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Comparison Of The Ptsd Factor Structure Among Hispanics And Non-Hispanic Whites Affected By Hurricanes

Johanna E. Hidalgo
University of Vermont

COMPARISON OF THE PTSD FACTOR STRUCTURE AMONG HISPANICS AND NON-HISPANIC WHITES AFFECTED BY HURRICANES

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Johanna Esther Hidalgo

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Thesis Examination Committee:

Matthew Price, Ph.D., Advisor
Ellen Waxler McGinnis, Ph.D., Chairperson
Keith Burt, Ph.D
Kelly Peck, Ph.D.
Holger Hoock, DPhil, Dean of the Graduate College

ABSTRACT

The Hispanic population in the United States (US), is a growing segment of the US population. This group is vulnerable to developing posttraumatic stress disorder (PTSD) due to minority-related stressors, financial insecurity, and their concentration in coastal regions prone to natural disasters. PTSD is a highly heterogeneous diagnosis with a complex factor structure. The factor structure within Hispanics may vary from Non-White Hispanic (NHW) individuals, the predominant group used in prior factor analytic work. Identifying such differences would inform culturally relevant theories of PTSD. Most prior research has focused on NHW samples or used DSM-IV criteria for Hispanics. The present study examined the PTSD factor structure in Hispanics after a natural disaster using the DSM-5 criteria. Invariance between Hispanics and NHW was also examined. The results of confirmatory factor analyses (CFA) indicated that the seven-factor Hybrid model exhibited superior model fit compared to the alternative models. There was strict invariance between Hispanics and NHW for this model. The findings suggest that a seven-factor hybrid model offers a reliable conceptualization of PTSD, and a more accurate assessment compared to extant models across Hispanics and NWHs.

Keywords: PTSD factor structure, Hispanics, adults, natural disaster

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CHAPTER 1: INTRODUCTION

The Hispanic population in the United States has rapidly grown since the 1990s, with a 211% increase in Hispanics residing in coastal shoreline counties (National Oceanic and Atmospheric Administration [NOAA], 2013; Park & Franklin, 2023). With rising extreme weather events over the last three decades, and many Hispanics living in areas highly susceptible to storm surge inundation, this population faces a disproportionate risk of developing PTSD due to natural disasters (Emanuel, 2005; Park & Franklin, 2023). Minority-related stressors experienced by Hispanics, such as being more likely to face financial displacement from these areas or limited support for evacuation compared to their generally more affluent and insured Non-Hispanic White (NHW) counterparts, further exacerbate this risk (Belkhir & Charlemaine, 2007; Donner & Rodríguez, 2008; Park & Franklin, 2023). However, it remains unclear if these disparities correspond to increased PTSD severity. Prior work exploring potential differences between the prevalence and severity of PTSD between Hispanic and other groups has reported mixed findings (López et al., 2017; Roberts et al., 2011). A potential cause for these differences is the heterogeneity inherent in PTSD (Galatzer-Levy & Bryant, 2013). Examining overall PTSD symptom severity alone may miss critical differences in the underlying factor structure between Hispanic and non-Hispanic individuals.

It is first important to acknowledge that the term Hispanic refers to a diverse group of individuals with some shared cultural attitudes and beliefs (Consoli et al., 2021; Mora, 2014). Prior work has shown there are commonalities in traditions, perceptions, values, and habits among individuals who identify as Hispanic (Cahill, Updegraff,

Causadias, & Korous, 2021; Clutter & Nieto, 2000). Thus, there is utility in using this broad categorization in studies while acknowledging it overlooks potentially meaningful nuances. These cultural contexts can play a significant role in the manifestation, maintenance, and presentation of PTSD (Sibrava et al., 2019). Research studies have shown that sociocultural factors such as spirituality, guiding values, or rituals can also provide a source of resilience (Fierros & Smith, 2006; Jocson et al., 2020). Given these shared characteristics, it suggests that individuals with a Hispanic cultural heritage may exhibit similar responses and coping mechanisms when faced with stressors and traumatic experiences, including those associated with PTSD. Thus, the present study will use the broad term Hispanic and focus on individuals living in the United States (US).

Minority Stress Theory

The minority stress model may explain the differences in PTSD severity and structure among Hispanics. The Minority Stress Theory (MST) posits that minority individuals face chronic stress due to stigma, discrimination, and prejudice, which can lead to adverse mental health outcomes (Findling et al., 2019; Pole et al., 2005; Sibrava et al., 2019). The MST has been adapted to understand how many minoritized groups are impacted by these minority stressors, such as Hispanics who have immigrated to the United States (Valentín-Cortés et al., 2020). For Hispanics in the United States, studies show a decline in mental health after immigration, with those born in the U.S. having worse mental health than their foreign-born counterparts (Grieb et al., 2023; Perreira et al., 2015; Perreira & Pedroza, 2019; Potochnick et al., 2017). One factor in this decline in mental health for Hispanics may be due to the minority stressors they encounter in the

United States. Roughly 33-50% of Hispanics reported that they experienced daily discrimination and lifetime exposure was estimate at 80% (Arellano-Morales et al., 2015; Findling et al., 2019; Perez et al., 2021). Chronic minority stressors are theorized to heighten the risk for emotion dysregulation, interpersonal difficulties, and maladaptive cognitions (Hatzenbuehler, 2009; Kaysen et al., 2021; Meyer, 2003) thereby elevating the risk for PTSD (King et al., 2008; Steele et al., 2009). The MST proposes that this community faces many unique challenges relative to their NHW counterparts that significantly increase the risk of PTSD diagnosis (Pole et al., 2005; Ruef et al., 2000; Sibrava et al., 2019).

Minority stressors play a role in the development and exacerbation of PTSD symptoms, among Hispanics. Individuals from the Hispanic community are more vulnerable to experiencing traumatic events due to a greater chance of prior trauma exposure, which includes migration and displacement due to war, political upheaval, and natural disasters (Davy, 2006). Additionally, this population experiences a disruption of cultural practices that would normally aid in healing and trauma recovery (Ruef et al., 2000). Migration often leads to a loss of protective social connections for displaced Hispanic families, further diminishing the social support that could help buffer PTSD symptoms related to negative affect and alienation (Cook et al., 2009). Negative encounters such as stereotyping or racial profiling can alter perceptions about self-worth or shame, leading to a sense of rejection and guilt which are associated with trauma-based cognitions (Seah & Berle, 2022), as well as, lead to avoidant behaviors and anxious arousal, which are characteristic of PTSD (Cole et al., 2024; Owens & Lynch, 2012; Zvolensky et al., 2022). Avoidance might include avoiding public authorities,

government officials, or enrolling in health insurance (Perreira & Pedroza, 2019; Potochnick et al., 2017). These stressors may result in a different presentation of PTSD than that observed in NHWs. This may also extend to potential differences in the factor structure of PTSD. Therefore, it is important to determine how the factor structure of PTSD differs between Hispanics and NHWs.

Impact of Natural Disasters

Natural disasters pose greater risk to Hispanics because of pre- and post-disaster risks. First, pre-existing minority stressors and limited resources increase their vulnerability before a disaster. Hispanic communities often have limited access transportation, adequate housing, and lack political representation, which impacts the existing resources in their area (Hernandez, 2023; Lewis et al., 2019). These factors can impede their ability to adequately prepare for natural disasters. Furthermore, many Hispanics live in disaster-prone areas such as flood prone areas, which compounds their risk (Bakkensen & Ma, 2020; Fox & Gull, 2017; Hernandez, 2023; Lewis et al., 2019). Due to limited financial recourse Hispanics are more likely to reside in flood-prone, high-risk zones susceptible to natural disasters, as these areas often provide more affordable housing (Bakkensen & Ma, 2020; Fox & Gull, 2017). Notably, 22% of Hispanics in the United States live in counties that have received federal disaster declarations due to flooding. Moreover, 44% of Hispanics reside in areas deemed at risk of flooding (Federal Emergency Management Agency [FEMA], 2023; Hernandez, 2023). In contrast, the non-Hispanic population exhibits relatively lower exposure, with only 10% living in counties impacted by declared flooding disasters and 35% residing in flood-prone areas (FEMA, 2023; Hernandez, 2023).

After a disaster, a new set of risks emerge. Studies have reported that after a natural disaster, 30-40% of the adults directly affected meet criteria for PTSD, with common symptoms being flashbacks, recurrent dreams, survival guilt, or hyper-vigilance (Galea et al., 2007). The psychological toll of minority stressors may exacerbate feelings of helplessness and fear during such events, further hindering effective coping mechanisms (Lewis et al., 2019). In particular, Hispanics may be more hesitant to seek out assistance due to anti-immigrant sentiment, which may lead to internalized stigma that may increase avoidance behaviors (American Public Health Association, 2006; Lewis et al., 2019; Méndez et al., 2020; Moyce et al., 2022). Internalized stigma refers to the process by which an individual accepts and internalizes negative societal perceptions and judgments, integrating them into their personal identity and self-worth (Meyer, 2003; Steward et al., 2008). Moreover, distrust in governmental support can prevent Hispanics from seeking federal disaster aid which prolongs the adverse impacts of the event. In a prior study, examining Hispanics and NHWs mental health outcomes after a disaster, Hispanics with direct personal disaster exposure were at greater risk of developing PTSD and depression diagnosis (Davidson et al., 2013). In comparison, their NHW counterparts who were impacted by a variety of factors (e.g., direct personal disaster exposure, property damage, and loss of services) that contributed to developing a PTSD diagnosis. These findings suggest that the effects of personal disaster exposure are amplified for Hispanics, potentially due to the interaction of economic disadvantages, minority stress, and systemic barriers, which impedes their access to resources and impairs recovery.

History of Factor Structure of PTSD

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IV/-TR) model (American Psychiatric Association [APA], 2000) had three clusters: (1) B: reexperiencing (intrusions), (2) C: avoidance and numbing, (3) D: hyperarousal (see Table 1 to review the clusters and 17 symptoms). A large body of work, however, suggested that an alternative structure had superior fit. Specifically, two competing models suggested that the cluster of hyperarousal could be divided into two distinct factors (Yufik & Simms, 2010). There was disagreement on which symptoms belonged to each factor, with two competing models evaluated in the literature.

Table 1
PTSD Factor Clusters with DVM-IV 17 Symptoms

Authors	APA, 2002	King et al., 2000	Simms et al., 2002
Models	DSM-IV (TR)	Emotional Numbing Model	Dysphoria Model
Clusters	**Symptoms**		
B: Intrusion	(B1) Intrusive recollections (B2) Distressing dreams (B3) Reliving/flashbacks (B4) Distress toward cues (B5) Reactivity toward cues	(B1) Intrusive recollections (B2) Distressing dreams (B3) Reliving/flashbacks (B4) Distress toward cues (B5) Reactivity toward cues	(B1) Intrusive recollections (B2) Distressing dreams (B3) Reliving/flashbacks (B4) Distress toward cues (B5) Reactivity toward cues
C: Avoidance/ numbing	(C1) Avoid thoughts/feelings (C2) Avoid people/places (C3) Amnesia (C4) Diminished interest (C5) Detached from others (C6) Restricted range of affect (C7) Foreshortened future	(C1) Avoid thoughts/feelings (C2) Avoid people/places	(C1) Avoid thoughts/feelings (C2) Avoid people/places
D: Hyperarousal	(D1) Disturbed sleep (D2) Anger outbursts (D3) Poor concentration (D4) Hypervigilance (D5) Exaggerated startle	(D1) Disturbed sleep (D2) Anger outbursts (D3) Poor concentration (D4) Hypervigilance (D5) Exaggerated startle	(D4) Hypervigilance (D5) Exaggerated startle

Emotional Numbing	(C3) Amnesia (C4) Diminished interest (C5) Detached from others (C6) Restricted range of affect (C7) Foreshortened future	
Dysphoria		(C3) Amnesia (C4) Diminished interest (C5) Detached from others (C6) Restricted range of affect (C7) Foreshortened future (D1) Disturbed sleep (D2) Anger outbursts (D3) Poor concentration

The first model, the Emotional Numbing model, identified the following clusters for PTSD: re-experiencing, effortful avoidance, emotional numbing, and hyperarousal (King et al., 1998). In this model, the symptoms of C3 to C7 (C3: trauma-related amnesia, C4: diminished interest, C5: feeling detached, C6: feeling numb, and C7: foreshortened future) were placed as part of the emotional numbing cluster. The second model was called the Dysphoria model (Simms et al., 2002), which includes the following factors: intrusions, avoidance, hyperarousal, and dysphoria. In this model, the symptoms of emotional numbing C3 to C7 were placed as part of dysphoria. Three symptoms of hyperarousal were also placed as part of dysphoria, (D1: sleeping difficulties, D2: irritability, and D3: concentration difficulties). The Dysphoria model distinguished itself by providing a broader range of emotional symptoms related to negative affect such as anger, shame, and guilt. See Table 2 for factor structure differences from the DSM-IV/-TR through the DSM-5 (APA, 2000, 2013). A meta-analysis suggested that the Dysphoria model had a superior fit, but both models fit well (Yufik & Simms, 2010). The support for a four-factor model of PTSD resulted in the reorganization of symptoms in the DSM-5 (See Table 2 for complete list of PTSD factor structures).

Table 2

PTSD Factor Structure Clusters

Authors	APA, 2002	King et al., 2000	Simms et al., 2002	APA, 2013	Elhai et al., 2011; Liu et al., 2014	Liu et al., 2014	Tsai et al., 2015	Armour et al., 2015
Models	DSM-IV (TR)	Emotional Numbing Model	Dysphoria Model	DSM-5 Model	DSM-5 Dysphoric Arousal Model	Anhedonia Model	Externalizing Model	Hybrid Model
Clusters	Intrusion	Intrusion	Intrusion	Intrusion	Intrusion	Intrusions	Intrusion	Intrusions
	Avoidance/ Numbing	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance	Avoidance
	Hyperarousal	Emotional Numbing	Dysphoria	Negative Alterations in Cognitions and Mood	Negative Alterations in Cognitions and Mood	Negative Affect	Negative Alterations in Cognitions and Mood	Negative Affect
		Hyperarousal	Hyperarousal	Alterations in Arousal and Reactivity	Dysphoric Arousal	Anhedonia	Externalizing	Anhedonia
					Anxious Arousal	Dysphoric Arousal	Anxious Arousal	Externalizing
						Anxious Arousal	Dysphoric Arousal	Anxious Arousal
								Dysphoric Arousal

The DSM-5 model of PTSD contains four clusters and 20 symptoms. (1) Cluster B (five symptoms) intrusion symptoms are seen as B1: reoccurring and involuntary upsetting memories of the traumatic event, B2: nightmares, B3: flashbacks, B4: emotional cue reactivity, and B5: physiological cue reactivity. (2) Cluster C (two symptoms) avoidance symptoms are seen as C1: averting thoughts and C2: reminders. (3) Cluster D (seven symptoms), Negative Changes in Cognition and Mood (NACM) symptoms involve D1: trauma-related amnesia, D2: negative beliefs, D3: the blame of self or others, D4: negative trauma-related emotions, D5: loss of interest, D6: detachment, D7: restricted affect. (4) Cluster E (six symptoms) Alterations in Arousal and Reactivity (AAR) associated with a traumatic event, symptoms include E1:

irritability/anger, E2: self-destructive/reckless behavior, E3: hypervigilance, E4: exaggerated startled response, E5: difficulty concentrating, and E6: sleep disturbance. Cluster A is the presence of a Criterion A event. A diagnosis is made by meeting the criteria for one symptom from clusters B and C, and two symptoms from D and E. The number of symptoms (20) and the minimum number needed to meet diagnostic criteria (6) make PTSD a highly heterogeneous diagnosis with over 600,000 possible presentations (Galatzer-Levy & Bryant, 2013).

The heterogeneity of the PTSD diagnosis has resulted in the continued investigation of its factor structure (Armour, 2015; Armour et al., 2012; Nugent et al., 2012; Zoellner et al., 2014). Initially, the four-factor Dysphoric model was supported. Following the publication of the DSM-5, this model was revised to the five-factor Dysphoric Arousal model (Elhai & Palmieri, 2011; Liu et al., 2014). The five-factor Dysphoric model included intrusion, avoidance, numbing, dysphoric arousal, and anxious arousal. Compared to the Dysphoric model, three symptoms of the dysphoria factor (E1: anger, E5: self-destructive, and E6: concentration issues) were reclassified as part of the dysphoric arousal factor. Two symptoms of hyperarousal formed a new anxious arousal factor, and the hyperarousal factor was removed. In comparison to the Dysphoric model, three symptoms of the dysphoria factor (E1: anger, E5: self-destructive, and E6: concentration issues) were placed as part of the dysphoria arousal factor. Two of the symptoms of hyperarousal formed a new anxious arousal factor, and the hyperarousal factor was removed. A study using Confirmatory Factor Analysis (CFA) across prior factor structures demonstrated that the five-factor Dysphoric Arousal model fit better than the four-factor Emotional Numbing and Dysphoria models (Armour et al., 2012).

Liu et al. modified the Dysphoric Arousal model to include additional symptoms added in the DSM-5, coining it the "five-factor and/or DSM-5 Dysphoric Arousal model." In this update, the emotional numbing factor was modified and renamed "negative alterations in mood and cognitions" (NAMC). The NAMC factor incorporated new DSM-5 symptoms: negative beliefs (D2), distorted blame (D3), and pervasive negative emotional state (D4). Additionally, recklessness (E2) was added to the dysphoric arousal factor. In their study, Liu et al. (2014) found that this DSM-5 Dysphoric Arousal model outperformed both the DSM-5 model and another revised DSM-5 Dysphoria model (Biehn et al., 2013).

Two additional factor structures have demonstrated superior fit compared to prior candidate model previously discussed: a six-factor and seven-factor model. The six-factor structure model has been proposed in two variations. The first model, the six-factor Anhedonia model, consisted of intrusion, avoidance, negative affect, anhedonia, dysphoric arousal, and anxious arousal (Liu et al., 2014). In comparison to the DSM-5 model, four symptoms of the NACM factor (D1: trauma-related amnesia, D2: negative beliefs, D3: blame, D4: negative feelings) were placed as part of the negative affect factor. The three remaining symptoms of NACM (D5: loss of interest, D6: feeling detached, and D7: difficulty experiencing positive emotions) were placed as part of a new anhedonia factor. The NACM and AAR factors were removed. Results from the study by Liu et al. (2014) demonstrated that separating the emotional numbing cluster into positive and negative affect fit better. Specifically, anhedonia and negative affect presented as distinct constructs.

The second valid six-factor model, the Externalizing Behavior model, created a factor of externalizing behaviors (encompassing, E1: irritable or aggressive behaviors and

reckless or E2: self-destructive behaviors). This model has factors for intrusion, avoidance, negative alterations in cognitions and mood, anxious arousal, and dysphoric arousal factors (Tsai et al., 2015). In comparison to the DSM-5 model, the AAR factor was removed, and the symptoms of difficulty with concentration and sleeping (E5 and E6) were placed in dysphoric arousal. The symptoms of AAR (E3: hypervigilance and E4: startle) were placed as part of the anxious arousal factor. This factor structure model and the Anhedonia model showed a superior fit to the five-factor model that included externalizing behaviors (Seligowski & Orcutt, 2016).

Most recently, a seven-factor hybrid model was proposed (Armour, 2015). The model includes re-experiencing, avoidance, negative affect, anhedonia, externalizing behaviors, anxious arousal, and dysphoric arousal. In contrast to the DSM-5 factor model, factors for NACM and AAR were reclassified into other factors. Similar to the Anhedonia model, symptoms D1 to D4 (D1: trauma-related amnesia, D2: negative beliefs, D3: blame D4: negative feelings) from the DSM-5 NACM factor were placed in a negative affect factor. Also, D5: loss of interest, D6: detachment, and D7: difficulty with positive emotions were placed in the anhedonia factor. Similar to the Externalizing Behavior model, the dysphoric arousal (E5: difficulty concentrating and E6: sleep problems), anxious arousal (E3: hypervigilance and E4: startle), and externalizing (E1: irritability and E2: risk taking) factors included the same two symptoms. The study by Armour and colleagues (2015) found that the seven-factor Hybrid model had a superior fit in comparison to other model versions of the PTSD factor structure.

The evolution of the factor structure, and the emergence of the currently competing four, five, six, and seven-factor models, highlight the heterogeneity of the

diagnosis. The majority of the variation in models comes from the arrangement of clusters NACM and ARR. The six and seven-factor models suggest these two factors may be further subdivided, which points to the breadth of symptoms included in these factors. By comparison, the clusters B: intrusion and C: avoidance factors are largely consistent across models. It is unclear if the variation in the support for these models stems from differences in the populations examined such that different models may have a superior fit within different populations.

Differences in the Factor Structure Between Non-Hispanic White and Hispanic Samples

The majority of work on the PTSD factor structure has been conducted with NHW male samples, usually composed of U.S. veterans or undergraduate students. As a result, there is substantially less known about how PTSD manifests in other racial and ethnic groups, such as Hispanic individuals. Determining how the factor structure of PTSD differs for this group is critical to identifying meaningful differences in the clinical presentation and providing treatment.

Comparison of the factor structure across two groups is done through tests of factorial invariance. Measurements of factorial invariance are integral to establishing whether the PTSD factor structure can be similarly assessed and interpreted among Hispanics and NHWs. Tests of factorial invariance proceed sequentially such that less stringent aspects of invariance are first evaluated (Putnick & Bornstein, 2016). If invariance is met at these initial levels, a more strict form of invariance is tested. The first step is to evaluate configural invariance. Configural invariance is met when the indicators for each latent factor are the same across groups. For example, the five items that comprise the reexperiencing factor are the same for Hispanics and NHWs. The second

step is to evaluate metric invariance. Metric invariance is met when the factor loadings for each latent factor are equal across both groups. For example, the factor loadings for all items on the re-experiencing factor will be the same for both Hispanics and NHWs. However, if not all factor loadings are equal, partial invariance can be established if at least two indicators have identical factor loadings. The third step is to evaluate scalar invariance. Scalar invariance is met when the indicator intercepts are equal across groups. For example, if all item intercept scores remain equal among Hispanics and NHWs, this would suggest a similar presentation of PTSD symptomology. However, if the intercepts for specific items significantly differ, those items may denote higher symptoms for a particular ethnic group. The fourth step is to evaluate strict factorial invariance. To achieve strict factorial invariance, the factor loadings, items intercepts, and residuals are identical for both groups. For example, the amount of error associated with each measurement for Hispanics and NHWs is the same. If measurement invariance is established, it suggests that the functions similar across groups.

The few studies that have examined factor structure differences between Hispanic and NHWs samples have shown different degrees of invariance. The first study examined the factor structure in a sample of Hispanics and Non-Hispanics that had recently experienced a hurricane (Norris et al., 2001). The participants were assessed for PTSD with the Revised Civilian Mississippi Scale (RCMS; Norris & Perilla, 1996), which contains 15 symptoms that correspond with DSM-IV criteria for PTSD. Participants consisted of non-Hispanics (67%) from the U.S. and Hispanics (33%) from Mexico. The four-factor model used in this study was most similar to the Emotional Numbing model. Findings demonstrated that the four-factor model met configural, and partial metric

invariance. However, model fit declined when equality constraints were applied to the item intercepts. Therefore, scalar and strict factorial invariance could not be established. Partial invariance was met because the hypervigilance item had a higher factor loading for the Hispanic group. Also, there were greater error variances for Hispanics for the latent factors of intrusion, avoidance, numbing, and arousal. This finding suggests that the Emotional Numbing model may not fully account for the factor structure for PTSD in Hispanics. Notable limitations of this study were that the U.S. group included multiple ethnic groups as opposed to only NHWs. Thus, these findings may not accurately represent the nuanced cultural differences between NHWs and Hispanics. Moreover, the Hispanic sample examined in this study was located in Mexico. Thus, the results may not generalize to a U.S. -based sample of Hispanics due to the complex socio-environmental determinants between Hispanics residing in the U.S. versus Mexico. Nevertheless, these study findings suggest that the factor structure of PTSD has a number of similarities across Hispanics and Non-Hispanics.

The second study comparing factor structures utilized the DSM-IV criteria and the PTSD Checklist – Civilian Version (PCL–C; Weathers et al., 1993) in a large undergraduate student sample (Hoyt & Yeater, 2010). The sample was evenly divided between NHW (55%) and Hispanic individuals (45%). Comparisons were made using the Dysphoria and the Emotional Numbing models. For the Emotional Numbing model, the data fit the model reasonably well for both samples. There was evidence for configural invariance and metric invariance. The criteria for scalar invariance was not met, however. Furthermore, model fit did not significantly change when an equality constraint was applied to the covariances between the factors. This suggests that the interrelations

among the factors were comparable across these groups. For the Dysphoria model, the models met criteria for configural invariance, metric invariance, but not for scalar invariance. Unlike the Emotional Numbing model, model fit significantly decreased when an equality constraint was imposed on the covariances among factors. The two items responsible for the decreases in model fit when testing each successive level of invariance were psychological distress when exposed to trauma cues and social isolation. There were several limitations of this study of note. First, trauma history was not explicitly assessed, nor were participants' responses to the PCL-C linked to a specific traumatic event, making it unclear what particular stressful experiences the participants were referring to. In addition, many of the self-reported symptom scores were low, which calls into question the generalizability of these findings to community samples with a higher prevalence of trauma exposure. Related to this point, the use of an undergraduate student sample may also have limited the generalizability of the findings. These results overall point to a high degree of similarity in the factor structure of PTSD between NHW and Hispanic individuals. Still, the lack of scalar invariance suggests there may be important and subtle differences in how PTSD symptoms are reported across these populations.

The third study to examine the PTSD factor structure of Hispanics and NWHs was conducted with undergraduate students exposed to a traumatic event at their university campus (Tiemensma et al., 2018). The PTSD factor structure was examined using the Impact of Event Scale-Revised scale with the DSM-IV PTSD symptoms (IES-R; Weiss & Marmar, 1997). The sample was divided between Hispanics (56%) and non-Hispanics (44%). Two factor structures were evaluated: a one-factor (total score) and a

three-factor (intrusions, avoidance, and hyperarousal) model. The three-factor model fit the data well but was found to have unusually high interfactor correlations (0.92 to 1.00). Thus, measurement invariance could not be estimated for this model. The one-factor model, however, showed configural, metric, scalar, and strict invariance. These findings suggest that the one-factor model may be an applicable factor structure among Hispanics and Non-Hispanics. However, there were notable limitations. The study was conducted with undergraduate students, decreasing generalizability with other community samples. Moreover, the non-Hispanic group included an array of ethnic and racial groups. Including different ethnicities in the comparison group may diminish differences between NHW and Hispanics due to the similarities between Hispanics and other minoritized groups (Flanagin et al., 2021).

The fourth study, to compare the PTSD factor structure among Hispanics and NHW, used a large sample of male firefighters using DSM-IV symptoms (Arbona et al., 2019). Most of the sample was composed of NHWs (76%). Three PTSD factor structures were compared: the four-factor Emotional Numbing model, the four-factor Dysphoria model, and the five-factor Dysphoric Arousal model. The two four-factor models did not fit the data, as such, they did not move forward with evaluating invariance. There was an excellent model fit for the five-factor dysphoric arousal model for both samples, such that the criteria for configural, metric, and scalar invariance were met. However, strict factorial invariance was not met due to two observed variables. The two variables that differed in item variances were sleep disturbance (D1) and difficulty concentrating (D3), which were higher in the Hispanic group. The authors argue that these item differences may be due to ethnic differences in the presentation of PTSD. Several limitations in this

study should be noted. Most participants were NHWs, which may have influenced the representativeness of the Hispanic sample. The participants in this study were firefighters, and due to their occupation involving repeated traumatic exposure, these study findings may not be generalizable to a community sample (Donnelly & Bennett, 2014).

Due to the limited number of studies comparing the factor structure between Hispanics and NHWs, it is important to consider group-specific work that examined the factor structure of PTSD in Hispanic samples. In an early study examining PTSD factor structure, participants included a Hispanic sample that were assessed for PTSD using the DSM-IV (Marshall, 2004). The study included Hispanic individuals who sustained injuries due to community violence. The data were dichotomized based on language preference, with 71% preferring English and 29% preferring Spanish. The four-factor Emotional Numbing model was used as the standard model similar to their proposed model factors was used to compare both ethnic groups. The model established configural, metric, and partial scalar invariance. As such, the study found that the factor structure was similar for both groups. However, there were item-level differences specifically within the avoidance factor, where one item's measured mean was not equivalent across the groups, indicating partial scalar invariance. Additionally, a significant difference was observed in the covariance between arousal and avoidance factors, which was higher in the English-speaking group compared to the Spanish-speaking group. While the results of this study are promising, it is important to note that this factor analytic work were conducted using the DSM-III-R (APA, 1987), which does not include all of the symptoms in the DSM-5. Nonetheless, these data highlight the potential usefulness of the

Emotional Numbing model within a Hispanic population, but the lack of scalar and strict invariance suggests that there may be meaningful differences among these groups.

Only two studies thus far have examined the factor structure in Hispanics using DSM-5 criteria. The first study included 165 treatment-seeking, Spanish-speaking Hispanics from Spain (Soberón et al., 2016). PTSD symptoms were assessed in Spanish using the DSM-5 PTSD symptoms and the Global Assessment of Posttraumatic Stress Scale 5 (EGEP-5; Crespo et al., 2017). The DSM-5, Dysphoria, Dysphoric Arousal, Externalizing Behavior, Anhedonia, and Hybrid models were compared. Findings demonstrated that all models fit the data well. However, the Hybrid and Anhedonia model fit best, with the Anhedonia model selected for further evaluation (Soberón et al., 2016). Although the indices of fit appear to have a better fit with the Hybrid model, the Anhedonia model was selected on the grounds of parsimony. These findings, however, may have limited generalizability to acculturated Hispanic populations in the United States. Additionally, the small sample size may compromise the reliability of the results. Nevertheless, the information gained from this study highlights the importance of examining the most recent factor structure with Hispanics.

The second study included a total of 204 students from a university located in Mexico who were assessed using the DSM-5 criteria (Durón-Figueroa et al., 2019). The Emotional Numbing, Anhedonia, and Hybrid models were evaluated, and all showed a good fit. However, the Anhedonia and Hybrid models had a slightly better fit. The Anhedonia model was selected as having the best fit with the Hispanic sample due to its parsimony. The study authors proposed that the Anhedonia model fit better with the participants due to the high volume of earthquakes in their location, similar to the trauma

exposure of the sample with which the Anhedonia model was developed (Liu et al., 2014). Despite the strengths of this study, there are some limitations to consider. The DSM-5 Dysphoria Arousal or the Externalizing Behavior model were not evaluated. These models have shown a superior fit in NHWs and thus may be strong candidates for this sample. The sample consisted of college-educated students, which may not generalize to other community samples. In addition, the sample was composed of Spanish-speaking natives of Mexico, which may not be generalizable to Hispanics living in the United States. These study findings suggest that the Anhedonia model might be a comparatively good fit for Hispanics, while the Hybrid model has been identified as the most suitable model with NHW samples from the United States (Armour et al., 2015; Blevins et al., 2015; Bovin et al., 2016; Seligowski & Orcutt, 2016; Wortmann et al., 2016).These results underscore cultural variations, such as geographic location, in the factor structure of PTSD and demonstrate the differential applicability of contemporary factor structure models across diverse populations.

The information gained from these studies is instrumental to understanding the latent factor structure of PTSD in Hispanics. Taken together, the limited number of studies comparing the factor structure between Hispanic and NHWs samples have shown varying measurements of invariance. There was majority support for the fit of the Emotional Numbing model in Hispanics, which at most obtained partial scalar invariance (Hoyt & Yeater, 2010; Marshall, 2004; Norris et al., 2001). The five-factor Dysphoric Arousal model and a one-factor model have also been found to fit well, with both obtaining the strictest measurement of invariance (scalar). However, these findings are inconsistent with one another (Arbona et al., 2019; Tiemensma et al., 2018). They

propose varying numbers of factors to explain PTSD symptoms in Hispanics, from one-factor to five-factor models. The studies also achieve different levels of measurement invariance, ranging from partial to scalar invariance. Moreover, the well-fitting models differ in their theoretical foundations: the Emotional Numbing model emphasizes distinct avoidance and numbing factors, while the Dysphoric Arousal model distinguishes between anxious and dysphoric arousal. The unexpected fit of a one-factor model contradicts these more complex structures, due possibly to unique sample characteristics. These inconsistencies suggest there may be potential differences in the latent structure of PTSD in Hispanic populations and emphasize the need for further research. To date, only two known studies have evaluated the factor structure with the DSM-5 criteria and a Hispanic population (Durón Figueroa, 2019; Soberón et al., 2016). These studies show that the Anhedonia model best fits Spanish-speaking Hispanics, which is also known as a well-fitting model among NHWs (Armour, 2015). However, these findings may not generalize to Hispanic populations living in the United States. Therefore, it is important to conduct additional studies to examine the latent factor structure using the most up-to-date factor models and diagnostic manuals to better understand the latent factor structure of PTSD in Hispanics.

Additional considerations

The majority of prior work on PTSD with Hispanics has focused on symptom severity (Alcántara et al., 2013). These findings have shown a number of differences in the severity of specific clusters across these groups. The specific clusters that differ, however, are mixed. The majority of studies have reported that Hispanics more consistently report greater avoidance when compared to NHWs (DiGangi et al., 2016;

Lewis-Fernández et al., 2008; Norris et al., 2001; Ortega & Rosenheck, 2000; Pole et al., 2005). Often no differences are found for the reexperiencing and hyperarousal clusters (Ortega & Rosenheck, 2000; Perilla et al., 2002; Pole et al., 2005). At the item level, the symptoms that differ are psychological distress when exposed to trauma cues, avoidance of reminders, social isolation, sleep disturbance, and difficulty concentrating (Arbona et al., 2019; Hoyt et al., 2010; Marshall et al., 2009). These differences in symptom clusters or items may stem from differences in the latent factor structure of PTSD among diverse racial and ethnic groups.

Many researchers have posited potential differences in PTSD symptomology could be attributed to ethnocultural factors that may vary between racial and ethnic differences (Marsella, 2010; Perilla et al., 2002; Pole et al., 2005). Studies have shown that Hispanics are at an increased risk of chronic stressors that increase the likelihood of developing and exacerbating PTSD symptoms (Alcántara et al., 2013; Hall-Clark et al., 2016). Hispanics are more likely to encounter traumatic experiences such as racism, acculturation stress, and greater exposure to natural disasters and are more vulnerable to the conditions that exacerbate the impact of these disasters (Alcántara et al., 2013; Hernandez, 2023; Lewis et al., 2019; Perilla et al., 2002). Moreover, the way that traumatic stress is conveyed and processed in Hispanics may differ from that of NHWs because of such cultural values (i.e., familism, fatalism, and spirituality; Marshall et al., 2009; Pole et al., 2005). These values may, in turn, affect the presentation of PTSD symptomology. Therefore, examining the PTSD latent factor structure compared to NHW samples is crucial to improving our understanding of the disorder and making it more inclusive to Hispanic populations.

Current Study

The present study aimed to identify the optimal PTSD factor structure for Hispanics from the United States who were exposed to Hurricanes to better understand how we can support this at-risk population. Based on prior work, the candidate models for evaluation were DSM-5, DSM-5 Dysphoric Arousal, Externalizing Behaviors, Anhedonia, and Hybrid (See Table 3 for PTSD clusters and symptoms). It was hypothesized that the hybrid model would fit best. The second aim was to determine the level of invariance between Hispanics and NHWs. It is hypothesized that metric invariance would be achieved, but not scalar based on prior work (Putnick & Bornstein, 2016). The third aim was to examine differences in the association of the PTSD factors with other variables. The purpose of these aims was to determine the extent that current conceptualizations of PTSD, which were derived from primarily NHW samples, apply to Hispanics.

Table 3
PTSD Factor Clusters with 20 Symptoms

Authors	APA, 2013	Elhai et al., 2011; Liu et al., 2014	Tsai et al., 2015	Liu et al., 2014	Armour et al., 2015
Models	DSM-5 Model	DSM-5 Dysphoric Arousal Model	Externalizing Model	Anhedonia Model	Hybrid Model
Clusters	**Symptoms**				
(B) Intrusions	(B1) Intrusive memories (B2) Nightmares (B3) Flashbacks (B4) Emotional reactivity (B5) Physiological reactivity	(B1) Intrusive memories (B2) Nightmares (B3) Flashbacks (B4) Emotional reactivity (B5) Physiological reactivity	(B1) Intrusive memories (B2) Nightmares (B3) Flashbacks (B4) Emotional reactivity (B5) Physiological reactivity	(B1) Intrusive memories (B2) Nightmares (B3) Flashbacks (B4) Emotional reactivity (B5) Physiological reactivity	(B1) Intrusive memories (B2) Nightmares (B3) Flashbacks (B4) Emotional reactivity (B5) Physiological reactivity
(C) Avoidance	(C1) Avoidance of thoughts (C2) Avoidance of reminders	(C1) Avoidance of thoughts (C2) Avoidance of reminders	(C1) Avoidance of thoughts (C2) Avoidance of reminders	(C1) Avoidance of thoughts (C2) Avoidance of reminders	(C1) Avoidance of thoughts (C2) Avoidance of reminders

(D) Negative Alterations in Cognition and Mood	(D1)Trauma-related amnesia (D2) Negative beliefs (D3) Blame (D4) Negative feelings (D5) Loss of interest (D6) Feeling detached (D7) Difficulty experiencing positive emotions	(D1) Trauma-related amnesia (D2) Negative beliefs (D3) Blame (D4) Negative feelings (D5) Loss of interest (D6) Feeling detached (D7) Difficulty experiencing positive emotions	(D1) Trauma-related amnesia (D2) Negative beliefs (D3) Blame (D4) Negative feelings (D5) Loss of interest (D6) Feeling detached (D7) Difficulty experiencing positive emotions		
(E) Alterations in Arousal and Reactivity	(E1) Irritability (E2) Risk taking (E3) Hypervigilance (E4) Startle (E5) Difficulty concentrating (E6) Sleep disturbance				
Dysphoric Arousal		(E1) Irritability (E2) Risk taking (E5) Difficulty concentrating (E6) Sleep disturbance	(E5) Difficulty concentrating E6) Sleep disturbance	(E1) Irritability (E2) Risk taking E5) Difficulty concentrating E6) Sleep disturbance	(E5) Difficulty concentrating (E6) Sleep disturbance
Anxious Arousal		(E3) Hypervigilance (E4) Startle	(E3) Hypervigilance (E4) Startle	(E3) Hypervigilance (E4) Startle	(E3) Hypervigilance (E4) Startle
Externalizing			(E1) Irritability (E2) Risk taking		(E1) Irritability E2) Risk taking
Negative Affect				D1) Trauma-related amnesia D2) Negative beliefs D3) Blame (D4) Negative feelings	(D1) Trauma-related amnesia (D2) Negative beliefs D3) Blame (D4) Negative feelings
Anhedonia				D5) Loss of interest D6) Feeling detached D7) Difficulty experiencing positive emotions	(D5) Loss of interest D6) Feeling detached (D7) Difficulty experiencing positive emotions

CHAPTER 2: METHODS

Participants and Procedures

Participants were recruited as part of a larger study on web-based treatment for disaster victims (NCT03403738). The participants were recruited remotely from locations affected by hurricanes in 2017 and 2018. The locations were affected by Hurricanes (Harvey: Texas, Irma: Florida, Florence: North Carolina, Maria: Puerto Rico, or Michael: Florida and Georgia). Eligible participants were English-speaking individuals over 18 years old who resided in hurricane-affected areas and had access to an internet-accessible device. The current study included participants who identified as Hispanic (672) and NHW (459).

Measures

The PTSD Checklist for the DSM 5 (PCL-5; Weathers et al., 2013) is a 20-item self-report measure that assesses DSM-5 PTSD symptoms experienced in the last month. Items assess symptoms across four symptom clusters of PTSD, including intrusions (items 1-5), dysphoria (items 6-7), negative alterations in cognition and mood (NACM; items 8-14), and alterations in arousal and reactivity (AAR; items 15-20), on a Likert-type scale of 0 to 4. Total scores range from 0–80, with a score of 33 or greater indicating likely PTSD. The sum of the scores from the items in each cluster calculates subscale scores. Participants' hurricane experience was used as the anchor for the PCL-5. The scale had good to excellent internal consistency in the overall scale (α = 0.95) and additional subscales, which included intrusions (α =.89), dysphoria (α =.84), NACM (α =.90), and AAR (α =.85).

The Patient-Reported Outcomes Measurement Information System Depression Short-Form (PROMIS-D-SF; Pilkonis et al., 2011) is an 8-item self-report

measure that assesses for depressive symptoms in the prior 7 days. Each item on the measure is rated on a 5-point Likert-type scale of 1 to 5. Total scores range from 8 to 40, with higher scores indicating greater severity of depression. The raw scores on the 8 items should be summed to obtain a total raw score. A T-score table is used to identify the T-score associated with the individual's total raw score and the information entered in the T-score row on the measure. The scale had excellent internal consistency, $\alpha = 0.96$.

The Kessler Screening Scale for Psychological Distress (K6; Kessler et al., 2002) is a six-item self-report measure that assesses psychological distress in the past month and how often they have experienced each symptom. Items assess six symptoms, which include feeling nervous, hopeless, restless or fidgety, depressed, worthless, and that everything was an effort. Responses range from 0 (none of the time) to 4 (all of the time). Scores are summed across the 6 items. The total scores can range from 0-24. The scale showed good internal consistency, $\alpha = 0.91$.

Data Analytic Plan

Data were assessed for missing values and potential outliers on non-demographic questionnaires. The distributions were examined for violations of normality. Missing data were handled using Full Information Maximum Likelihood. Descriptive statistics were calculated and reviewed to ensure consistency with prior findings for the proportion of likely PTSD (Kilpatrick et al., 2013). CFA's for both aims were conducted using the R package Lavann for Structural Equation Modeling (SEM; Rosseel, 2012). All analyses were conducted in R (version 4.2.2).

A CFA was used to test and examine the hypothesized PTSD factor structure models. Based on prior research, CFA was used with a standardized covariance matrix

with variances set equal to one (Putnick & Bornstein, 2016). Model fit was evaluated using standard models of fit as indicated by Hu & Bentler (1999). The approximate fit indices used were: Chi-Square Test (lower value and p-value greater than .05 indicate better fit), Comparative Fit Index (CFI), and Tucker-Lewis Index (TFI) of > .90 (acceptable) to > .95 (good). The Root-Mean-Square Error of Approximation (RMSEA) is defined as having an acceptable to good fit if it is between < .08 (acceptable) to < .05 (good) with a 90% CI with an upper limit that is < .10. In Standardized Root Mean Square Residual (SRMR) lower values indicate better fit with an acceptable range between 0 and 0.08. For model comparisons, nested models were compared with a Chi-Square Difference Test. The Chi-Square Difference Test quantifies the difference in chi-square between competing models to determine whether the less restrictive model provides a significantly better fit for the data than the more restrictive model. Akaike's information criterion (AIC) was used to compare nonnested models; the model with the lowest AIC is preferred, but the difference in AIC values between models is also considered. If the difference in AIC values is greater than 2, then the model with the lower AIC value is generally considered significantly better. A difference of 4 to 7 indicates weaker evidence, and a difference of more than 10 suggests that the model with the higher AIC is very unlikely to be the better model. The Bayesian Information Criterion (BIC) indicates that the better-fitting model has the lowest BIC value. This prevents overfitting by placing greater restrictions on models with more parameters. The BIC criterion scale also determines the strength of evidence for the difference between models using the following scores: zero to two is weak, two to six is positive, six to ten is strong, and differences greater than ten indicate very strong evidence.

For aim 1, the competing models were evaluated separately in each group and within a multigroup model. First, a single group CFA was conducted to find the optimal fitting model of PTSD for both ethnic groups by examining the goodness of fit for each of the five proposed factor analytic models. Comparisons of the fit indices were evaluated for each model, and the strongest fitting model was selected for both ethnic groups. Second, a Multigroup Confirmatory Factor Analysis (MGCFA) was conducted to examine the goodness of fit of the PTSD models among both groups. The PTSD model that resulted in the strongest fit indices was selected from aim 2.

For aim 2, invariance testing was assessed using configural, metric, scalar, and strict factorial invariance in ascending order. Equality constraints were placed on various parameters described above, and model fit was evaluated.

For aim 3, two MGCFA were conducted using ethnic group status as a grouping variable to examine the association between PTSD factors and depression (PROMIS-D-SF), and psychological distress (K6). The equivalence of the covariance among the PTSD factors and the additional variables was of interest. Equality constraints were placed on both groups' factor loadings, intercepts, residuals, and covariances.

CHAPTER 3: RESULTS

The distributions for all variables were examined. All variables approximated normality (standardized values of kurtosis or skewness less than two standard units).

Demographic Comparisons

The majority of the sample was female (76%), with a mean age of 43.53 years (*SD* = 12.98). There were no differences in age between NLWs and Latiné Americans, $t(1033) = 1.29$, $p = .196$. While most participants obtained at least a high school diploma, Latiné Americans were significantly more likely than NLWs to have an education beyond high school, $\chi^2(1, N = 925) = 42.57$, $p < .001$. There was no significant difference in partner status, $\chi^2(1, N = 1{,}099) = 2.71$, $p = .099$. NLWs had significantly higher household incomes than Latiné individuals ($\chi^2[1, N = 1{,}062] = 7.22$, $p < .01$).

Psychopathology Comparisons

The total sample had a PCL-5 score of 37.19 (18.67) and a 52% prevalence of probable PTSD (see Table 1 for psychopathology scores). NLWs reported significantly greater severity of PTSD symptoms $t(939) = 2.69$, $p < .01$, and a higher likelihood of meeting the criteria for a probable PTSD diagnosis, $\chi^2(1, N = 967) = 7.97$, $p < .01$, compared to Latiné Americans. NLWs exhibited significantly more depressive symptoms than their Latiné American counterparts, $t(1010) = 6.17$, $p < .001$, and a higher likelihood of meeting the criteria for probable depression, $\chi^2(1, N = 1131) = 23.89$, $p < .001$. NLWs reported greater severity of psychological distress symptoms, $t(1008) = 4.89$, $p < .001$, and higher levels of serious psychological distress, $\chi^2(1, N = 1131) = 3.86$, $p < .05$, compared to their Latiné American counterparts.

Table 4

Characteristics of Hispanics and NHWs

Demographic Variables	Hispanic		*Non-Hispanic White*		Total Sample	
	n (%)	M(SD)	n (%)	M(SD)	n (%)	M(SD)
N	672 (59%)		459(41%)		1131(100%)	
Age (18-78)		43.13 (13.38)		44.13 (12.36)		43.53 (12.98)
Gender (Women)	513 (76%)		380 (83%)		893 (79%)	
Income						
< 20 K	324 (48%)		194 (42%)		518 (46%)	
>= 20 K**	295 (44%)		249 (54%)		544 (48%)	
Education level						
≤High school diploma	72 (11%)		133 (29%)		205 (18%)	
>High school diploma**	440 (65%)		280 (61%)		720 (64%)	
Hurricanes						
Harvey (Texas)	43 (6%)		64 (14%)		107 (9%)	
Maria (Puerto Rico)	596 (89%)		51 (11%)		647 (57%)	
Florence (North Carolina)	4 (1%)		43 (9%)		47 (4%)	
Irma (Florida)	16 (2%)		31 (7%)		47 (4%)	
Micheal (Florida, Georgia)	13 (2%)		270 (59%)		283 (25%)	
Partner Status						
With partner	317 (47%)		246 (54%)		563 (50%)	
Single	329 (50%)		207 (45%)		536 (48%)	
PCL-5**		35.72 (18.79)		38.95 (18.40)		37.19 (18.67)
Probable PTSD (>/= 31)**	297 (44%)	0.56 (0.50)	287 (63%)	0.65 (0.48)	584 (52%)	0.60 (0.49)
PROMIS-D-SF**		22.07 (8.94)		25.33 (8.57)		23.40 (8.93)
Probable Depression (>= 21) ***	375(56%)	0.56 (0.50)	326 (71%)	0.71 (0.45)	701 (62%)	0.62 (0.49)
K6 (>= 13)***		6.05 (5.08)		7.53 (4.89)		6.65 (5.06)
Significant Psychological Distress (>= 13)*	81(12%)	0.12 (0.33)	75 (16%)	0.16 (0.37)	156 (14%)	0.14 (0.34)

Note. PCL-5 = PTSD Checklist for DSM-5. PROMIS-D-SF = Patient-Reported Outcomes Measurement Information System Depression Short-Form. K6 = Kessler Screening Scale for Psychological Distress. Numbers within categories may not add up to presented N due to missing values or preference not to respond. * p <.05. ** p <.01. p *** <.001

Two-Way ANOVA

A Two-Way ANOVA (2 x 5; ethnicity x hurricanes) was conducted to determine the differences between hurricane and ethnicity on PTSD symptoms (PCL scores). There was no significant hurricane-by-ethnicity interaction [$F(2, 957) = 1.43$, $p = 0.221$]. There was a main effect for hurricanes ($p = 0.005$) but not for ethnicity ($p = 0.539$). Bonferroni-adjusted comparisons indicated that those who were involved with Hurricane Florence ($M = 39.96$, $SD = 20.75$; 95% CI [36.5 to 55.5]) had significantly higher PTSD symptoms than those who experienced Hurricane Irma ($M = 29.26$, $SD = 17.24$; $p = 0.032$; 95% CI [22.2 to 35.2]). No other significant differences across hurricanes were observed.

Single Group CFA Between Ethnic Groups

Out of the five proposed models, the hybrid model was ultimately determined to be the best-performing model for the two samples compared to all other models (see Figures 1-5 for factor structure models). All evaluated models had adequate fit (see Table 5 for fit indexes for each ethnic group). Regarding ranking, the second-best-performing model was the Anhedonia model. The third best performing model was the Externalizing Behaviors model. The fourth best performing model was the DSM-5 Dysphoric Arousal. The fifth best performing model was the DSM-5. The fit for each model across both ethnic groups was comparable.

Table 5

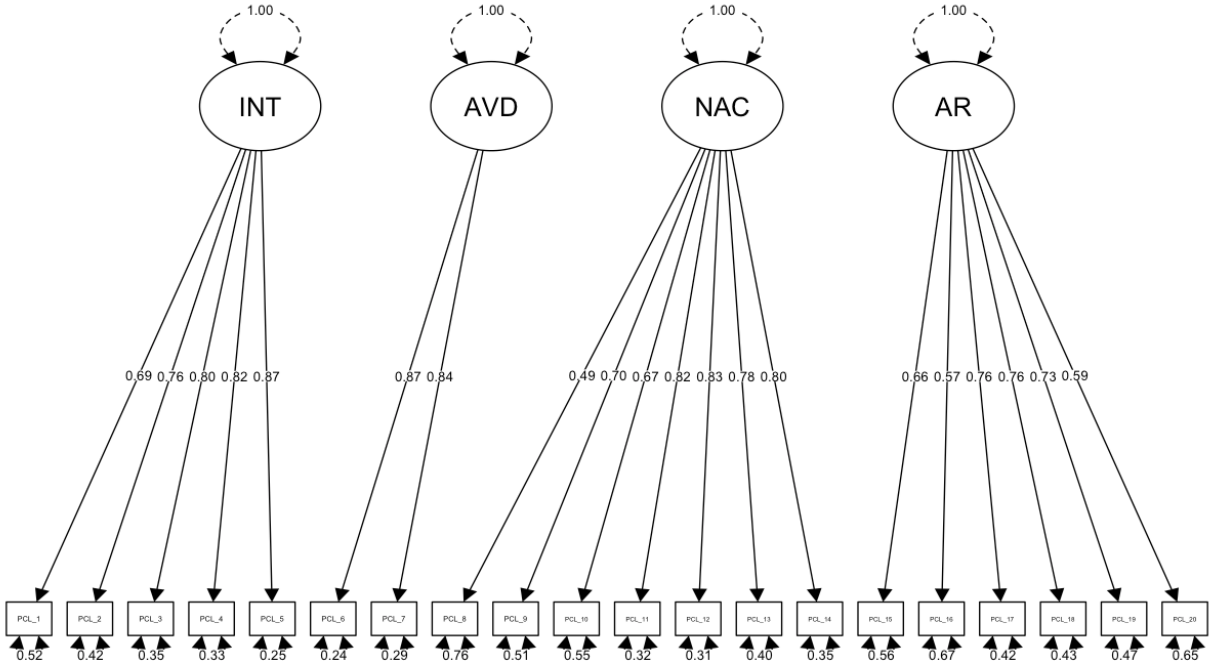
PTSD Factor Structure Single Group Confirmatory Factor Analysis Indices of Fit for each Hispanics and NHWs

Model	χ^2	*df*	CFI	TLI	AIC	BIC	RMSEA [CI]	SRMR
Hispanics (*n* =672)								
DSM-5	715.48	164	.924	.912	28793.7	28990.1	.080 [.074, .086]	.055
DSM-5 Dysphoric Arousal	579.96	160	.942	.932	28666.2	28879.6	.071 [.064, .077]	.051
Externalizing Behaviors	530.99	155	.948	.937	28627.2	28862.0	.068 [.062, .074]	.048
Anhedonia	465.35	155	.957	.948	28561.6	28796.4	.062 [.055, .068]	.047
Hybrid	410.78	149	.964	.954	28519.0	28779.4	.058 [.051, .064]	.044
Non-Hispanic Whites (*n* = 459)								
DSM-5	646.41	164	.914	.901	24329.6	24517.5	.082 [.075, .089]	.052
DSM-5 Dysphoric Arousal	545.70	160	.931	.919	24236.9	24441.1	.074 [.067, .081]	.047
Externalizing Behaviors	492.47	155	.940	.927	24193.6	24418.3	.070 [.063, .077]	.044
Anhedonia	399.78	155	.957	.947	24100.9	24325.6	.060 [.053, .067]	.040
Hybrid	337.77	149	.966	.957	24050.9	24300.1	.054 [.046, .061]	.036

Note. X^2 =Chi Square; *df*= Degrees of Freedom; AIC = Akaike's information criterion; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; BIC = Bayesian Information Criterion.

Figure 1

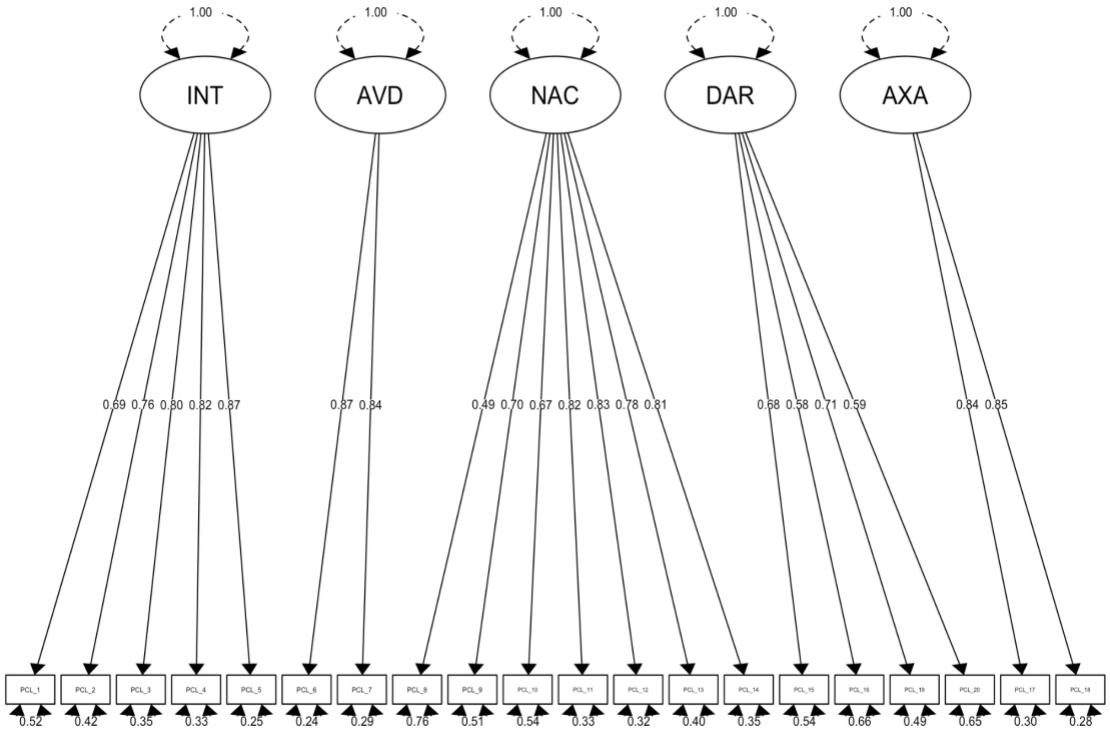
DSM-5 PTSD Factor Structure Model Path Diagram



Note. INT = Intrusions. AVD = Avoidance. NAC = Negative Alterations in Cognitions and Mood. AR = Alterations in Arousal and Reactivity. PCL = PTSD Checklist for DSM-5. PCL_1 = Intrusive memories. PCL_2 = Nightmares. PCL_3 = Flashbacks. PCL_4 = Emotional reactivity. PCL_5 = Physiological reactivity. PCL_6. = Avoidance of thoughts. PCL_7 = Avoidance of reminders. PCL_8 = Trauma-related amnesia. PCL_9 = Negative beliefs PCL_10 = Blame. PCL_11 = Negative feelings. PCL_12 = Loss of interest. PCL_13 = Feeling detached. PCL_14 = Difficulty experiencing positive emotions. PCL_15 = Irritability PCL_16 = Risk taking. PCL_17 = Hypervigilance. PCL_18 = Startle. PCL_19 = Difficulty concentrating. PCL_20 = Sleep disturbance.

Figure 2

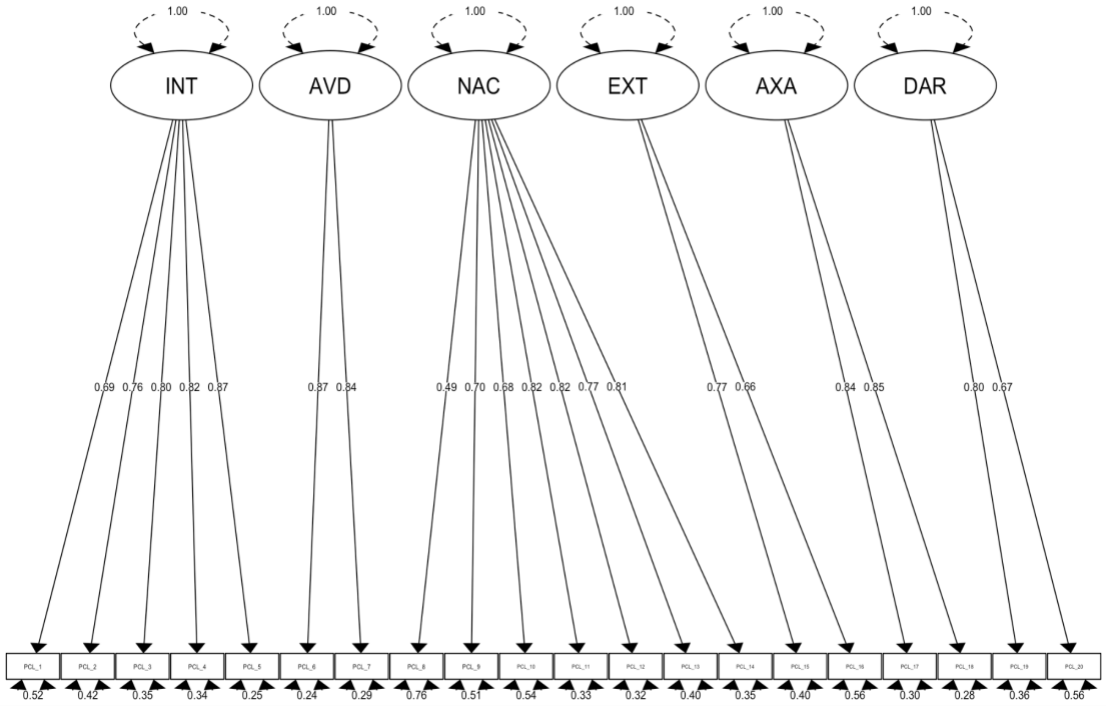
DSM-5 Dysphoric Arousal Factor Structure Model Path Diagram



Note. INT = Intrusions. AVD = Avoidance. NAC = Negative Alterations in Cognitions and Mood. DAR = Dysphoric Arousal. AXA = Anxious Arousal. PCL = PTSD Checklist for DSM-5. PCL_1 = Intrusive memories. PCL_2 = Nightmares. PCL_3 = Flashbacks. PCL_4 = Emotional reactivity. PCL_5 = Physiological reactivity. PCL_6. = Avoidance of thoughts. PCL_7 = Avoidance of reminders. PCL_8 = Trauma-related amnesia. PCL_9 = Negative beliefs PCL_10 = Blame. PCL_11 = Negative feelings. PCL_12 = Loss of interest. PCL_13 = Feeling detached. PCL_14 = Difficulty experiencing positive emotions. PCL_15 = Irritability PCL_16 = Risk taking. PCL_17 = Hypervigilance. PCL_18 = Startle. PCL_19 = Difficulty concentrating. PCL_20 = Sleep disturbance.

Figure 3

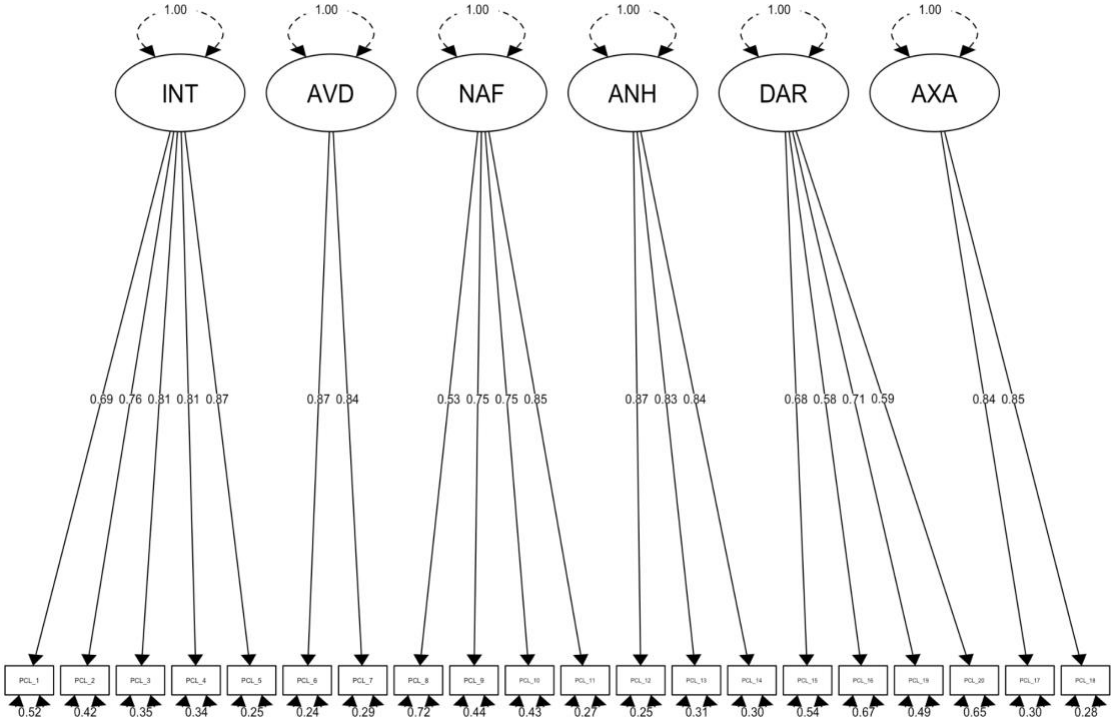
Externalizing Behaviors Factor Structure Model Path Diagram



Note. INT = Intrusions. AVD = Avoidance. NAC = Negative Alterations in Cognitions and Mood. EXT = Externalizing Behaviors. DAR = Dysphoric Arousal. AXA = Anxious Arousal. PCL = PTSD Checklist for DSM-5. PCL_1 = Intrusive memories. PCL_2 = Nightmares. PCL_3 = Flashbacks. PCL_4 = Emotional reactivity. PCL_5 = Physiological reactivity. PCL_6. = Avoidance of thoughts. PCL_7 = Avoidance of reminders. PCL_8 = Trauma-related amnesia. PCL_9 = Negative beliefs PCL_10 = Blame. PCL_11 = Negative feelings. PCL_12 = Loss of interest. PCL_13 = Feeling detached. PCL_14 = Difficulty experiencing positive emotions. PCL_15 = Irritability PCL_16 = Risk taking. PCL_17 = Hypervigilance. PCL_18 = Startle. PCL_19 = Difficulty concentrating. PCL_20 = Sleep disturbance.

Figure 4

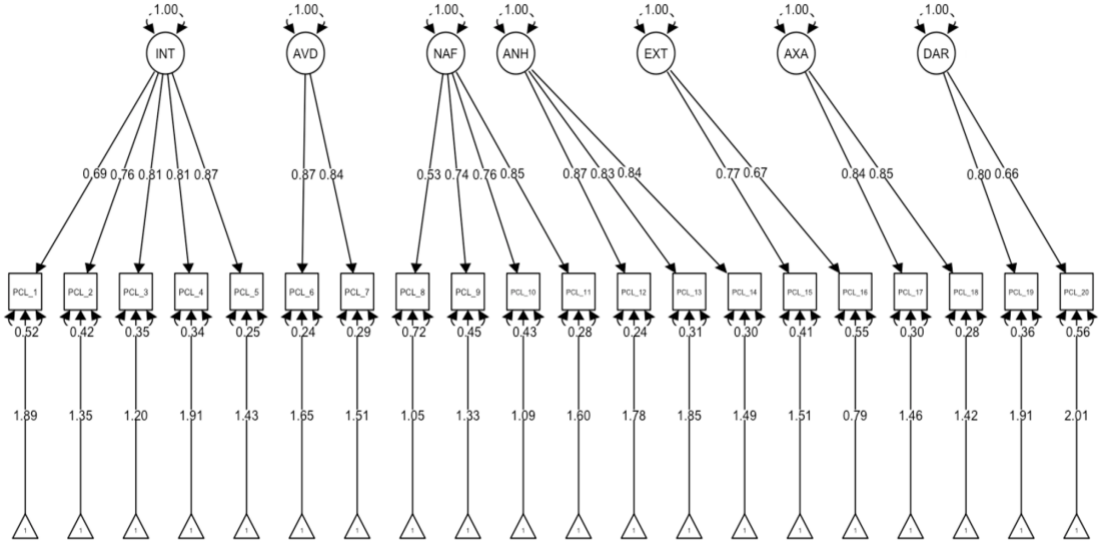
Anhedonia Factor Structure Model Path Diagram



Note. INT = Intrusions. AVD = Avoidance. NAF = Negative Affect. ANH = Anhedonia. DAR = Dysphoric Arousal. AXA = Anxious Arousal. PCL = PTSD Checklist for DSM-5. PCL_1 = Intrusive memories. PCL_2 = Nightmares. PCL_3 = Flashbacks. PCL_4 = Emotional reactivity. PCL_5 = Physiological reactivity. PCL_6. = Avoidance of thoughts. PCL_7 = Avoidance of reminders. PCL_8 = Trauma-related amnesia. PCL_9 = Negative beliefs PCL_10 = Blame. PCL_11 = Negative feelings. PCL_12 = Loss of interest. PCL_13 = Feeling detached. PCL_14 = Difficulty experiencing positive emotions. PCL_15 = Irritability PCL_16 = Risk taking. PCL_17 = Hypervigilance. PCL_18 = Startle. PCL_19 = Difficulty concentrating. PCL_20 = Sleep disturbance.

Figure 5

Hybrid Factor Structure Model Path Diagram for Strict Invariance



Note. INT = Intrusions. AVD = Avoidance. NAF = Negative Affect. ANH = Anhedonia. EXT = Externalizing Behaviors. DAR = Dysphoric Arousal. AXA = Anxious Arousal. PCL = PTSD Checklist for DSM-5. PCL_1 = Intrusive memories. PCL_2 = Nightmares. PCL_3 = Flashbacks. PCL_4 = Emotional reactivity. PCL_5 = Physiological reactivity. PCL_6. = Avoidance of thoughts. PCL_7 = Avoidance of reminders. PCL_8 = Trauma-related amnesia. PCL_9 = Negative beliefs PCL_10 = Blame. PCL_11 = Negative feelings. PCL_12 = Loss of interest. PCL_13 = Feeling detached. PCL_14 = Difficulty experiencing positive emotions. PCL_15 = Irritability PCL_16 = Risk taking. PCL_17 = Hypervigilance. PCL_18 = Startle. PCL_19 = Difficulty concentrating. PCL_20 = Sleep disturbance.

MGCFA Among Ethnic Groups

In the MGCFA, it was determined that the Hybrid model was also the best-performing model among the two samples relative to all other models (see Table 6 for fit indexes for each ethnic group and confirmatory factor analysis of the DSM-5 symptoms). Regarding ranking, the second-best-performing model was the Anhedonia model. The third best performing model was the Externalizing Behaviors model. The fourth best performing model was the DSM 5 Dysphoric Arousal. The fifth best performing model was the DSM-5.

Table 6

PTSD Multigroup Confirmatory Factor Analysis Indices of Fit

Model	χ^2	*df*	CFI	TLI	AIC	BIC	RMSEA [90% CI]	SRMR
Hispanics and Non-Hispanic Whites (*N* = 1,131)								
DSM-5	1361.885	328	.920	.907	53203.3	53846.7	.081 [.076, .085]	.051
DSM-5 Dysphoric Arousal	1125.654	320	.938	.926	52983.0	53665.4	.072 [.068, .077]	.047
Externalizing Behaviors	1023.457	310	.945	.932	52900.9	53632.0	.069 [.064, .074]	.044
Anhedonia	865.126	319	.957	.947	52742.5	53473.7	.061 [.056, .066]	.042
Hybrid	748.554	298	.965	.956	52649.9	53439.6	.056 [.051, .061]	.038

Note. X^2 =Chi Square; *df*= Degrees of Freedom; AIC = Akaike's information criterion; CFI = comparative fit index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; BIC = Bayesian Information Criterion.

MGCFA Model: Measurement Invariance

Invariance was also evaluated for the DSM-5 model because it is the current diagnostic criteria. The model met configural invariance, metric and scalar invariance (See Table 7 for fit indexes and Figure 1 for the factor structure path diagram). Strict invariance was examined last. Fit remained acceptable when the residuals were constrained across groups. Thus, strict invariance was the highest degree of invariance met.

Table 7
PTSD DSM-5 Model Measurement of Invariance Indices of Fit

Measurements of invariance	χ^2	*df*	CFI	TLI	AIC	BIC	RMSEA [90% CI]	SRMR
Configural	1361.885	328	.920	.907	53203.3	53846.7	.081 [.076, .085]	.051
Metric	1393.057	348	.919	.912	53194.5	53740.4	.079 [.075, .083]	.060
Scalar	1509.398	364	.911	.907	52720.7	53278.8	.081 [.076, .085]	.062
Strict	1541.743	384	.910	.911	53271.1	53641.6	.079 [.075, .083]	.062

Note. Hispanics and Non-Hispanic Whites (*N* = 1131); X^2 =Chi Square; *df*= Degrees of Freedom; AIC = Akaike's information criterion; CFI = comparative fit index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; BIC = Bayesian Information Criterion.

The Hybrid Model was next evaluated because it had the best fit. This model met for configural, metric, scalar, and strict invariance was achieved (See Table 8 for fit indexes and Figure 5 for factor structure path diagram for strict invariance). The model met configural invariance. This implies that the magnitude of the associations between the indicators and the latent variables in the Hybrid model was similar across groups. As such, it was deemed appropriate to assess for metric invariance. Metric invariance was then evaluated. Model fit remained adequate when equality constraints were placed on factor loadings across ethnic groups. Scalar invariance was then evaluated. Results supported strict invariance in that model fit remained good when item intercepts were constrained. This finding indicates that intercepts were invariant across ethnic groups. Strict invariance was examined last. Fit generally improved when the residuals were constrained across groups. Thus, strict invariance was the highest degree of invariance for which support was obtained. The Hybrid model demonstrated a better fit compared to the DSM-5 Model across all levels of invariance (configural, metric, scalar, and strict). The

Hybrid model consistently demonstrated higher CFI and TLI values across all levels of invariance, as well as lower RMSEA and SRMR values, indicating better overall model fit. Although the metric model had a lower AIC, the Hybrid model exhibited superior fit indices overall.

Table 8
PTSD Hybrid Model Measurement of Invariance Indices of Fit

Measurements of invariance	χ^2	*df*	CFI	TLI	AIC	BIC	RMSEA [90% CI]	SRMR
Configural	748.554	298	.965	.956	52649.9	53439.6	.056 [.051, .061]	.038
Metric	771.673	318	.965	.958	52633.1	53325.2	.054 [.049, .059]	.045
Scalar	885.342	331	.957	.951	52720.7	53349.5	.059 [.054, .064]	.048
Strict	903.296	351	.957	.954	52698.7	53230.0	.057 [.052, .062]	.047

Note. Hispanics and Non-Hispanic Whites (*N* = 1131); X^2 =Chi Square; *df*= Degrees of Freedom; AIC = Akaike's information criterion; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; BIC = Bayesian Information Criterion.

Hybrid Model MGCFA: Additional Constructs

A multigroup confirmatory factor analysis was conducted to examine differences in the covariance between depression and the latent factors for the Hybrid model of PTSD (See Table 9). Model fit remained adequate when equality constraints were placed on the covariances (See Table 10). This adds evidence to the similar behavior of the latent factors between both groups.

A follow-up analysis was conducted with the measure of general distress (K6). The model met strict invariance (See Table 9). Model fit remained adequate when equality constraints were placed on the covariances (See Table 10).

Table 9

Depression, Psychological Distress, and Hybrid Model Measurement of Invariance Indices of Fit

Measurements of invariance	χ^2	*df*	CFI	TLI	AIC	BIC	RMSEA [90% CI]	SRMR
PROMIS-D-SF								
Strict without covariance constraint	992.589	379	.956	.951	58658.7	59267.1	.058 [.053, .062]	.056
Strict with covariance constraint	1038.880	407	.955	.953	58648.1	59121.8	.057 [.052, .061]	.061
K6								
Strict without covariance constraint	971.079	379	.958	.953	57444.5	58053.7	.057 [.052, .061]	.055
Strict with covariance constraint	1038.88	407	.956	.954	57449.3	57922.1	.056 [.052, .061]	.059

Note. PROMIS-D-SF = Patient-Reported Outcomes Measurement Information System Depression Short-Form; K6 = Kessler Screening Scale for Psychological Distress; X^2 =Chi Square; *df*= Degrees of Freedom; AIC = Akaike's information criterion; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; BIC = Bayesian Information Criterion. Std.all = Standardized all standardizes by the variances of the latent variable and by the outcome.

Table 10

Depression, Psychological Distress, and Hybrid Model Measurement of Invariance Covariances

PROMIS-D-SF			**K6**	
Strict without covariance constraint				
	Latent Variables	Std. all	Latent Variables	Std. all
Hispanics				
	INT	.60	INT	.68
	AVD	.64	AVD	.71
	NAF	.80	NAF	.82

	ANH	.82	ANH	.83
	EXT	.79	EXT	.82
	DAR	.80	DAR	.82
	AXA	.62	AXA	.75
NHWs				
	INT	.62	INT	.69
	AVD	.66	AVD	.70
	NAF	.79	NAF	.79
	ANH	.79	ANH	.81
	EXT	.73	EXT	.68
	DAR	.67	DAR	.75
	AXA	.57	AXA	.61
Strict with covariance constraint				
	INT	.61	INT	.69
	AVD	.65	AVD	.70
	NAF	.80	NAF	.81
	ANH	.80	ANH	.82
	EXT	.76	EXT	.76
	DAR	.74	DAR	.79
	AXA	.60	AXA	.69

Note. Hispanics and Non-Hispanic Whites (N = 1131). INT = Intrusions. AVD = Avoidance. NAF = Negative Affect. ANH = Anhedonia. EXT = Externalizing Behaviors. DAR = Dysphoric Arousal. AXA = Anxious Arousal. Std. all = Standardized all standardizes by the variances of the latent variable and by the outcome.

Severity of Latent Variables in the Hybrid Model

NHWs reported significantly higher levels of intrusions (M = 1.95, SD = 1.06) compared to Hispanics (M = 1.80, SD = 1.04), $t(928) = 2.17$, $p = 0.030$. NHWs reported significantly higher levels of avoidance (M = 2.04, SD = 1.21) compared to Hispanics (M = 1.83, SD = 1.18), $t(924) = 2.83$, $p = 0.004$. NHWs reported significantly higher levels of anhedonia (M = 2.21, SD = 1.17) compared to Hispanics (M = 1.93, SD = 1.19), $t(940) = 3.62$, $p = 0.000$. NHWs reported significantly higher levels of externalizing behaviors (M = 1.47, SD = 1.11) compared to Hispanics (M = 1.36, SD = 1.12), $t(936) = 1.60$, $p = 0.109$. NHWs reported significantly higher

levels of dysphoric arousal (M = 1.91, SD = 1.23) compared to Hispanics (M = 1.82, SD = 1.21), $t(928) = 1.18$, $p = 0.237$. However, anxious arousal [NWHs M = 1.91, SD = 1.23, Hispanics M = 1.82, SD = 1.21, $t(927) = 1.60$, $p = 0.237$] and negative affect were not significantly different [M = 1.68, SD = 1.07, Hispanics M = 1.59, SD = 1.10), $t(940) = 1.32$, $p = 0.187$].

CHAPTER 4: DISCUSSION

The current study identified the optimal PTSD factor structure for Hispanics and NHW hurricane survivors. Results of the MGCFA indicated that the seven-factor Hybrid model fit the data significantly better than the DSM-5 model, DSM-5 Dysphoric Arousal model, Externalizing Behavior model, and Anhedonia model. The Hybrid model met the criterion for strict invariance, which suggests the relations among symptoms are comparable in both NHW and Hispanic trauma survivors. The prevalence rate of PTSD in the current sample (52%) was consistent with prior prevalence work examining victims in disasters (3.7% - 60%; Neria et al., 2008). The findings of the current study suggest that the factor structure of PTSD is comparable across Hispanics and NHWs. The Hybrid model met criteria for strict invariance. Most importantly, the Hybrid model demonstrated a better fit compared to the DSM-5 model across all levels of invariance (configural, metric, scalar, and strict). Furthermore, the relation between each factor of the Hybrid model, and the constructs of depression and psychological distress were comparable. These results support the use of this PTSD factor structure among Hispanics. This provides further support for the comparability of psychological constructs across different cultural backgrounds in the Hispanic and NHW populations in the United States.

The superior fit of the hybrid model contrasts with prior studies conducted with Hispanic samples (Durón-Figueroa et al., 2019; Soberón et al., 2016). These studies found that the Anhedonia model had better fit. However, these studies were conducted with Hispanic populations in countries where Spanish is predominantly spoken. A prior study found that English-preferring and Spanish-preferring Hispanics differ in their report of distress and PTSD symptom severity (Perilla, 2002). Cultural factors may explain the

differences in fit among these models. US-based Hispanics who have adopted American customs may exhibit symptoms similar to those of their NHW counterparts. For Hispanic immigrants to the United States, the process often involves acculturation, which entails unlearning certain culturally ingrained behaviors, and assimilation, which consists of adopting the behavioral norms of the new cultural environment (Lara et al., 2005). Prior studies examining mental and physical health prevalences and severity have found differences in more acculturated and assimilated Hispanics (Lara et al., 2005; Perilla et al., 2002). Thus, these processes may influence how Hispanics report PTSD symptoms. As such, it is crucial to contextualize PTSD symptoms based on the individual's connection to the dominant culture in the way they understand and describe their distress (Van Rooyen & Nqweni, 2012).

Although previous research has documented higher ratings of PTSD symptom severity among Hispanics compared to NHWs following a natural disaster (Alcántara et al., 2013; Hall-Clark et al., 2016; Hoyt et al., 2010; Marshall et al., 2009; F. Norris et al., 2001; Ortega & Rosenheck, 2000; Perilla et al., 2002; Pole et al., 2005), the present study's findings differ. Only one other known study also reported that NHWs had greater PTSD symptom severity when compared to Hispanics (Arbona et al., 2019). Another study reported the Hispanic study sample did not differ in PTSD severity compared to NHWs (Adams & Boscarino, 2005). Regarding natural disasters, a study found that the relationship between loss of services and PTSD symptoms was stronger among NHWs (Davidson et al., 2013). Conversely, an earlier study suggested that Hispanics experienced more severe PTSD symptoms and greater traumatic experiences than NHWs (Perilla et al., 2002). These conflicting results highlight the need to examine cultural

factors that may influence PTSD symptom expression and severity. An alternative hypothesis to consider is that the NHW sample in this study, characterized by low socioeconomic status and educational attainment, may be subject to significant social risk factors that are known to be major determinants of health outcomes, potentially explaining the observed results.

When examining cultural factors, the current study's findings continue to diverge from previous research. In the current study, the NHW had elevated intrusions, avoidance, anhedonia, externalizing behaviors, and dysphoric arousal compared to Hispanics. The majority of prior findings have suggested the opposite, that symptom clusters are usually elevated in Hispanics relative to NWHs (DiGangi et al., 2016; Marshall, 2004; F. H. Norris, Perilla, & Murphy, 2001 a; F. H. Norris, Perilla, Ibañez, et al., 2001 b; Ortega & Rosenheck, 2000; Perilla et al., 2002; Pole et al., 2005). In a majority of prior studies, it has been commonly reported that Hispanics have higher avoidance symptoms. It has been discussed that avoidance-oriented coping varies by ethnocultural background (Marsella et al.1996; Yeomans & Forman, 2009). More specifically, a study found that the relationship between avoidance and language preference among Hispanic individuals was mediated by a fatalistic outlook, which was associated with the development of PTSD (Perilla et al., 2002). A fatalistic outlook, conceptualized as the stoic acceptance of life circumstances, has been cited as a common phenomenon in traditional Hispanic cultures, often intertwined with religious beliefs ascribing events to a higher power's intentions (Abraído-Lanza et al., 2007; Martín-Baró, 1987; Perilla et al., 2002; Pole et al., 2005). Previous research suggests that when fatalism is a dominant cultural attitude, it may contribute to learned helplessness and

inadequate disaster preparedness, with natural disasters perceived as retribution for sins (O'Connell et al., 2017; Rahmani et al., 2022). Notably, studies have shown that Hispanics are more likely than non-Hispanic Whites to endorse the belief of "castigo divino," or divine punishment, concerning chronic diseases (Abraído-Lanza et al., 2007; Antshel, 2002), highlighting the need to consider culturally-specific beliefs and potential distinctions in fatalistic attitude for different traumatic experiences.

While cultural factors offer some explanation for these differences, it's also important to consider longitudinal and environmental factors that may influence the results. The lack of differences among the groups in the current study can be attributed to several potential explanations. For instance, Hispanics in this study may have been more likely to be raised in coastal areas like Puerto Rico and Florida, where hurricanes are common occurrences. This repeated exposure could have fostered resilience and habituation to this type of adversity (Fothergill et al., 1999; Park & Franklin, 2023). However, the cross-sectional nature of this study limits our ability to draw definitive conclusions. The timing of the assessment may have contributed to the observed lack of difference between groups. A longitudinal study would be necessary to determine if these findings persist over time. Further research is warranted to examine long-term PTSD severity differences among Hispanics following repeated hurricane exposure. Additionally, future studies should investigate potential protective factors and supportive social networks that could buffer against the development or severity of PTSD symptomatology in Hispanic individuals.

Among Hispanics, the aftermath of a Hurricane can be detrimental without the appropriate support. A previous study revealed significant disparities between NHWs and

Hispanics regarding their perceived capability to recover, rebuild, and prepare for future natural disasters (Gallup, Inc., 2023). For Hispanics, 53-56% reported feeling able to recover and reconstruct their homes, access necessary resources, and take preparatory measures for their households. For NHWs, the corresponding figures were markedly higher (65% to 70%). Moreover, socioeconomic factors limit their resources to cope with traumatic stressors, especially after a hurricane (Roberts et al., 2011). A prior study reported that Hispanics experienced a greater loss of services than their NHW counterparts (Davidson et al., 2013). As extreme weather events like hurricanes and floods are likely to increase in frequency and severity in the coming decades (United States Environmental Protection Agency [U.S. EPA], 2016), these issues are more likely to disproportionately impact Hispanic communities, particularly those situated in low-resourced, coastal, or flood-prone areas (Bakkensen & Ma, 2020). The compounded stressors increase the vulnerability of these populations to develop PTSD following natural disasters. Future efforts should focus on identifying innovative strategies to disseminate hurricane disaster information and relief initiatives in a manner that addresses fears surrounding immigration enforcement and promote safety in potential encounters with immigration authorities. Furthermore, accessible community-based approaches should be implemented, such as deploying mobile clinics in conjunction with cultural brokers within heavily impacted Hispanic neighborhoods (Lewis et al., 2019). Concurrently, the development of user-friendly online resources with intuitive navigation could enhance outreach and access to essential services for Hispanics (Ruggiero et al., 2015). Understanding and addressing these intersecting factors are essential in

developing interventions that effectively mitigate PTSD symptoms experienced by the Hispanic community.

Limitations

The study had several limitations of note. First, data on the specific sample characteristics pertinent to the Hispanic population, such as country of origin, immigration status, language preference, and acculturation levels were not collected. Prior studies have shown that these factors can influence symptom presentation and maintenance of PTSD (Durón-Figueroa et al., 2019; Norris et al., 2001; Perilla et al., 2002; Soberón et al., 2016). Therefore, the social constructs and experiences underlying PTSD may vary considerably across cultures. The majority of both NHW and Hispanic groups reported low PTSD severity, restricting the generalizability of findings to individuals experiencing more severe PTSD symptoms. Future studies may benefit from examining more severe cases. Additionally, participants across groups resided in similar environments, suggesting comparable levels of resource access and trauma exposure, which may have contributed to similar manifestations of PTSD symptomatology. However, the study did not specifically examine hurricane-related traumatic experiences such as the availability of resources, loss of power, or willingness to seek assistance. Thus, inequities in service delivery between Hispanics and NHWs could not be examined as they pertain to PTSD symptoms or the PTSD factor structure.

Relatedly, discrimination-related trauma was not examined but can be compounded by natural disaster exposure, which can exacerbate PTSD symptomatology. As such, qualitative experiences on symptom presentation would be informative, as similar symptoms may not fully capture individual experiences (e.g., minority stressors or

reporting differences; Marshall et al., 2009; Ortega & Rosenheck, 2000). Overcoming these limitations is crucial for developing maximally effective and culturally responsive PTSD interventions among Hispanic individuals.

Conclusions

In conclusion, the current study found that the best-fitting PTSD factor structure model among Hispanics and NWHs is the seven-factor Hybrid model. Out of the five candidate PTSD factor structures, the seven-factor Hybrid model revealed a superior fit among Hispanics and NHWs. Findings also demonstrated that the PTSD factor structure is invariant across NWHs and Hispanics. These findings suggest that the underlying factor structure is comparable among both groups, and support the use of the PCL-5 with Hispanic populations. Further research is needed to understand how to increase adherence and tailor treatment to the specific needs of Hispanics to address/overcome minority stressors and increase long-term outcomes. Overall, these findings represent an important step towards refining our understanding of the underlying factor structure among Hispanics and expanding support for a well-established model with Hispanics.

REFERENCES

Abraído-Lanza, A. F., Viladrich, A., Flórez, K. R., Céspedes, A., Aguirre, A. N., & De La Cruz, A. A. (2007). Commentary: Fatalismo Reconsidered: A Cautionary Note for Health-Related Research and Practice with Latino Populations. *Ethnicity & Disease*, *17*(1), 153–158. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3617551/

Adams, R. E., & Boscarino, J. A. (2005). Differences in Mental Health Outcomes among Whites, African Americans, and Hispanics Following a Community Disaster. *Psychiatry*, *68*(3), 250–265. https://doi.org/10.1521/psyc.2005.68.3.250

Alcántara, C., Casement, M. D., & Lewis-Fernández, R. (2013). Conditional Risk for PTSD among Latinos: A Systematic Review of Racial/Ethnic Differences and Sociocultural Explanations. *Clinical Psychology Review*, *33*(1), 107–119. https://doi.org/10.1016/j.cpr.2012.10.005

American Psychiatric Association [APA]. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th edition, text revision.). American Psychiatric Association.

American Public Health Association. (2006). *Addressing the Needs of Immigrants in Response to Natural and Human-Made Disasters in the United States*. https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/23/17/36/addressing-the-needs-of-immigrants-in-response-to-natural-and-humanmade-disasters-in-the-us.

Antshel, K. (2002). Integrating culture as a means of improving treatment adherence in the Latino population. *Psychology, Health&Medicine*, 435–449. https://doi.org/10.1080/1354850021000015258

APA. (1987). *Diagnostic and Statistical Manual of Mental Disorders: DSM-lII-R* (3rd edition, text revision.). American Psychatric Association.

APA. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR* (4th edition, text revision.). American Psychiatric Association.

APA. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. (5th edition). American Psychiatric Association.

Arbona, C., Fan, W., Schwartz, J., Pao, C., Tran, J. K., & Buser, S. (2019). Measurement and Structural Invariance of Posttraumatic Stress Disorder Symptoms in Hispanic and Caucasian Firefighters: A Bias-Corrected Bootstrap Confidence Intervals Approach. *Assessment*, *26*(2), 209–222. https://doi.org/10.1177/1073191116685805

Arellano-Morales, L., Roesch, S. C., Gallo, L. C., Emory, K. T., Molina, K. M., Gonzalez, P., Penedo, F. J., Navas-Nacher, E. L., Teng, Y., Deng, Y., Isasi, C. R., Schneiderman, N., & Brondolo, E. (2015). Prevalence and Correlates of Perceived Ethnic Discrimination in the Hispanic Community Health Study/Study of Latinos Sociocultural Ancillary Study. *Journal of Latina/o Psychology*, *3*(3), 160–176. https://doi.org/10.1037/lat0000040

Armour, C. (2015). The underlying dimensionality of PTSD in the diagnostic and statistical manual of mental disorders: Where are we going? *European Journal of Psychotraumatology*, *6*, 10.3402/ejpt.v6.28074. https://doi.org/10.3402/ejpt.v6.28074

Armour, C., Elhai, J. D., Richardson, D., Ractliffe, K., Wang, L., & Elklit, A. (2012). Assessing a five factor model of PTSD: Is dysphoric arousal a unique PTSD construct showing differential relationships with anxiety and depression? *Journal of Anxiety Disorders*, *26*(2), 368–376. https://doi.org/10.1016/j.janxdis.2011.12.002

Armour, C., Tsai, J., Durham, T. A., Charak, R., Biehn, T. L., Elhai, J. D., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress symptoms: Support for a hybrid Anhedonia and Externalizing Behaviors model. *Journal of Psychiatric Research*, *61*, 106–113. https://doi.org/10.1016/j.jpsychires.2014.10.012

Bakkensen, L. A., & Ma, L. (2020). Sorting over flood risk and implications for policy reform. *Journal of Environmental Economics and Management*, *104*, 102362. https://doi.org/10.1016/j.jeem.2020.102362

Belkhir, J. A., & Charlemaine, C. (2007). Race, Gender and Class Lessons from Hurricane Katrina. *Race, Gender & Class*, *14*(1/2), 120–152. https://www.jstor.org/stable/41675200

Biehn, T. L., Elhai, J. D., Seligman, L. D., Tamburrino, M., Armour, C., & Forbes, D. (2013). Underlying Dimensions of DSM-5 Posttraumatic Stress Disorder and Major Depressive Disorder Symptoms. *Psychological Injury and Law*, *6*(4), 290–298. https://doi.org/10.1007/s12207-013-9177-4

Blais, R. K. (2022). The association of self-reported romantic relationship satisfaction and anhedonia symptoms secondary to posttraumatic stress among trauma-exposed male service members/veterans. *Psychological Trauma: Theory, Research, Practice, and Policy*, *14*(2), 318–325. https://doi.org/10.1037/tra0001058

Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5): Development and Initial Psychometric Evaluation. *Journal of Traumatic Stress*, *28*(6), 489–498. https://doi.org/10.1002/jts.22059

Bovin, M. J., Marx, B. P., Weathers, F. W., Gallagher, M. W., Rodriguez, P., Schnurr, P. P., & Keane, T. M. (2016). Psychometric properties of the PTSD Checklist for Diagnostic and Statistical Manual of Mental Disorders–Fifth Edition (PCL-5) in veterans. *Psychological Assessment*, *28*, 1379–1391. https://doi.org/10.1037/pas0000254

Cahill, K. M., Updegraff, K. A., Causadias, J. M., & Korous, K. M. (2021). Familism values and adjustment among Hispanic/Latino individuals: A systematic review and meta-analysis. *Psychological Bulletin*, *147*(9), 947–985. https://doi.org/10.1037/bul0000336

Clutter, A. W., & Nieto, R. D. (2000). *Understanding the Hispanic culture*. Ohio State University. Ohioline - Fact Sheet. http://ohioline.osu.edu/

Cohen, A. K., Nussbaum, J., Ritterman Weintraub, M. L., Nichols, C. R., & Yen, I. H. (2020). Association of Adult Depression With Educational Attainment, Aspirations, and Expectations. *Preventing Chronic Disease*, *17*. https://doi.org/10.5888/pcd17.200098

Cole, T. A., Dubuclet, C. M., Valentine, J., Meyer, E. A., & Orcutt, H. K. (2024). Assessing the mediating role of emotion regulation and experiential avoidance

within a posttraumatic stress disorder and racial trauma framework. *Psychological Trauma: Theory, Research, Practice and Policy*, *16*(2), 254–261. https://doi.org/10.1037/tra0001487

Consoli, A. J., López, I., & Whaling, K. M. (2021). Alternate Cultural Paradigms in Latinx Psychology: An Empirical, Collaborative Exploration. *Journal of Humanistic Psychology*, 00221678211051797. https://doi.org/10.1177/00221678211051797

Crespo, M., Gutiérrez, M., & Soberón, C. (2017). *Evaluación Global de Estrés Postraumatico 5—EGEP 5*.

Davidson, T. M., Price, M., McCauley, J. L., & Ruggiero, K. J. (2013). Disaster Impact Across Cultural Groups: Comparison of Whites, African Americans, and Latinos. *American Journal of Community Psychology*, *52*(1–2), 97–105. https://doi.org/10.1007/s10464-013-9579-1

DiGangi, J., Ohanian, D., & Jason, L. A. (2016). A Factor Analysis of PTSD with Latino Samples with Substance Use Disorders. *Journal of Addiction & Prevention*, *4*(2), 7. https://doi.org/10.13188/2330-2178.1000031

Donnelly, E. A., & Bennett, M. (2014). Development of a critical incident stress inventory for the emergency medical services. *Traumatology: An International Journal*, *20*, 1–8. https://doi.org/10.1177/1534765613496646

Donner, W., & Rodríguez, H. (2008). Population Composition, Migration and Inequality: The Influence of Demographic Changes on Disaster Risk and Vulnerability. *Social Forces*, *87*(2), 1089–1114. https://www.jstor.org/stable/20430904

Durón-Figueroa, R., Cárdenas-López, G., Castro-Calvo, J., & Rosa-Gómez, A. D. la. (2019). Adaptación de la Lista Checable de Trastorno por Estrés Postraumático para DSM-5 en Población Mexicana. *Acta de investigación psicológica*, *9*(1), 26–36. https://doi.org/10.22201/fpsi.20074719e.2019.1.03

Elhai, J. D., & Palmieri, P. A. (2011). The factor structure of posttraumatic stress disorder: A literature update, critique of methodology, and agenda for future research. *Journal of Anxiety Disorders*, *25*(6), 849–854. https://doi.org/10.1016/j.janxdis.2011.04.007

Emanuel, K. (2005). *Divine Wind: The History and Science of Hurricanes*. Oxford University Press.

Federal Emergency Management Agency. (2023). *Disasters and Other Declarations | FEMA.gov*. https://www.fema.gov/disaster/declarations?field_dv2_declaration_date_value%5Bmin%5D=2019&field_dv2_declaration_date_value%5Bmax%5D=2023&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All

Fierros, M., & Smith, C. (2006). The Relevance of Hispanic Culture to the Treatment of a Patient with Posttraumatic Stress Disorder (PTSD). *Psychiatry (Edgmont)*, *3*(10), 49–56. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2945874/

Findling, M. G., Bleich, S. N., Casey, L. S., Blendon, R. J., Benson, J. M., Sayde, J. M., & Miller, C. (2019). Discrimination in the United States: Experiences of Latinos. *Health Services Research*, *54*(Suppl 2), 1409–1418. https://doi.org/10.1111/1475-6773.13216

Flanagin, A., Frey, T., Christiansen, S. L., & AMA Manual of Style Committee. (2021).

Updated Guidance on the Reporting of Race and Ethnicity in Medical and Science Journals. *JAMA*, *326*(7), 621–627. https://doi.org/10.1001/jama.2021.13304

Folayan, M. O., Zuñiga, R. A. A., Ellakany, P., Yousaf, M. A., Osamika, B. E., Virtanen, J. I., Gaffar, B., Lawal, F. B., Khalid, Z., Aly, N. M., Lusher, J., & Nguyen, A. L. (2024). Socio-economic factors associated with post-traumatic stress symptoms among adolescents and young people during the first wave of the COVID-19 pandemic. *Scientific Reports*, *14*(1), 2276. https://doi.org/10.1038/s41598-023-50333-8

Fothergill, A., Maestas, E. G. M., & Darlington, J. D. (1999). Race, Ethnicity and Disasters in the United States: A Review of the Literature. *Disasters*, *23*(2), 156–173. https://doi.org/10.1111/1467-7717.00111

Fox, Z., & Gull, Z. (2017, September 8). *Lower-income households hurt most by hurricane flooding*. https://www.spglobal.com/marketintelligence/en/news-insights/trending/FhDosjVLVR-MxpOOw-fO6g2

Galatzer-Levy, I. R., & Bryant, R. A. (2013). 636,120 Ways to Have Posttraumatic Stress Disorder. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *8*(6), 651–662. https://doi.org/10.1177/1745691613504115

Gallup, Inc. (2023, October 30). *Black, Hispanic Americans More Vulnerable to Extreme Weather*. Gallup.Com. https://news.gallup.com/poll/513401/black-hispanic-americans-vulnerable-extreme-weather.aspx

Grieb, S. M., Platt, R., Vazquez, M. G., Alvarez, K., & Polk, S. (2023). Mental Health Stigma Among Spanish-Speaking Latinos in Baltimore, Maryland. *Journal of Immigrant and Minority Health*, 1–9. https://doi.org/10.1007/s10903-023-01488-z

Hall-Clark, B., Sawyer, B., Golik, A., & Asnaani, A. (2016). Racial/Ethnic Differences in Symptoms of Posttraumatic Stress Disorder. *Current Psychiatry Reviews*, *12*(2), 124–138. https://doi.org/10.2174/1573400512666160505150257

Hatzenbuehler, M. L. (2009). How does sexual minority stigma "get under the skin"? A psychological mediation framework. *Psychological Bulletin*, *135*(5), 707–730. https://doi.org/10.1037/a0016441

Hernandez, P. (2023, November 6). *Latinos face higher flood risks than other groups*. Headwaters Economics. https://headwaterseconomics.org/natural-hazards/latinos-face-higher-flood-risks/

Hoyt, T., Link to external site, this link will open in a new window, & Yeater, E. A. (2010). Comparison of posttraumatic stress disorder symptom structure models in Hispanic and White college students. *Psychological Trauma: Theory, Research, Practice, and Policy*, *2*(1), 19–30. http://dx.doi.org.ezproxy.uvm.edu/10.1037/a0018745

Hoyt, T., & Yeater, E. A. (2010). Comparison of posttraumatic stress disorder symptom structure models in Hispanic and White college students. *Psychological Trauma: Theory, Research, Practice, and Policy*, *2*(1), 19–30. http://dx.doi.org.ezproxy.uvm.edu/10.1037/a0018745

Jocson, R. M., Alers-Rojas, F., Ceballo, R., & Arkin, M. (2020). Religion and Spirituality: Benefits for Latino Adolescents Exposed to Community Violence. *Youth & Society*, *52*(3), 349–376. https://doi.org/10.1177/0044118X18772714

Kaysen, D., Rhew, I. C., Bittinger, J., Bedard-Gilligan, M., Garberson, L. A., Hodge, K.

A., Nguyen, A. J., Logan, D. E., Dworkin, E. R., & Lindgren, K. P. (2021). Prevalence and Factor Structure of PTSD in DSM-5 Versus DSM-IV in a National Sample of Sexual Minority Women. *Journal of Interpersonal Violence, 36*(21–22), NP12388–NP12410. https://doi.org/10.1177/0886260519892960

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S.-L. T., Walters, E. E., & Zaslavsky, A. M. (2002). Short screening scales to monitor population prevalences and trends in non-specific psychological distress. *Psychological Medicine, 32*(6), 959–976. https://doi.org/10.1017/S0033291702006074

Kilpatrick D. G., Resnick H. S., Milanak M. E., Miller M. W., Keyes K. M., & Friedman M. J. (2013). National Estimates of Exposure to Traumatic Events and PTSD Prevalence Using DSM-IV and DSM-5 Criteria. *Journal of Traumatic Stress*, *26*(5), 537–547. https://doi.org/10.1002/jts.21848

King, D. W., Leskin, G. A., King, L. A., & Weathers, F. W. (1998). Confirmatory factor analysis of the clinician-administered PTSD Scale: Evidence for the dimensionality of posttraumatic stress disorder. *Psychological Assessment, 10*, 90–96. https://doi.org/10.1037/1040-3590.10.2.90

King, M., Semlyen, J., Tai, S. S., Killaspy, H., Osborn, D., Popelyuk, D., & Nazareth, I. (2008). A systematic review of mental disorder, suicide, and deliberate self harm in lesbian, gay and bisexual people. *BMC Psychiatry*, *8*, 70. https://doi.org/10.1186/1471-244X-8-70

Lara, M., Gamboa, C., Kahramanian, M. I., Morales, L. S., & Hayes Bautista, D. E. (2005). Acculturation and Latino Health in the United States: A Review of the Literature and its Sociopolitical Context. *Annual Review of Public Health, 26*, 367–397. https://doi.org/10.1146/annurev.publhealth.26.021304.144615

Lewis, M. L., Rappe, P. T., Tierney, L. K., & Albury, J. D. (2019). Stay or Go! Challenges for Hispanic Families Preceding Hurricanes: Lessons Learned. *Journal of Family Strengths*, *19*(1). https://doi.org/10.58464/2168-670X.1403

Lewis-Fernández, R., Turner, J. B., Marshall, R., Turse, N., Neria, Y., & Dohrenwend, B. P. (2008). Elevated rates of current PTSD among Hispanic veterans in the NVVRS: True prevalence or methodological artifact? *Journal of Traumatic Stress*, *21*(2), 123–132. https://doi.org/10.1002/jts.20329

Liu, P., Wang, L., Cao, C., Wang, R., Zhang, J., Zhang, B., Wu, Q., Zhang, H., Zhao, Z., Fan, G., & Elhai, J. D. (2014). The underlying dimensions of DSM-5 posttraumatic stress disorder symptoms in an epidemiological sample of Chinese earthquake survivors. *Journal of Anxiety Disorders*, *28*(4), 345–351. https://doi.org/10.1016/j.janxdis.2014.03.008

López, C. M., Andrews III, A. R., Chisolm, A. M., de Arellano, M. A., Saunders, B., & Kilpatrick, Dean. G. (2017). Racial/ethnic differences in trauma exposure and mental health disorders in adolescents. *Cultural Diversity and Ethnic Minority Psychology*, *23*(3), 382–387. https://doi.org/10.1037/cdp0000126

Marsella, A. J. (2010). Ethnocultural aspects of PTSD: An overview of concepts, issues, and treatments. *Traumatology*, *16*(4), 17–26. https://doi.org/10.1177/1534765610388062

Marshall, G. N. (2004). Posttraumatic Stress Disorder Symptom Checklist: Factor Structure and English–Spanish Measurement Invariance. *Journal of Traumatic*

Stress, *17*(3), 223–230. https://doi.org/10.1023/B:JOTS.0000029265.56982.86
Marshall, G. N., Schell, T. L., & Miles, J. N. V. (2009). Ethnic Differences in Posttraumatic Distress: Hispanics' Symptoms Differ in Kind and Degree. *Journal of Consulting and Clinical Psychology*, *77*(6), 1169–1178. https://doi.org/10.1037/a0017721
Martín-Baró, I. (1987). *El latino indolente: Carácter ideológico del fatalismo latinoamericano*. Psicología Politica Latinoamericana. Caracas, Panapo,135-162.
Méndez, M., Flores-Haro, G., & Zucker, L. (2020). The (in)visible victims of disaster: Understanding the vulnerability of undocumented Latino/a and indigenous immigrants. *Geoforum*, *116*, 50–62. https://doi.org/10.1016/j.geoforum.2020.07.007
Meyer, I. H. (2003). Prejudice, Social Stress, and Mental Health in Lesbian, Gay, and Bisexual Populations: Conceptual Issues and Research Evidence. *Psychological Bulletin*, *129*(5), 674–697. https://doi.org/10.1037/0033-2909.129.5.674
Mora, G. C. (2014). Cross-Field Effects and Ethnic Classification: The Institutionalization of Hispanic Panethnicity, 1965 to 1990. *American Sociological Review*, *79*(2), 183–210. https://doi.org/10.1177/0003122413509813
Moyce, S., Thompson, S., Metcalf, M., Velazquez, M., Aghbashian, E., Sisson, N., & Claudio, D. (2022). Rural Hispanic Perceptions of Mental Health: A Qualitative Study. *Journal of Transcultural Nursing : Official Journal of the Transcultural Nursing Society*, *33*(3), 346–354. https://doi.org/10.1177/10436596211070592
National Oceanic and Atmospheric Administration [NOAA]. (2013). *National Coastal Population Report: Population Trends from 1970 to 2020*. https://coast.noaa.gov/digitalcoast/training/population-report.html
Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: A systematic review. *Psychological Medicine*, *38*(4), 467–480. https://doi.org/10.1017/S0033291707001353
Norris, F. H., & Perilla, J. L. (1996). The revised Civilian Mississippi Scale for PTSD: Reliability, validity, and cross-language stability. *Journal of Traumatic Stress*, *9*, 285–298. https://doi.org/10.1002/jts.2490090210
Norris, F. H., Perilla, J. L., Ibañez, G. E., & Murphy, A. D. (2001). Sex differences in symptoms of posttraumatic stress: Does culture play a role? *Journal of Traumatic Stress*, *14*(1), 7–28. https://doi.org/10.1023/A:1007851413867
Norris, F. H., Perilla, J. L., & Murphy, A. D. (2001). Postdisaster stress in the United States and Mexico: A cross-cultural test of the multicriterion conceptual model of posttraumatic stress disorder. *Journal of Abnormal Psychology*, *110*(4), 553–563. http://dx.doi.org/10.1037/0021-843X.110.4.553
Norris, F., Perilla, J., & Murphy, A. (2001). Postdisaster stress in the United States and Mexico: A cross-cultural test of the multicriterion conceptual model of posttraumatic stress disorder. *Journal of Abnormal Psychology*. https://doi.org/10.1037//0021-843X.110.4.553
Nugent, N. R., Koenen, K. C., & Bradley, B. (2012). Heterogeneity of Posttraumatic Stress Symptoms in a Highly Traumatized Low Income, Urban, African American Sample. *Journal of Psychiatric Research*, *46*(12), 1576–1583. https://doi.org/10.1016/j.jpsychires.2012.07.012
O'Connell, E., Abbott, R. P., & White, R. S. (2017). Emotions and beliefs after a disaster:

A comparative analysis of Haiti and Indonesia. *Disasters*, *41*(4), 803–827. https://doi.org/10.1111/disa.12227

Ortega, A. N., & Rosenheck, R. (2000). Posttraumatic Stress Disorder Among Hispanic Vietnam Veterans. *American Journal of Psychiatry*, *157*(4), 615–619. https://doi.org/10.1176/appi.ajp.157.4.615

Owens, J., & Lynch, S. M. (2012). Black and Hispanic immigrants' resilience against negative ability racial stereotypes at selective colleges and universities in the United States. *Sociology of Education*, *85*(4), 303–325. https://doi.org/10.1177/0038040711435856

Park, G., & Franklin, R. (2023). The changing demography of hurricane at-risk areas in the United States (1970–2018). *Population, Space and Place*, *29*(6), e2685. https://doi.org/10.1002/psp.2685

Perez, M., Perko, V., Yu, K. Y., Hernández, J. C., Ohrt, T. K., & Stadheim, J. (2021). Identifying central symptoms of eating disorders among ethnic and racial minority women. *Journal of Abnormal Psychology*. https://doi.org/10.1037/abn0000695

Perilla, J. L., Norris, F. H., & Lavizzo, E. A. (2002). Ethnicity, Culture, and Disaster Response: Identifying and Explaining Ethnic Differences in PTSD Six Months After Hurricane Andrew. *Journal of Social and Clinical Psychology*, *21*(1), 20–45. https://doi.org/10.1521/jscp.21.1.20.22404

Perreira, K. M., Gotman, N., Isasi, C. R., Arguelles, W., Castañeda, S. F., Daviglus, M. L., Giachello, A. L., Gonzalez, P., Penedo, F. J., Salgado, H., & Wassertheil-Smoller, S. (2015). Mental Health and Exposure to the United States: Key Correlates from the Hispanic Community Health Study of Latinos. *The Journal of Nervous and Mental Disease*, *203*(9), 670–678. https://doi.org/10.1097/NMD.0000000000000350

Perreira, K. M., & Pedroza, J. M. (2019). POLICIES OF EXCLUSION: IMPLICATIONS FOR THE HEALTH OF IMMIGRANTS AND THEIR CHILDREN. *Annual Review of Public Health*, *40*, 147–166. https://doi.org/10.1146/annurev-publhealth-040218-044115

Pilkonis, P. A., Choi, S. W., Reise, S. P., Stover, A. M., Riley, W. T., & Cella, D. (2011). Item Banks for Measuring Emotional Distress From the Patient-Reported Outcomes Measurement Information System (PROMIS®): Depression, Anxiety, and Anger. *Assessment*, *18*(3), 263–283. https://doi.org/10.1177/1073191111411667

Pole, N., Best, S. R., Metzler, T., & Marmar, C. R. (2005). Why Are Hispanics at Greater Risk for PTSD? *Cultural Diversity and Ethnic Minority Psychology*, *11*(2), 144–161. https://doi.org/10.1037/1099-9809.11.2.144

Potochnick, S., Chen, J.-H., & Perreira, K. (2017). Local-Level Immigration Enforcement and Food Insecurity Risk among Hispanic Immigrant Families with Children: National-Level Evidence. *Journal of Immigrant and Minority Health*, *19*(5), 1042–1049. https://doi.org/10.1007/s10903-016-0464-5

Putnick, D. L., & Bornstein, M. H. (2016). Measurement Invariance Conventions and Reporting: The State of the Art and Future Directions for Psychological Research. *Developmental Review : DR*, *41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Rahmani, M., Muzwagi, A., & Pumariega, A. J. (2022). Cultural Factors in Disaster Response Among Diverse Children and Youth Around the World. *Current*

Psychiatry Reports, *24*(10), 481–491. https://doi.org/10.1007/s11920-022-01356-x

Roberts, A. L., Gilman, S. E., Breslau, J., Breslau, N., & Koenen, K. C. (2011). Race/ethnic differences in exposure to traumatic events, development of post-traumatic stress disorder, and treatment-seeking for post-traumatic stress disorder in the United States. *Psychological Medicine*, *41*(1), 71–83. https://doi.org/10.1017/S0033291710000401

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*, 1–36. https://doi.org/10.18637/jss.v048.i02

Ruef, A. M., Litz, B. T., & Schlenger, W. E. (2000). Hispanic Ethnicity and Risk for Combat-Related Posttraumatic Stress Disorder. *Cultural Diversity & Ethnic Minority Psychology*, *6*(3), 235–251. https://doi.org/10.1037/1099-9809.6.3.235

Ruggiero, K. J., Davidson, T. M., McCauley, J., Gros, K. S., Welsh, K., Price, M., Resnick, H. S., Danielson, C. K., Soltis, K., Galea, S., Kilpatrick, D. G., Saunders, B. E., Nissenboim, J., Muzzy, W., Fleeman, A., & Amstadter, A. B. (2015). Bounce Back Now! Protocol of a population-based randomized controlled trial to examine the efficacy of a Web-based intervention with disaster-affected families. *Contemporary Clinical Trials*, *40*, 138–149. https://doi.org/10.1016/j.cct.2014.11.018

Seah, R., & Berle, D. (2022). Shame Mediates the Relationship Between Negative Trauma Attributions and Posttraumatic Stress Disorder (PTSD) Symptoms in a Trauma Exposed Sample. *Clinical Psychology in Europe*, *4*(3), e7801. https://doi.org/10.32872/cpe.7801

Seligowski, A. V., & Orcutt, H. K. (2016). Support for the 7-factor hybrid model of PTSD in a community sample. *Psychological Trauma: Theory, Research, Practice, and Policy*, *8*(2), 218–221. https://doi.org/10.1037/tra0000104

Sibrava, N. J., Bjornsson, A. S., Pérez Benítez, A. C. I., Moitra, E., Weisberg, R. B., & Keller, M. B. (2019). Posttraumatic stress disorder in African American and Latinx adults: Clinical course and the role of racial and ethnic discrimination. *American Psychologist*, *74*(1), 101–116. https://doi.org/10.1037/amp0000339

Simms, L. J., Watson, D., & Doebbelling, B. N. (2002). Confirmatory factor analyses of posttraumatic stress symptoms in deployed and nondeployed veterans of the Gulf War. *Journal of Abnormal Psychology*, *111*, 637–647. https://doi.org/10.1037/0021-843X.111.4.637

Soberón, C., Crespo, M., Gómez-Gutiérrez, M. del M., Fernández-Lansac, V., & Armour, C. (2016). Dimensional structure of DSM-5 posttraumatic stress symptoms in Spanish trauma victims. *European Journal of Psychotraumatology*, *7*(1), 32078. https://doi.org/10.3402/ejpt.v7.32078

Steele, L. S., Ross, L. E., Dobinson, C., Veldhuizen, S., & Tinmouth, J. M. (2009). Women's sexual orientation and health: Results from a Canadian population-based survey. *Women & Health*, *49*(5), 353–367. https://doi.org/10.1080/03630240903238685

Steward, W. T., Herek, G. M., Ramakrishna, J., Bharat, S., Chandy, S., Wrubel, J., & Ekstrand, M. L. (2008). Details for Manuscript Number SSM-D-07-01631R1 "HIV-Related Stigma: Adapting a Theoretical Framework for Use in India." *Social Science & Medicine (1982)*, *67*(8), 1225–1235.

https://doi.org/10.1016/j.socscimed.2008.05.032
Tiemensma, J., Depaoli, S., Winter, S. D., Felt, J. M., Rus, H. M., & Arroyo, A. C. (2018a). The performance of the IES-R for Latinos and non-Latinos: Assessing measurement invariance. *PLOS ONE*, *13*(4), e0195229. https://doi.org/10.1371/journal.pone.0195229
Tiemensma, J., Depaoli, S., Winter, S. D., Felt, J. M., Rus, H. M., & Arroyo, A. C. (2018b). The performance of the IES-R for Latinos and non-Latinos: Assessing measurement invariance. *PLOS ONE*, *13*(4), e0195229. https://doi.org/10.1371/journal.pone.0195229
Tsai, J., Harpaz-Rotem, I., Armour, C., Southwick, S. M., Krystal, J. H., & Pietrzak, R. H. (2015). Dimensional structure of DSM-5 posttraumatic stress disorder symptoms: Results from the National Health and Resilience in Veterans Study. *The Journal of Clinical Psychiatry*, *76*(5), 546–553. https://doi.org/10.4088/JCP.14m09091
United States Environmental Protection Agency. (2016, June 27). *Climate Change Indicators: Weather and Climate* [Reports and Assessments]. https://www.epa.gov/climate-indicators/weather-climate
Valentín-Cortés, M., Benavides, Q., Bryce, R., Rabinowitz, E., Rion, R., Lopez, W. D., & Fleming, P. J. (2020). Application of the Minority Stress Theory: Understanding the Mental Health of Undocumented Latinx Immigrants. *American Journal of Community Psychology*, *66*(3–4), 325–336. https://doi.org/10.1002/ajcp.12455
Van Rooyen, K., & Nqweni, Z. C. (2012). Culture and Posttraumatic Stress Disorder (PTSD): A Proposed Conceptual Framework. *South African Journal of Psychology*, *42*(1), 51–60. https://doi.org/10.1177/008124631204200106
Vilaplana-Pérez, A., Sidorchuk, A., Pérez-Vigil, A., Brander, G., Isoumura, K., Hesselmark, E., Sevilla-Cermeño, L., Valdimarsdóttir, U. A., Song, H., Jangmo, A., Kuja-Halkola, R., D'Onofrio, B. M., Larsson, H., Garcia-Soriano, G., Mataix-Cols, D., & Fernández de la Cruz, L. (2020). Assessment of Posttraumatic Stress Disorder and Educational Achievement in Sweden. *JAMA Network Open*, *3*(12), e2028477. https://doi.org/10.1001/jamanetworkopen.2020.28477
Weathers, F., Litz, B., Herman, D., Huska, J. A., & Keane, T. (1993). The PTSD Checklist (PCL): Reliability, validity, and diagnostic utility. *Paper Presented at the Annual Convention of the International Society for Traumatic Stress Studies*.
Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P. (2013). The PTSD Checklist for DSM-5 (PCL-5). Scale available from the National Center for PTSD at www.ptsd.va.gov. (n.d.).
Weiss, D. S., & Marmar, C. R. (1997). The Impact of Event Scale—Revised. In *Assessing psychological trauma and PTSD* (pp. 399–411). The Guilford Press.
Wortmann, J. H., Jordan, A. H., Weathers, F. W., Resick, P. A., Dondanville, K. A., Hall-Clark, B., Foa, E. B., Young-McCaughan, S., Yarvis, J. S., Hembree, E. A., Mintz, J., Peterson, A. L., & Litz, B. T. (2016). Psychometric analysis of the PTSD Checklist-5 (PCL-5) among treatment-seeking military service members. *Psychological Assessment*, *28*(11), 1392–1403. https://doi.org/10.1037/pas0000260
Yeomans, P. D., & Forman, E. M. (2009). Cultural Factors in Traumatic Stress. In S. Eshun & R. A. R. Gurung (Eds.), *Culture and Mental Health* (1st ed., pp. 221–

244). Wiley. https://doi.org/10.1002/9781444305807.ch11
Yufik, T., & Simms, L. J. (2010). A meta-analytic investigation of the structure of posttraumatic stress disorder symptoms. *Journal of Abnormal Psychology*, *119*, 764–776. https://doi.org/10.1037/a0020981
Zoellner, L. A., Pruitt, L. D., Farach, F. J., & Jun, J. J. (2014). UNDERSTANDING HETEROGENEITY IN PTSD: FEAR, DYSPHORIA, AND DISTRESS. *Depression and Anxiety*, *31*(2), 97–106. https://doi.org/10.1002/da.22133
Zvolensky, M. J., Rogers, A. H., Mayorga, N. A., Shepherd, J. M., Bakhshaie, J., Garza, M., Viana, A. G., Ochoa-Perez, M., Lemaire, C., Ruiz, A., & Peraza, N. (2022). Perceived Discrimination, Experiential Avoidance, and Mental Health among Hispanic Adults in Primary Care. *Transcultural Psychiatry*, *59*(3), 337–348. https://doi.org/10.1177/13634615211038159