusters (B, C, and D) and the PTSD total score.

Translation procedures for the CAPS were similar to the other written measures. CAPS items were translated into ASL and a glossed ASL version was created. Each item was translated as closely as possible to the English meaning in an effort to remain faithful to the original item. However, it became clear that many deaf individuals, especially those unfamiliar with psychological concepts, would have difficulty with item comprehension. Therefore, several real life examples were added to the already existing examples to further increase comprehension.

Peritraumatic Distress Scale (PDST). The PDST is part of the Detailed Assessment of Posttraumatic Stress (DAPS), which is designed to evaluate trauma exposure and posttraumatic response in adults (Briere, 2001). The eight-item PDST scale was specifically developed to evaluate detailed information about emotional distress during (or soon after) a traumatic event. Three test items consistent with *DSM-IV* PTSD criteria A2 were simplified to allow for clear and accurate ASL translations. Item 1 originally asked: "At the worst point, how much *fear* did you feel during this experience?" This question was simplified to "How much fear did you experience?" Item three, which evaluates horror, was eliminated because the concepts of "fear" and "horror" in ASL cannot be clearly distinguished. The PDST scale was completed for the three most distressing events identified on the LEC. In order to meet *DSM-IV* criteria for this study, an event must have received a score of 4 or above on one of the PDST A2 scale items.

Trauma Symptom Inventory (TSI). The TSI is a 100-item self-report measure, which assesses acute and chronic trauma symptoms in adults. The TSI consists of 10 clinical and three validity scales. The clinical scales are Anxious Arousal (AA), Depression (D), Anger/Irritability (AI), Intrusive Experiences (IE), Defensive Avoidance (DA), Dissociation (DIS), Sexual Concerns (SC), Dysfunctional Sexual Behaviors (DSB), Impaired Self-Reference (ISR), and Tension Reduction Behavior (TRB) scales. The three validity scales assess denial of symptoms (Response Level; RL), unusual or bizarre symptoms (Atypical Response; AR)

and inconsistent or random response patterns (Inconsistent Response; INC) (Briere, 1995). The reliability coefficients for the clinical scales range from .74 to .94 for the hearing norm sample (Briere, 1995), and from .70 to .89 for deaf individuals (Dobosh, 1999). Both Briere (1995) and Dobosh (1999) report strong evidence for construct validity.

Somatoform Dissociation Questionnaire (SDQ). The SDQ is a 20-item self-report measure that assesses the dimensional construct of somatoform dissociation (Nijenhuis, 2004). Somatoform dissociation refers to disturbances of sensations, movement, and other bodily functions. Reliability coefficients are excellent, ranging from .95 to .96 (Nijenhuis, 2004). The convergent validity between the SDQ-20 and other measures of psychological dissociation has been found to be adequate.

For the purpose of this study, one SDQ-20 item was reworded and two items were completely eliminated in order to avoid any hearing biases. No. 18, "I cannot speak (or only with great effort) or I can only whisper," was changed to "I cannot sign (or only with great effort)." Item No. 3, "I hear sounds from nearby as if they were coming from far away," and No. 11, "I cannot hear for a while (as if I am deaf)," were completely eliminated. The SDQ-20 rating scale and the assessed time frame were changed in order to maintain consistency with the TSI. Specifically, the new response format was changed from 1 (not at all) to 5 (extremely) to a scale ranging from 0 (Never) to 3 (Often). In addition, the assessed time frame was shortened from "in the past year" to "in the past 6 months."

Peabody Individual Achievement Test—Revised (PIAT-R). The PIAT-R is an 82 item individually administered achievement test (Markwardt, 1992). For the purpose of this study, only the reading comprehension subtest was administered. Testing is discontinued once a participant scores 5 errors within 7 consecutive responses. This discontinue rule and the multiple-choice format make this reading comprehension test ideal for individuals with limited language and expressive skills (Markwardt, 1992).

Socio-Demographic Questionnaire (SoDe-Q). The SoDe-Q was used to collect information about each participant's background. The SoDe-Q was developed to assess three main areas: (a) general demographic information, (b) deaf specific information (e.g., degree of hearing loss), and (c) use of alcohol and illicit drugs.

Interpersonal Support Evaluation List (ISEL). From the 40 items of the ISEL (Cohen, Mermelstein, Kamarck, & Hoberman, 1985), two appraisal, two tangible support, and two belonging support items were selected. Several items were simplified and reworded to ensure better reading comprehension. In addition, the response format was changed from a dichotomy (i.e., probably true and probably false) to a 5-point Likert scale ranging from "strongly disagree" to "strongly agree." The 6-item and original version was administered to a sample of 17 traumatized adults (7 males and 10 females, Mean age 40.47, *SD* = 15.20) who were involved in group therapy for their past traumas. The correlation between the two measures was .93.

Results

Description of Sample

The sample consisted of 79 participants, 45 women and 34 men. The mean age for the entire sample was 40.8 years (*SD* =

16). The majority of the participants were White (58.2%) and heterosexual (82.3%). The non-Caucasian participants were Hispanics (19%), Blacks (11.4%), and other races (11.4%). Approximately half of the sample (53.2%) was currently in a relationship. Over 30% of the sample also reported additional disabilities, with ADHD/ADD and learning disability being most common. Over 94% of the participants grew up in hearing families where spoken language was the main mode of communication. As is typical for deaf samples, the median income was low (\$15,000 to \$30,000), with 38% of the sample being employed, and an additional 17.7% on disability. About a third of the sample (34.2%) reported a high school education or less. Descriptive details about deafness-related variables are in Table 1. The 22 low-trauma and 57 high trauma individuals did not differ on any of the demographic variables.

All participants reported at least one LEC event. The most commonly reported experienced negative events were transportation accidents (75.9%), unexpected death of someone close (74.7%), physical assault (72.2%), and natural disaster (67.1%). The most commonly witnessed adverse events were physical assault (62%), life threatening illness or injury (60.8%), transportation accident (54.4%), and fire or explosion (48.1%). The low and high trauma groups were significantly different on the number of types of negative events experienced on the LEC ($M = 4.55$ and $M = 6.81$, SD 's = 2.50 and 2.34; $t = 3.66$, $p < .001$).

Trauma exposure and trauma symptoms. Hearing loss and age of hearing loss were not related to trauma symptoms. As predicted, there was a significant positive correlation between number of personal adverse events experienced, as measured by the LEC, and trauma symptoms, as measured by the CAPS, $r = .42$, $p < .01$, and the TSI, $r = .40$, $p < .01$. Number of adverse events experienced also correlated with both dissociation mea-

asures: SDQ, $r = .40$, $p < .01$, and TSI Dissociation, $r = .23$, $p < .05$.

Comparison of rates of PTSD in deaf and hearing samples.

Using the original CAPS scoring rule, 19.5% were classified as meeting diagnostic criteria for PTSD. PTSD in the hearing population occurs in approximately 25% to 30% of traumatized individuals (Carlson, 1997). Since this deaf sample was multitraumatized, the 19.5% was compared to the upper bound of the PTSD rates reported by Carlson (1997), that is, 30%. Using z for the binomial, results indicated that the prevalence of PTSD in this deaf sample was significantly lower than prevalence rates among hearing individuals ($z = 2.02$, $p < .05$).

Among the PTSD positive subjects, over half were male (53.3%), nonwhite (60%), between ages 31 and 50 (53.3%), and had an additional disability (60%). In addition, one third (33.3%) were also nonheterosexual. Chi-square indicated significant PTSD versus no PTSD differences for disability status, $\chi^2(1, N = 77) = 7.22$, $p < .01$, and sexual orientation (i.e., heterosexual, homosexual, and bisexual/questioning), $\chi^2(2, N = 79) = 11.06$, $p < .005$. There was also a marginally significant difference for race (i.e., White vs. Black and Hispanic) $\chi^2(1, N = 68) = 2.88$, $p < .09$. PTSD was present for 18.5% of heterosexuals ($n = 63$), 11.1% of homosexuals ($n = 9$), and 80% of those who were bisexual or questioning of their sexual orientation ($n = 5$).

Group differences. The high trauma group had significantly more symptoms of reexperiencing, avoidance/numbing, and hyperarousal than did the low trauma group, as measured by the CAPS (t 's > 4.43 , $p < .001$; see Table 2). The low and high trauma group also differed on most subscales of the TSI, including the Intrusive Experiences, Defensive Avoidance, and Anxious Arousal subscales of the TSI. In addition, 32% of the high trauma group and 4% of the low trauma group reported a history of substance abuse ($\chi^2 = 6.53$, $p < .001$).

Table 1
Frequencies and Percentages for Deafness Variables by Group

Demographic variables	Entire sample <i>n</i> (%)	Low-trauma <i>n</i> (%)	High-trauma <i>n</i> (%)	χ^2
Degree of hearing loss				ns
Moderate-severe (61–70db)	12 (15.2%)	3 (25%)	9 (75%)	
Severe (71–89db)	23 (29.1%)	6 (26.1%)	17 (73.9%)	
Profound (90 + db)	44 (55.7%)	13 (29.5%)	31 (70.5%)	
Age at onset of HL loss ^a				
Birth	19 (24.7%)	4 (21.1%)	15 (78.9%)	ns
1st & 2nd year (1–24 months)	39 (50.6%)	12 (30.8%)	27 (69.2%)	
3rd–8th year (25–96 months)	19 (24.7%)	5 (26.3%)	14 (73.7%)	
Cause of hearing loss				ns
Genetic	11 (13.9%)	0 (0%)	11 (100%)	
Childhood disease/illness	34 (43%)	10 (29.4%)	24 (70.6%)	
Other ^a	16 (20.3%)	5 (31.3%)	11 (68.7%)	
Unknown	18 (22.8%)	7 (38.9%)	11 (61.1%)	
Preferred mode of communication used currently				
Signing ^b	75 (94.9%)	22 (29.3%)	53 (70.7%)	ns
Orally & Lipreading English	4 (5.1%)	0 (0%)	4 (100%)	
Hearing status of parent				ns
Hearing	75 (94.9%)	21 (28%)	54 (72%)	
Deaf	4 (5.1%)	1 (25%)	3 (75%)	

^a Other included head trauma, medication, and maternal illness. ^b Signing included ASL, Pidgin Sign English, and Total Communication.

Table 2
Differences Between High and Low Trauma Individuals on the CAPS, TSI, & SDQ

	Low trauma Mean (SD)	High trauma Mean (SD)	<i>t</i>
CAPS			
Cluster B	1.00 (2.00)	7.98 (6.96)	6.79***
Cluster C	2.90 (5.13)	11.00 (9.10)	4.90***
Cluster D	2.05 (4.19)	8.09 (7.57)	4.43***
Total	5.95 (8.90)	27.07 (20.32)	6.33***
TSI			
Atypical Response	53.23 (11.22)	62.47 (17.67)	2.76*
Response Level	52.09 (8.38)	47.44 (6.42)	2.64**
Inconsistent Response	54.14 (11.07)	59.82 (13.90)	1.72^
Anxious Arousal	46.18 (6.80)	52.19 (9.16)	2.79**
Depression	47.68 (7.57)	54.60 (10.98)	3.18**
Anger/Irritability	46.77 (8.42)	54.30 (11.88)	2.71**
Intrusive Experiences	47.55 (8.43)	55.51 (9.77)	3.37***
Defensive Avoidance	47.73 (7.27)	57.12 (10.02)	4.00***
Dissociation	52.64 (7.27)	56.54 (12.19)	1.75^
Sexual Concerns	47.05 (7.27)	53.09 (11.14)	2.83**
Dysfunctional Sexual Behavior	54.18 (10.06)	58.39 (12.79)	ns
Impaired Self-Reference	52.68 (8.41)	57.40 (12.78)	1.91^
Tension Reduction Behavior	53.73 (9.63)	61.11 (15.79)	2.52**
IE, DA, & AA Total	141.45 (19.47)	164.82 (24.18)	4.05***
SDQ			
Total	1.10 (2.14)	3.24 (3.77)	3.09**

^ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Internal structure of the PTSD diagnosis. Using a logistic regression, the three PTSD clusters were entered as the predictors with the presence of PTSD, as defined by the CAPS original scoring rule, the criterion. The Nagelkerke R^2 was .74 and correctly classified 92.2% of all PTSD cases. Both hyper-arousal symptoms (CAPS cluster D; $\beta = .32, p < .002$) and avoidance and numbing symptoms (CAPS cluster C; $\beta = .19, p < .01$) significantly contributed to the prediction of PTSD. The reexperiencing cluster (CAPS cluster B) did not uniquely contribute. The reexperiencing cluster correlated with the avoidance cluster ($r = .66, p < .001$), and the hyperarousal cluster ($r = .69, p < .001$). The avoidance cluster correlated with the hyperarousal cluster ($r = .59, p < .001$).

Table 3 presents the correlations between the five reexperiencing symptoms, the seven avoidance symptoms, and the five hyper-arousal symptoms with the cluster totals and PTSD (as defined by the CAPS original scoring rule). The base rate of each item for individuals who met and did not meet full criteria is presented. Each symptom correlated with the respective subtotals and PTSD, with the exception of C3 (the inability to recall an important aspect of the trauma).

To match the age groups reported by Briere (1995), subjects were divided according to age (above and below 55) and gender. The data is presented in Table 4 for men and women who were 54 years of age or younger. This sample contained an inadequate number of older male and female participants to allow analysis. Two of the three validity scores on the TSI (i.e., ATR and INC) were significantly higher for the deaf sample. Both females and male deaf samples scored higher than hearing norms on most scales.

TSI validity scale scores are considered invalid for ATR T scores at or above 90, RL T scores at or above 73, and INC T

scores at or above 75 (Briere, 1995). Approximately one third (i.e., 32.4%) of the deaf male participants and 8.9% of the deaf female participants scored in the range that would invalidate their profiles. Further, there was an inverse relationship between English language skills, as defined by the PIAT-R Reading Comprehension score, and atypical symptoms (ATR; $r = -.30, p < .01$), inconsistency (INC; $r = -.27, p < .05$), and denial of common symptoms (RL; $r = -.23, p < .05$) scales.

Convergent validity correlations. The CAPS subscales correlated quite significantly with the comparable TSI subscales. CAPS cluster B correlated with TSI intrusive experiences ($r = .64, p < .01$), CAPS cluster C correlated with TSI defensive avoidance ($r = .64, p < .01$), and CAPS cluster D correlated with the TSI anxious arousal ($r = .70, p < .01$). All TSI scores and all CAPS clusters had acceptable internal consistency (alphas $> .69$). However, as predicted, the overall alpha coefficient for the 17 CAPS symptoms ($\alpha = .87$) was significantly lower ($z = -2.31, p < .05$) than the published alpha coefficient of .94 to .95 for hearing individuals (Blake et al., 1995; Hyer, Summers, Boyd, Litaker, & Boudewyns, 1996). To assess the discriminant validity of the CAPS, the individual CAPS clusters and the CAPS total score were correlated with each participant's reading score on the PIAT-R, with nonsignificant results (r 's $< .10, ns$).

Supplemental Analyses

Using the CAPS versus the TSI to determine PTSD. Using the clinically significant cut-off score of 65, only 6.7% ($n = 1$) of all people who had PTSD according to the CAPS were correctly classified as having PTSD according to the TSI, although the TSI made no false positive diagnoses. The percentage of correctly classified individuals increased to 66.7% ($n = 10$) when the cut-off

Table 3
Correlations Between the PTSD Symptoms and the Total Cluster Scores

					Base-rate ($n = 77$)	
	B-Total	C-Total	D-Total	PTSD	Criteria met ^a n (%)	Criteria not met n (%)
B1	.84**	.66**	.56**	.47**	23 (29.9%)	13 (16.9%)
B2	.52**	.28*	.41**	.35**	22 (28.6%)	4 (5.19%)
B3	.73**	.50**	.47**	.39**	13 (16.9%)	4 (5.19%)
B4	.77**	.48**	.54**	.45**	25 (32.5%)	6 (7.79%)
B5	.67**	.39**	.49**	.34**	9 (11.7%)	4 (5.19%)
C1	.64**	.73**	.48**	.55**	31 (40.3%)	37 (48.1%)
C2	.40**	.69**	.55**	.56**	22 (28.6%)	29 (37.7%)
C3	.17	.37**	.04	.06	15 (19.5%)	16 (20.8%)
C4	.63**	.64**	.51**	.38**	17 (22.1%)	24 (31.2%)
C5	.27**	.63**	.33**	.23*	18 (23.4%)	24 (31.2%)
C6	.41**	.76**	.31**	.42**	14 (18.2%)	18 (23.4%)
C7	.39**	.50**	.28*	.25*	8 (10.4%)	8 (10.4%)
D1	.31**	.32**	.61**	.38**	22 (28.6%)	26 (33.8%)
D2	.54**	.45**	.85**	.71**	20 (26%)	21 (27.3%)
D3	.52**	.45**	.59**	.48**	19 (24.7%)	21 (27.3%)
D4	.53**	.44**	.64**	.29*	16 (20.8%)	27 (35.1%)
D5	.48**	.34**	.70**	.57**	11 (14.5%)	13 (16.9%)

Note. a = Number of participants with each symptom who met full criteria for the cluster (i.e., Frequency = 1; Intensity = 2).

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

score was lowered to a T score of 50. However, 14% of the sample was identified by this cutoff as positive for PTSD when the CAPS score was negative.

Discussion

The purpose of this research was to validate the CAPS for the use with deaf individuals and to explore trauma symptoms in this highly underserved population. As the results revealed, all participants endorsed events that were potentially traumatizing. There was no gender difference on type or amount of traumatic events experienced. The high incidence rate is consistent with other reports of elevated rates of trauma among people with physical or

mental disabilities or ethnic minority groups, including Hallam, Ashton, Sherbourne, and Gailey's (2006) sample of participants with acquired hearing loss, Nosek, Foley, Hughes, and Howland's (2001) sample of women with physical disabilities, and Manson, Beals, Klein and Croy's (2005) sample of Native Americans. As these studies have shown, minority status may increase vulnerability and likelihood of trauma exposure and traumatization.

Specific Traumas in the Lives of Deaf People

Within this sample, 76.6% of men and 64.4% of women had experienced a natural disaster in their lifetime. In addition, 23% of individuals endorsed the occurrence of a natural disaster as one of

Table 4
Mean Scores Differences Between Deaf and Hearing Participants (Ages 18 to 54)

	Deaf females ($n = 34$)			Deaf males ($n = 29$)		
	M	SD	t	M	SD	t
ATR	3.97	4.14	3.28**	4.76	4.92	3.92***
RL	1.47	1.40	-1.75 [^]	2.14	1.88	-.26 ^{ns}
INC	5.71	3.07	3.54***	6.24	4.14	3.78***
AA	7.47	3.94	-.31 ^{ns}	6.52	4.23	.19 ^{ns}
D	7.59	6.14	.46 ^{ns}	7.34	5.23	2.41*
AI	9.65	6.51	1.20 ^{ns}	8.45	6.83	.60 ^{ns}
IE	7.12	4.93	1.28 ^{ns}	6.69	5.76	2.32*
DA	10.53	6.17	3.18**	7.55	5.77	1.80 [^]
DIS	7.79	5.71	2.38*	7.62	4.54	3.74***
SC	4.56	5.79	.50 ^{ns}	5.90	6.11	1.41 ^{ns}
DSB	4.59	6.00	2.23*	7.59	6.42	4.42***
ISR	9.76	6.86	2.81**	8.72	5.88	3.41**
TRB	5.18	4.91	3.00**	5.90	4.65	4.07***

[^] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

their three worst life events. These findings are substantially higher than the findings by Kessler, Sonnega, Bromet, and Hughes (1995) and Norris (1992), who found that between 10.1% and 18.9% of men and between 11.9% and 15.2% of women had experienced similar natural disasters. Given that hearing losses are most prevalent in low income families and among individuals in rural areas (Holt et al., 1994), it is possible that deaf people are more likely to reside in areas with a higher likelihood of natural disasters. Language limitations and the inability to perceive auditory warning signals about imminent natural disasters may also render deaf people more likely to experience these events.

Sexual assault was reported by 20.6% of men and by 37.8% of women, in addition to the 38.2% of men and 42.2% of women who reported "other unwanted sexual experiences." Overall, 44.1% of men and 53.3% of women reported some kind of sexual abuse. These findings are substantially higher than reports of sexual abuse among the general hearing population. They are, however, consistent with the sexual abuse rates reported by Sullivan et al. (1987) for deaf children. It is possible the deaf population may be opportunistically exploited by perpetrators who may feel protected by a child's language limitations (Benedict, White, Wulff, & Hall, 1990). Further, limitations in language are often compensated in deaf children by enhanced use of touch, which may again render deaf children more vulnerable to exploitation. In addition, deaf children may also have limited access to information on appropriate sexual behaviors, abuse, and general safety measures (Ridgeway, 1993). Sadly, as pointed out by Ridgeway (1993), "many deaf children believe that abuse is part of being deaf" (p. 166).

Three-fourths of the sample also experienced physical assault (73.5% of men and 71.1% of women), which included being hit, slapped, beaten up, or kicked. Given that the majority of the sample (i.e., 64.2%) reported household incomes of less than \$30,000 annually, participants in this study may live in neighborhoods where exposure to assault is more common. Low income and neighborhood poverty are generally associated with increased risk for domestic and community violence, as well as with harsher child rearing practices (Field & Caetano, 2004).

Sixty-two percent of this sample endorsed events on the LEC in the "other" category. While detailed information about many of these events was not available, findings were consistent with Carlson (1997), who cautioned that many events associated with PTSD do not qualify as traumatic by current definitions. For example, two individuals (13.33%) who otherwise did meet diagnostic criteria for PTSD reported a stressor that fell outside the specified criteria in the *DSM-IV*. One of these events included the termination of a long-term relationship and one included severe financial struggles. This study therefore adds to previous research (e.g., Scott & Stradling, 1994) that questions the necessity of PTSD criteria A1.

It is likely that the deaf experience lowers the threshold for perceiving an event as traumatic. For example, the anticipated death of a loved one may be experienced as "traumatic" if the deceased was the primary source of social support and only means of communication with the world. This is consistent with Vernon and Andrews (1990), who observed that many deaf adults are likely to suffer from PTSD if they lose a parent or caregiver on whom they depend.

Information Deprivation Trauma (IDT)

Although no formal analysis of this data was conducted, a theme emerged from this study that has not been adequately addressed in previous research: *Information Deprivation Trauma* or *IDT*. *IDT* is defined here as an event that is experienced as traumatic or more traumatic because information or knowledge about the event is limited or not available. The lack of information increases factors that have been found in the trauma literature to relate to traumatization, such as suddenness, unpredictability, and uncontrollability (Carlson, 1997; Carlson & Dalenberg, 2000). For instance, many deaf people in this study reported their first earthquake, which in most cases was a minor incident without any injuries or destruction, as one of their three worst life experiences. The lack of information or knowledge about this naturally occurring event made it less predictable and less controllable. The deaf individual may be unable to glean information from the radio about the extent of the disaster and maybe was unable to obtain information about the well-being of family members. This is consistent with other studies that found that prior knowledge about a trauma had a desensitization effect and was an important part of the recovery process (Kalayjian, Kanazi, Aberson, & Feygin, 2002; Norris & Murrell, 1988).

Several participants expressed that they were uninformed, in some cases for years, about the tragic death of a close relative. Once informed about the event, their emotional responses were overwhelming. Other people reported being traumatized because people withheld information about an imminent brushfire, which threatened their home. Discussing these instances of *IDT* frequently elicited strong emotional reactions during the clinical interview. Further studies are needed to explore the potential influence of *IDT* on traumatization.

Vulnerability Factors

In this study, trauma symptoms were associated with amount of trauma exposure, race/ethnicity, sexual orientation, additional disability, prior substance abuse, social support, and language deficits. In this sample, 60% of all people who met PTSD criteria were non-White. These findings are consistent with other research suggesting an increased vulnerability to PTSD among ethnic minorities (Allen, 1996; Hough, Canino, Abueg, & Gusman, 1996). Further, although only 6.5% of the sample did not identify as homosexual or heterosexual, this group constituted one quarter (26.7%) of all PTSD positive individuals. The increased vulnerability among sexual minorities within the deaf community may be due a lack of education and understanding about sexuality and sexual identity (Gannon, 1998; Robinson, 1979).

Sixty percent of all PTSD positive individuals had an additional disability such as ADHD/ADD and learning disabilities, as compared to 21% of PTSD negative individuals. Thus, this study is consistent with other research that found that psychological or psychiatric disorders increase a person's vulnerability to developing trauma-related symptoms (Adler, Kunz, Chua, Rotrosen, and Resnick, 2004; Ozer, Best, Lipsey, and Weiss, 2003). Consistent with other studies, PTSD positive individuals were also more likely to report a previous drug or alcohol problem (Najavits, Weiss, and Shaw, 1997) and lack a social support system (Ozer et al., 2003). Surprisingly, slightly more men (53.3%) than women

met criteria for PTSD, which is in stark contrast to research with hearing samples (Breslau et al., 1998; Kessler et al., 1995). In hearing samples, variance in PTSD rates is frequently accounted for by the types of trauma experienced. Among deaf people, however, there was no gender difference for any of the traumatic events. For example, sexual abuse, which is frequently credited with increased rates of PTSD among women, occurred relatively equally among men (44.1%) and women (53.3%).

Trauma Symptoms

Comparing the TSI results of this study to the TSI standardization scores, several significant differences were found favoring higher trauma symptoms in the deaf sample. These higher scores are likely the reflection of more trauma symptoms among this multitraumatized deaf sample; however, other explanations cannot be completely dismissed. It is possible that the elevated scores may be due to: (a) a cultural difference in labeling affective or behavioral states, (b) an artifact of the test and/or testing procedure (Dobosh, 1999), or (c) potential translation errors. The last explanation is rendered less likely since strict translation procedures were followed. In addition, these elevations were found regardless of whether the test was administered in ASL (as in this study) or in English as in Dobosh's (1999) study.

Deaf individuals who were between ages 18 and 54 also reported significantly more symptoms of dissociation, as measured by the TSI dissociation scale, than hearing people from the standardization sample. These findings are consistent with Dobosh (1999), who examined a sample of deaf sexual abuse survivors. Interestingly, there were only marginally significant differences between the low and high trauma group and a nonsignificant correlation between the amount of trauma experienced and dissociation. In other words, deaf people in general, regardless of trauma exposure and level of traumatization, were more likely to dissociate than hearing people. In this sample, only 1.8% of the variance in dissociation was explained by the amount of trauma exposure alone, which is slightly lower than the 4.4% reported by Briere, Scott, and Weathers (2005). It is possible that early language deprivation and social isolation may have increased a deaf individual's overall vulnerability for dissociation.

Although definite statements about their potential influence on dissociative symptoms cannot be made at this time, Freyd's (1994) shareability theory provides some support for this assumption. As the theory proposes, it is necessary to share traumatic experiences in order to organize them into more readily accessible units. One frequently voiced frustration of parents of deaf children is the ease with which they may refuse to know (by looking away and refusing to see). Such behavior may be a precursor to dissociation (Stern, 1997).

TSI dissociation in this sample was also significantly correlated with somatoform dissociation as measured by the SDQ. Thus, this study provides the first empirical evidence that deaf people who are more likely to dissociate are also more likely to experience unexplained physical symptoms. The SDQ was also significantly correlated with trauma exposure.

Posttraumatic Stress Disorder

PTSD appears to be manifested differently among the deaf population as reflected by the lower prevalence rates, different

predictors for the disorder, lower alpha coefficients, and different symptom constellation. In this multitraumatized sample, only 19.5% of all participants met the diagnostic criteria for PTSD, which was substantially lower than what would be expected (Carlson, 1997). The prevalence rates remained significantly lower even when less stringent inclusion criteria were used.

One possible explanation is that trauma symptoms in deaf people manifest in a different symptom constellation. This explanation seems likely given the relatively high base rates for some symptoms and the fact that some participants did not meet criteria for PTSD despite elevated CAPS scores. Another possible explanation is that people simply fell short of the full diagnostic criteria for PTSD because they were experiencing chronic, as opposed to acute, symptoms. One participant, for example, expressed that he had been diagnosed with PTSD in the past (which was also reflected in his elevated scores on all three TSI subscales), but he did not experience any reexperiencing symptoms in the past month, and thus fell short of the full PTSD criteria. This is consistent with findings from McFarlane (1988), who found that reexperiencing symptoms are generally the first symptoms to disappear during the course of the disorder. In this study, only avoidance/numbing and hyperarousal symptoms significantly contributed to predicting the presence of PTSD—reexperiencing symptoms did not. In other words, using reexperiencing symptoms as indicators of PTSD alone would likely misdiagnose deaf individuals and significantly underestimate the presence of the disorder among this population.

Preliminary findings also suggest that certain items with the PTSD criteria might not be predictive within the deaf population. Reactivity to internal and external cues (B5) and feelings of detachment from others (C5) certainly may be more common in the overall deaf population than the hearing population. For example, exaggerated startle response is most commonly triggered by noise (Wilson, 2004). Hearing, which is a relatively passive process (Braden, 1994), may trigger startle reactions much easier than visual cues, which are also easier to avoid. In other words, deaf people may simply avoid situations that could provide a visual reminder of their trauma, and therefore report fewer trauma-related startle reactions. Other triggers, such as tactile stimulation, temperature, pain, and aversive or conditioned odors (van der Kolk, 1996) may also be easier avoided than auditory cues, or they may simply be less common among deaf people.

Clinical Implications

Selection of a PTSD measure. Findings from this study suggest that the CAPS is a more sensitive measure of PTSD in deaf people than is the TSI. Although the convergent validity for the two tests was in the expected range, differences emerged when each measure was used to determine the presence of PTSD. According to the CAPS, 19.5% of this sample met PTSD criteria. According to the TSI, using the suggested cut-off score of 65 (Briere, 1995), only 2.5% of the sample ($n = 2$) was classified as having PTSD. The TSI cut-off score had to be lowered to the mean of 50 in order to allow for two thirds (66.7%) of the CAPS PTSD positive individuals to be classified correctly. This finding reemphasizes Carlson's (1997) point regarding the importance of using self-report measures solely as screens for a clinical diagnosis followed up by clinical interview.

A further problem with the self-report measure was that the majority of the deaf male participants (i.e., 64.7%) and a third of all deaf female participants (i.e., 35.6%) had elevated validity scores at or above a *T* score of 65, often in the invalid range. Potentially invalid scores, however, were only obtained for unusual or bizarre symptoms (ATR) and for inconsistent or random response patterns (INC). Elevated scores on the RL scale, which are generally indicative of defensive, avoidant, and oppositional test taking behaviors (Briere, 1995), were not observed. Further, there was an inverse relationship between English language skills and the three validity scales. Importantly, Briere (1995) states that elevated INC scores are frequently due to poor attention/concentration and/or dissociation, as reflected in the significant correlation between dissociation and INC in this study. Since the TSI standardization sample did not include any deaf individuals (Briere, 1995), it is currently impossible to determine whether the elevated ATR and INC scores reflect invalid TSI profiles or more severe posttraumatic symptoms.

Limitations of the Study

This study was limited to traumatized deaf individuals with chronic trauma symptoms that were experienced for many months, and in some cases, even years. Chronic trauma symptoms are frequently not captured by the construct of PTSD (Herman, 1992), and PTSD symptoms are known to wax and wane over the course of the disorder (American Psychiatric Association, 2000). These reasons may account for the lower observed PTSD rates.

Another shortcoming that might limit the interpretation of some findings is that this study did not contain a no-trauma control group. Overall, this study found that the more traumatized a person was, the more trauma symptoms he or she reported. However, the nonsignificant (e.g., dysfunctional sexual behavior) and marginally significant (e.g., dissociation and impaired self-references) findings between the low and high trauma group are difficult to interpret because the low-trauma group may have already reached a threshold for traumatization.

Despite the great diversity of this sample, another limitation was that certain subgroups within this sample were either underrepresented or not included. For example, certain ethnic groups (e.g., Asian Americans, Native Americans, Multiethnic individuals), individuals over 54, postlingually deaf individuals, and deaf people from Deaf families were underrepresented.

In addition, there was a restriction of range with regard to language. This study was limited to individuals with at least functional language abilities (in both English and/or ASL). Therefore no statements can be made about the effects of trauma in deaf adults with limited or no language skills. Given the general difficulties in clinical assessment with high-functioning deaf adults (Glickman & Gulati, 2003), deaf individuals with limited language skills present a particular challenge and require a different type of assessment approach. In this study, there was an inverse relationship between reading skills and capacity to complete a valid TSI, suggesting possible language-based limitations in interpretation of trauma items even in ASL. Alternatively, reading level, on its own or as a proxy for intelligence, may be a buffering factor in trauma symptom development.

Conclusion and Directions for Future Research

Using qualitative approaches, such as semistructured interviews (Mitchell, Clegg, and Furniss, 2006) or metaphors, visual aids, or stories (Glickman, 2003) may be especially useful with this population and would allow a deeper understanding of their posttraumatic experiences. Even when assessed by a culturally and linguistically competent clinician, limited language skills and knowledge about psychological concepts is a major limitation in trauma assessment with deaf people. Therefore, future trauma studies may use psycho-physiological measures, such as increase in heart rate, skin conductance, and blood pressure, which have shown promising results and may be conducted with minimal use of language (Kaloupek & Bremner, 1996; Pole, 2007).

Close attention should also be given to the dissociative phenomena in deaf people. The work of Wright, Loftus, and Hall (2001), for instance, has shown in hearing populations that memory loss (a typical sign of dissociation) is greater in populations who are prevented from communicating about the trauma. In addition, future studies may examine factors suggested by Briere (2006), such as insecure attachment relationships, emotional neglect, panic attacks, and substance abuse, which may be especially prevalent among the deaf population.

Several studies employed prospective designs to study PTSD in hearing people (e.g., McFarlane, 1988). As Mezzich, Jorge, and Salloum (1994) pointed out, such designs “allow the possibility of investigating the unfolding of psychopathologic processes and testing etiologic hypotheses, pathogenic pathways of interest, prognostic considerations, lasting treatment effectiveness, patient trajectories, and outcomes of illness” (p. 137). The field of trauma and deafness would also benefit from such designs, since currently no information exists on the progression of the disorder in deaf people.

While there has been some evidence that deaf children display behavioral manifestation of their trauma (Sullivan & Knutson, 1998), to the best of the authors’ knowledge, the construct of PTSD has not been closely scrutinized on an individual symptom level. Anecdotal evidence, however, suggests that PTSD prior to the acquisition of language may manifest in an array of bizarre or unusual symptoms (Gulati, 2003). Studies that use PTSD specific measures for deaf children are therefore urgently needed.

Despite the difficulties in collecting data with this population, this study highlighted the importance of conducting trauma research in general with this underserved population, as deaf people may not only experience more traumatic events than hearing people, but also may have additional symptoms. Much remains to be learned about incidence rates of trauma, vulnerability factors, general trauma symptoms, and PTSD among deaf people.

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