

Full Length Research

A Reliability Study of the *Downs Posttraumatic Stress Scale*: A Refined Instrument for Measuring the Effects of Human Catastrophes

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An international group of counseling and psychology scholars undertook a unique study of populations that live in the most disaster prone regions of Java and Sumatra in areas that had no experienced trauma related counseling and which had experienced multiple tragedies over several years. The research team was interested not only measured posttraumatic stress in this unique population but going beyond simply considering threshold of diagnosis for PTSD, as is common in postdisaster studies, but to consider subclinical trauma reactions and to measure frequency and intensity of symptoms. To do this, the team designed a new instrument. Before other analysis was done a reliability study, using a large and culturally diverse sample (n=1084) was undertaken. The instrument proved to have internal consistency after several tests.

Key words: Posttraumatic, Population, Sumatra, Counseling

INTRODUCTION

On December 26, 2004, a 9.3 magnitude earthquake, the second largest recorded struck off of the coast of Sumatra, Indonesia (Stein and Okal, 2005). The ensuing tsunami caused an estimated 225,000 deaths in eight countries: India, Indonesia, Malaysia, Maldives, Seychelles, Somalia, Sri Lanka, and Thailand (Centers for Disease Control and Prevention, 2005). Altogether, at least five million people in these geographic regions were affected by the earthquake and tsunami, in addition to those who lost their lives or were displaced (WHO, 2005). In Indonesia, the province of Aceh, Sumatra, the closest

area of land to the epicenter of the earthquake, was the most adversely affected, with over 165,000 deaths, but the destruction spread south into other Sumatran districts and along the west coast of the island of Java as well (Rofi, Doocy, and Robinson, 2006).

Another tsunami, this time centered off the Pangandaran beach resort on the west coast of Java, occurred July 17, 2006, caused by a magnitude 7.7 earthquake. The death toll reached 520 with 275 missing (BBC News, 2006). According to the West Java Disaster Management Bureau, the communities of Pangandaran and Legok Jawa – Cimerak were the most devastated.

On September 30, 2009, a magnitude of 7.6 earthquake struck western Sumatra (Antara News, 2009). The casualty count included 1,117 deaths in West Sumatera

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Province. The largest numbers of victims were found in the Padang Pariaman Regency (675 people), the second largest casualty count was in Kota Padang (313 people). The total number of seriously injured people was 1,214 and the count of slightly injured was 1,688 people. The most serious damage occurred in Padang Pariaman Regency, including Nagari Cumanak (Patamuan District), Desa Lubuak Laweh, Pulau Aie and Desa Kaki Gunung Tigo. Most of the houses collapsed or were interred below ground. The total number of destroyed or badly damaged houses was 135,448, seriously damaged but habitable houses, 65,380, and slightly damaged, 78,604. Moreover, inhabitants in several houses were entombed (Kompas.com: October 15, 2009). The earthquake was felt as far away as Malaysia and Borneo (Antara News, 2009).

This study by an international team of researchers was undertaken to measure the incidence, frequency, and intensity of posttraumatic stress symptoms in the locations that were the most disaster prone in Indonesia. Because the purpose of the research was to study all of the identified posttraumatic stress symptoms and signs, not just diagnostic symptom criteria, existing instruments for measuring Posttraumatic Stress Disorder were inappropriate. Thus, a new instrument was developed. It was judicious that this instrument, the Downs Posttraumatic Stress Scale, be reliability tested. The sample population studied for this purpose was ideal because of the diversity of culture and the availability of large populations in concentrated locales.

LITERATURE REVIEW

Post-traumatic stress disorder (PTSD) is the most prevalent psychological disorder to occur following human traumatic experiences (Ehnholt and Yule, 2006), and is the most frequently reported psychiatric illness among victims of natural disasters (McMillen, North and Smith, 2000). The disorder is described variously by the two major taxonomical systems, the *Diagnostic and Statistical Manual* (American Psychiatric Association, 2013), and the *International Classification of Diseases* (World Health Organization, 2010). According to the *DSM 5*, symptoms include intrusive, distressing recollections of the traumatic event, avoidance of stimuli related to the trauma, persistent hyperarousal, and negative moods, behaviors or cognitions. The PTSD incidence rate is somewhat dependent on the severity of the disaster encountered, level of family and community devastation, and rescue effectiveness and quality (Piyasil et al., 2008). Studies have documented that symptoms can persist long after the traumatic event and are likely to become chronic (Zhang, Jiang, Ho and Wu, 2011; Liu, Wang, Shi, Zhang, and Jianhua, 2011).

So, understanding trauma related indicators is essential

for identifying vulnerable populations and developing culturally specific mental health interventions (van Griensven et al., 2006). Periodic measurement of trauma prevalence is also important to assess impact of relief efforts (Chandra, Padav and Bhugra, 2006).

There has been significant disagreement among professionals as to the accuracy or efficacy of either of the major taxonomical systems (Briere and Scott, 2006; Frueh, Elhai, and Acierno, 2010; Rose, Spitzer and McHugh, 2004), and criticism of the newest edition of the *DSM* is rising (Kvavilashvili, 2014; Chafee, 2012). Further, not only diagnostic criteria but also identified symptoms differ from one nosological guide to another. The debate over the nosology for therapeutic purposes has focused on features that are common and unique to PTSD but not relegated as diagnostic criteria as well as the unidentified cluster of interpersonal issues (Kvavilashvili, 2014; Iverson et al., 2011; Robertson, Rushton, Bartrum and Ray, 2004).

There are 21 symptoms identified in the *DSM 5*, and 19 are criteria for diagnosis (APA, 2013). In the earlier edition, the *DSM IV TR*, there were the 19 criteria, one of which are not recognized or mentioned in the later edition, even though it is commonly discussed as a phenomenon by PTSD victims (APA, 2000). The *ICD 10* generalizes criteria and symptoms and identifies only 11 (WHO, 2010). Further, the *ICD 10* requires only 4 symptoms over three clusters to qualify for diagnosis, while the *DSM IV-TR* required six symptoms across three symptom clusters, and the *DSM 5* requires six symptoms across four symptom clusters. With the appearance of a fourth cluster in the *DSM 5*, the reassignment of symptoms reduces avoidant behaviors from seven to two symptoms and adds the rest to the new cluster, negative thoughts and mood. This potentially presents a restriction to reaching threshold of diagnosis, because the *DSM IV-TR* included seven symptoms within the avoidance cluster, of which any three were required for diagnosis. According to the *DSM 5*, two symptoms from hyper arousal and two from negative cognitions or feelings are required to reach diagnosability. It seems unlikely that a person who is actively avoiding triggering events might experience enough hyperarousal and negative cognitions to qualify for diagnosis or services should diagnosis be required.

Finally, posttraumatic stress tests and research are based on diagnostic criteria rather than including other identified symptoms. However, since taxonomies differ widely and since other symptoms and features of the disorder have been empirically corroborated including suicidal ideations (Jakupcak et al., 2009; Kaplan, Huguet, McFarland and Newsom, 2007; Hendin and Haas, 1991), substance abuse (Center for Substance Abuse Treatment, 2005), interpersonal problems (Robertson, Rushton, Bartrum and Ray, 2004) including increased violence (Elbogen, 2012; Hawkins, 2009), guilty feelings

(Beck, 2011; Robinaugh and McNally, 2010), suspicion (Freeman, 2013; Soosay et al., 2012; Rippy, 2007) and PTSD related physical problems (Jankowski, 2010; Schnurr, 1999), phenomena related to posttraumatic stress become important for study.

METHODOLOGY

The Research Group and the Instrument

To ensure construct validity, content validity was strengthened (Westen and Rosenthal, 2003; Messick, 1989), by engaging a panel of 9 scholars from the United States, Indonesia, Malaysia, and Brunei who met for one week and collaborated on the construction of the instrument. These scholars included two licensed psychologists, three counseling scholars and two educational developmental experts, as well as one counseling doctoral student.

The panel used the newly published *Diagnostic and Statistical Manual of Mental Disorders 5* (American Psychiatric Association, 2013), *International Statistical Classification of Diseases and Related Health Problems, 10th Revision* (World Health Organization, 2010), and the *Diagnostic and Statistical Manual of Mental Disorders IV-TR* (American Psychiatric Association, 2000), as well as a diverse sampling of literature that describes the phenomena related to PTSD to construct the symptom list for the new instrument.

The Downs Posttraumatic Stress Scale was designed to be sensitive to subclinical cases of posttraumatic stress that do not qualify for the diagnostic threshold but that may still have harmful effects on victims of traumatic events. The research panel identified 27 commonly occurring symptoms of PTSD. The DPTS Scale was designed to measure incidence as well as frequency and intensity of prominently identified symptoms rather than exclusively criterion symptoms.

Generally, instruments for use with children differ in form from those used to measure adult posttraumatic stress (Elhai, Gray, Kashdan, and Franklin, 2005; Strand, Pasquale, and Sarmiento, 2005). Because it was impractical to train and field separate research teams in diverse, sometimes back country locales to manage data from a large sample population, including children, and adults – both educated and illiterate – a single instrument that would serve all populations seemed advantageous. Not only would data management be simpler but samples from young and old could be compared. So, with the help of the child experts on the panel, language and psychological jargon were simplified. A pilot study confirmed that study participants understood symptoms across anticipated populations. The DPTS Scale was then translated into Bahasa Indonesia, Bahasa Melayu, and Chinese; after which each version was back-

translated for accuracy and consistency across versions.

Rather than using a subjective Likert-type scale, each symptom's frequency and intensity was measured with an integral-quantified, Likert-type scale. Subjective scaling (that is, strongly agree, agree, neutral, disagree, strongly disagree) is properly analyzed using nonparametric measures, as they are ordinal scales (Kitchen, 2009). For robust analysis via parametric testing, integral scaling is required. Thus, frequency of symptom occurrence for each of the 27 symptoms was quantified – 1) Once a year or less/Rarely, 2) Once a month/Sometimes, 3) 2 to 10 times a year/Occasionally, 4) Once a week/Often, 5) 2 to 6 times a week or daily/Always. When measuring intensity of symptoms, additive symptoms served to quantify each experience. For instance, when measuring intensity of nightmares the Likert-type scale was stated, "When I have bad dreams, 1) I feel bad when I wake up in the morning; 2) I wake up after I dream and feel upset; 3) I wake up, feel upset and I can't fall back to sleep easily; 4) I wake up, feel upset and I feel so scared and nervous that I cannot fall back to sleep; 5) I wake up, feel upset and I feel so scared and nervous that I feel sick or I stay up all night."

To further enhance the reliability study, the DPTS Scale designed in 2 versions; the first with all symptoms sequentially by symptom cluster and the second with symptoms scrambled. These would be analyzed comparatively. The instrument, which was developed in English was translated by a bilingual member of the research team and back translated by a bilingual Indonesian scholar not connected with the research project. This ensured accuracy of translation.

A criterion study sample population was chosen, contingent on residing in sites that were most likely to have experienced severely traumatic experiences. Regions that were in the path of the 2004 and 2006 tsunamis and subsequent earthquakes were targeted.

Two regions of Indonesia were chosen for the study. These regions are located on the western end of the islands of Java and Sumatra, in the most tectonically active landmasses in the Ring of Fire, due to the subduction in the Sunda Trench (Pramono, 2014), and had experienced several significant destructive events.

Two data gathering teams were formed, one consisting of 8 counseling students and academic staff from Universitas Pendidikan Indonesia in Bandung, Java, and the other consisting of 15 counseling students and academic staff from Sekolah Tinggi Agama Islam Negeri (STAIN) in West Sumatra. A member of the research team trained all data team members in administration of the DPTS Scale as well as in crisis recognition and counseling skills. Training and ensuing research procedures included screening for education level of participants and appropriate self-administration of the DPTS Scale among adequately educated adults and adolescents with verbally administration with study

participants who were incapable of reading and understanding the questionnaire. Research team members were drilled in verbal administration of the instrument without influencing responses.

Population

The Java sites for the study were suggested by the West Java Disaster Management Bureau. The population of the province is the highest in density in Indonesia, with 46.3 million residents (Suwarni, 2011).

In Sumatra the residents of the two areas most affected by the 2009 earthquake (Padang City and Padang Pariaman Regency) were chosen to be participants of the research. The population of West Sumatra Province is 4,846,909. The population of Padang City is 833,562 and of Padang Pariaman, 391,056 (Warta and BKKBN, 2011).

Sample

The research team on Java was referred to the communities of Pangandaran and Legok Jawa – Cimerak and assigned to schools by the Pangandaran Bureau of Education to draw its youth sample. Teachers and staff agreed to participate, as did members of the community who had been informed of the study. The rural Sumatra sites were chosen by proximity to the ocean and by statistical reports that identified areas which had sustained the most damage and loss of life throughout the past several years of high seismic activity. Communities and schools, which agreed to participate, were included. Because Padang was the urban area that has been recently hardest hit, consultation with Wali Negara (Village heads) and Wali Korong (neighborhood community leaders) produced referrals to the most devastated communities. Schools in these communities that readily cooperated were chosen, and two community centers contacted potential participants and referred them to the research team.

Review of Reliability of Comparative Posttraumatic Stress Research Instruments

The reliability results of field-testing the Downs Posttraumatic Stress Scale would be compared against the internal reliability of standardized PTSD instruments commonly used in psychology as reported in literature. The widely used Harvard Trauma Questionnaire (HTQ) was the first chosen because of its wide use. The HTQ is a self-report scale based on the Hopkins Symptom Checklist-25. The HTQ contained three sections; Part I identified traumatic experiences, Part II consisted of open

ended questions to allow subjects to describe these situations, and Part III listed 30 symptoms with a shortened Likert-type scale of intensity (Derogatis, Lipman, Rickels, Uhlenhuth and Covi, 1974). Mollica, Caspi-Yavin, Bollini and Trong (1992) studied the reliability of the HTQ using three methods: interrater reliability, test/retest, and internal consistency. A series of Cronbach's alpha revealed a coefficient for Part I ($\alpha=.90$) and Part III ($\alpha=.96$). Interrater reliability produced its own reliability result of Part I ($\alpha=.93$) and Part III ($\alpha=.98$). A Pearson product-moment reported Part I ($r=.89$, $p<.000$), and Part III ($r=.92$, $p<.000$). However, trauma related questions' reliability ranged from $r=.39$ to $r=.86$.

Another study of the HTQ, used a sample population of 104 adolescents (Ward, Flisher, Zissis, Muller and Lombard, 2004). A Cronbach's alpha of Part III reported internal consistency ($\alpha=.92$) for the symptoms questions only, but a concordance correlation coefficient showed test/retest results much lower ($r=.64$, $CI=.51-.74$).

A reliability study of a Tibetan translation of the HTQ ($n=57$) was completed by Lhewa, Banu, Rosenfeld, and Keller (2007). A Cronbach's alpha reported internal consistency ($\alpha=.89$).

Renner, Salem, and Ottomeyer (2006) performed another reliability study of multiple measures, the Hopkins Symptom Checklist-25 (Derogatis, Lipman, Rickels, Uhlenhuth, and Covi, 1974), the Harvard Trauma Questionnaire (Mollica et al., 1992), the Impact of Event Scale (Weiss and Marmar, 1997), the Bradford Somatic Inventory (Mumford et al., 1991), the Clinician Administered PTSD Scale (Blake et al., 1990), and the Social Adaptation Self-Evaluation Scale (Bosc, Dubini and Polin, 1997), and performing a Chronbach's alpha on the five PTSD instruments. The sample population ($n=150$) was asylum seekers from Chechnya, Afghanistan and West Africa. The Chronbach's alpha reported overall reliability of the HTQ by culture, Chechnya ($\alpha=.95$), Afghanistan ($\alpha=.96$), and West Africa ($\alpha=.95$). Part I was reported to have lower reliability, Chechnya ($\alpha=.91$), Afghanistan ($\alpha=.90$), and West Africa ($\alpha=.87$).

The rest of the inventories reported Chronbach's alpha results as such: HSCL-25, by culture as Chechnya ($\alpha=.92$), Afghanistan ($\alpha=.96$) and West Africa ($\alpha=.91$); the IES-R, Chechnya ($\alpha=.93$), Afghanistan ($\alpha=.96$), and West Africa ($\alpha=.91$); the BSI, Chechnya ($\alpha=.96$), Afghanistan ($\alpha=.95$), and West Africa ($\alpha=.97$); the CAPS-1, Chechnya ($\alpha=.90$), Afghanistan ($\alpha=.90$), and West Africa ($\alpha=.91$); and finally the SASS, Chechnya ($\alpha=.52$), Afghanistan ($\alpha=.48$), and West Africa ($\alpha=.74$).

The largest research sample ($n=456$) was a reliability study on the PTSD Checklist: Military Version (Yarvis, Yoon Ameuke, Simien-Turner and Landers, 2012), using the Chronbach's Alpha, and reported overall instrument internal consistency ($\alpha=.93$). The four subscales,

however showed lower reliability, reexperiencing ($\alpha=.90$), avoiding ($\alpha=.84$), numbing ($\alpha=.81$), and hyperarousal symptoms ($\alpha=.84$).

RESULTS

Sample populations were drawn from Western Sumatra and West Java ($n=1084$). The two sites in West Java included the largest sample population ($n=370$, 34.1%) and 20.4% ($n=221$); while Western Sumatra consisted of 4 communities, which comprised in descending order of overall sample size 23.2% ($n=251$), 9.4% ($n=102$), 6.8% ($n=74$), and 6.1% ($n=66$). All participants ($n=1084$) completed the Downs Posttraumatic Stress Scale.

Study participants included 56.5% females ($n=612$) and 43.2% males ($n=468$) with 4 participants not identifying gender. The sample population in all sites was skewed toward youth, with the age range of participants from ages 8 to 89 and a median age of 15 (interquartile range=13-17). Seven participants did not identify their ages. Ethnically, participants were representative of six distinct cultures. Sundanese was the largest ethnic group comprising 48.2% of the sample population ($n=522$), all from West Java. Menangkabau, living in West Sumatra, was the second largest ethnic group, 44.6% ($n=483$). Other cultures comprised a small percentage of the sample, including 5.4% Javanese ($n=58$), 7% Malay ($n=8$), .1% Buginese ($n=1$), and .1% mixed-race Sundanese-Chinese ($n=1$) making up the rest of the sample. Except for 2 Malay, all minority populations lived in West Java.

Participants were asked what their religious preference was. Of the 1084 sample population all reported themselves to be Muslim except 3, who identified as being Christian. Participants were asked their marital status before and after experiencing the identified primary traumatic event. Predisaster marital status was reported as 85.7% single ($n=929$), 12.5% married ($n=135$), .2% divorced ($n=2$), .1% living as married ($n=1$) and 1.5% widowed ($n=16$). Postdisaster marital status was reported as 84.4% single ($n=915$), 12.7% married ($n=138$), .5% divorced ($n=5$), .2% living as married ($n=2$), and 2.1% widowed ($n=23$). A Chi Square reported a significant difference between pre and post disaster marital status ($\chi^2_{16}=1998.33$, $p<.000$, $n=1083$) with postdisaster marriage and widowhood as the significant differences.

Because the intention of this study was to sample disaster-prone geographical areas, all participants had experienced some sort of traumatic incident, some related to living in coastal Ring of Fire locales and others related to living in rural locations with intrinsic environmental or dangerous roads. Participants were asked to identify all experienced catastrophes but to also name the single event that was the most traumatic. Although many of the

subjects reported that they had experienced multiple disasters, the study reduced these data to the, self-identified, most traumatic experience that each participant reported. There were 34 separate types of traumatic incidents identified. The most numerous reported significant incidents were tsunami, 42.1% ($n=456$), followed by earthquake, 40.1% ($n=435$). Vehicular accidents accounted for 5.2% ($n=56$), while the only other multiple reports of most significant event included near drowning (1.9%, $n=21$) and animal attacks (1.2%, $n=13$).

A Chronbach's Alpha was performed on the database to assess reliability of the DPTS Scale (Santos, 1999). Of the 1084 returned questionnaires, 18 were excluded because they did not report both frequency and intensity of symptoms, and so were only partially informative. The reliability test revealed a power of .884 ($r=.94$). Further reliability testing was performed to compare the reliability of the scrambled to the clustered versions of the Scale. Separate Chronbach's alpha were performed with the results that the symptom-clustered version had the highest reliability ($\alpha=.945$), while the scrambled version, though high, did not prove to be as reliable ($\alpha=.935$), though the difference in reliability was insignificant. Finally, to see if consistency held up across sample cultures a series of Chronbach's alpha tests revealed consistently high reliability – Menangkabau ($\alpha=.949$), Javanese ($\alpha=.949$), and Sundanese ($\alpha=.92$).

DISCUSSION

In spite of the fact that symptom lists for Posttraumatic Stress Disorder varies somewhat from one taxonomy to another, the actual list of symptoms has stayed stable over time. However, diagnosis and diagnostic thresholds for declaring a sufferer with the actual diagnosis continues to be redefined as the social construction continues to influence diagnosability. What gets lost in this continued evolution is, first, consideration of patients and clients who present with considerable symptoms but do not "medically qualify" for services. Further, treatment considerations increasingly revolve around isolated symptom clusters to the exclusion of others both for treatment and for research purposes, including instrument construction.

The Downs Posttraumatic Stress Scale was constructed with the assumption that symptoms, in and of themselves, are important, and perhaps more important than diagnosability. Even though the Scale can be used for diagnosis, it was intended more for study of all identified symptoms, whether meeting diagnostic threshold or not. Secondly, it was designed to consider symptom clusters that have not been officially iterated. To this end, symptoms that are identified in the nosological

systems that have interpersonal impact were crossweighted to identify not only the cluster they are ordered into but a separate symptom cluster, interpersonal problems. This Crossweighting was done without adding identified interpersonal experiences that clients might mention but rather stayed strictly inside the *DSM* and *ICD* frameworks. Finally, the DPTS Scale added a unique feature: each symptom had accompanying measures of intensity as well as frequency of symptoms. However, rather than using a simple Likert-type scale, the instrument quantified how often each symptom was experienced; and further, it quantified intensity by using additive descriptions of intensity employing accepted descriptions that accompany subjective increasing intensity. The Clinically Administered PTSD Scale (Renner et al., 2006) attempts to do the same measurements but with a ordinal Likert-type scale, and the Harvard Trauma Questionnaire (Derogatis et al., 1974) did the same ordinal measure with intensity only.

In comparison with several of the other posttraumatic stress scales of various types and variations on types, the DPTSS reliability research was conducted with an exceptionally high number of study participants and with a diverse sample population. That sample included both youth and adult participants with a range from 9 to 89 years of age. The overall internal consistency proved to be $\alpha=.94$; and, if the symptom clustered version is used as the standard for reliability, then the reliability is higher ($\alpha=.945$). Further, the range of reliability across three cultural samples ($n=1069$) ranged from $\alpha=.92$ to $\alpha=.949$. When compared to other post trauma inventories The DPTSS reliability remained among the high reliability reports. The HTQ was reported to have a range of trauma question reliability from $\alpha=.89$ to $\alpha=.96$ with cross-cultural reliability ranging from $\alpha=.87$ to $\alpha=.96$; the PTSD Checklist overall reliability reported $\alpha=.93$. The rest of the comparative instruments were reported for cross-cultural reliability: the HSCL-25 ranged from $\alpha=.91$ to $\alpha=.96$, the IES-R from $\alpha=.91$ to $\alpha=.96$, the BSI from $\alpha=.95$ to $\alpha=.97$, CAPS-1 from $\alpha=.90$ to $\alpha=.91$ and the SASS from $\alpha=.48$ to $\alpha=.74$.

The limitations of this study include that the sample was taken from targeted communities; and, even though participants all reported having experienced traumatic events, making for a data rich sample, results cannot be said to be representative of all victims of disasters and crises. Further, even though the sample was taken from quite diverse populations, all participants were Indonesian and so cannot be said to be representative of other societies. However, because the sample was both quite large compared to other studies, because all participants completed the study, and because samples were taken from various communities and various catastrophic situations speculations about what other

disaster survivors experience are more likely than smaller samples taken from more narrow circumstances.

Conclusion

The Downs Posttraumatic Stress Scale has potential to measure the psychological effects of catastrophes in several ways. It can be used to collect integral data for use of parametric measures, unlike most comparative instruments. Even though it can be used to measure diagnostic thresholds of PTSD using *ICD*, *DSM-V*, or *DSM-IV*, it can also be used to measure and study characteristics of posttraumatic stress that don't qualify for diagnosis, including both intensity and frequency of symptoms. Moreover, the Scale can be used for both youth and adult populations, and it appears to be a reliable instrument, overall and for diverse populations and diverse circumstances. It also suggests that the data gathered in this study will be a valid sample for further study into the phenomenon of posttraumatic stress.

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