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The Tonic Immobility Scale in Adolescent and Young Adult Rape Victims: Support for Three-Factor Model

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Objective: A substantial number of sexual assault victims report experiencing some form of peritraumatic tonic immobility (TI). A self-report questionnaire that is widely used to assess TI retrospectively is the Tonic Immobility Scale (TIS). This study explored the factor structure of the TIS in a clinical sample of adolescent and young adults. ***Method:*** The sample comprised 131 female rape victims, aged 13–25, who were referred for specialized trauma-focused treatment. An exploratory factor analysis (EFA) was performed. ***Results:*** The EFA showed support for a three-factor model, with factors TI, Fear, and Detachment. Item correlations ranged from .32 to .57 for TI, from .14 to .35 for Fear, and .29 for the two Detachment items. ***Conclusions:*** We found support for a three-factor solution distinguishing TI, fear, and detachment, suggesting the need to further develop the TIS with different subscales in varying age groups and clinical samples.

Clinical Implication Statement
When assessing peritraumatic reactions in adolescent victims of sexual assault using the Tonic Immobility Scale, the present study suggests the use of three subscales. These subscales of Tonic Immobility, Fear, and Detachment may be more appropriate for clinical settings than previously found subscale structures.

Keywords: Tonic Immobility Scale, exploratory factor analysis, rape, adolescents

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Tonic immobility (TI) is an involuntary behavioral reaction to stress characterized by motor inhibition, suppressed vocal behavior, hypertonicity, parkinsonian-like tremors, eye closure, analgesia, and waxy flexibility (Fusé et al., 2007; Galliano et al., 1993; Marx et al., 2008). TI occurs when fight-or-flight reactions are no longer survival options and thus under conditions of (perceived) restraint or inescapability (Marx et al., 2008).

Studies estimating the prevalence of TI showed that a substantial number of sexual assault victims (33–48%) experience TI during the assault (Fusé et al., 2007; Hagenaars, 2016; Heidt et al., 2005; Kalaf et al., 2017; Möller et al., 2017). This high prevalence is especially alarming since multiple cross-sectional indicate a positive association between TI and psychopathology (e.g., Abrams et al., 2009; Bovin et al., 2008; Hagenaars, 2016; Heidt et al., 2005; Portugal et al., 2012). Moreover, longitudinal and experimental studies suggest that TI predicts posttraumatic stress symptoms (Hagenaars & Putman, 2011; Kuiling et al., 2019; Möller et al., 2017).

The questionnaire mostly used to assess TI is the Tonic Immobility Scale (TIS; Forsyth et al., 2000). The TIS is a two-part self-report instrument that was specifically developed to measure the occurrence and severity of TI in female victims of sexual assault (Forsyth et al., 2000). Subsequent adaptations in the instructions of the TIS were made to use the questionnaire in the context of different types of traumas and in experimental studies.

Fusé et al. (2007) were the first to evaluate the factor structure of the TIS in two samples of female undergraduate students who reported experiences of sexual victimization (Sample 1: M_{age} = 19.42 years, SD = 2.13, range 18–35; Sample 2: M_{age} = 19.96, SD = 4.96, range 18–56). The findings from both studies suggested that the 10-item TIS comprises two independent factors: Tonic Immobility (TI; 7 items) and Fear (3 items).

In contrast, Reichenheim et al. (2014) found a one-factor solution to show the best fit in a relatively older community sample with experiences of mixed trauma and aversive events (both men and women; M_{age} = 41.1 years). In this study, the number of items was reduced from 10 to 6 after initial analysis due to residual correlations indicating content redundancies. It is important to

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stress, however, that the samples of the studies done by Fusé et al. (2007) and Reichenheim et al. (2014) differed by gender, age, and type of event experienced, so several of these factors could have contributed to the differences in results between the studies.

In summary, previous studies are limited in number and have found mixed results concerning the underlying factor structure of the TIS. This complicates the use and interpretation of the TIS to diverge between studies and in turn contributes to conceptual confusion regarding the concept TI. For example, some studies have used only the four physical immobility items (Lima et al., 2010; Portugal et al., 2012; Volchan et al., 2011), while others have used the total score based on the results of Reichenheim et al. (2014; Kalaf et al., 2017). Alternatively, others have used one or both of the subscales as originally proposed by Fusé et al. (2007; Fiszman et al., 2008; Fragkaki et al., 2016; Heidt et al., 2005). All of these scales, although different in content, were taken to reflect the concept of TI. This methodological problem may also (partly) account for the wide range of prevalence rates of TI during sexual assault reported in the literature.

The studies described so far were all done in adult community samples. This includes the studies indexing the occurrence of TI during childhood abuse (e.g., Heidt et al., 2005; Humphreys et al., 2010; Kalaf et al., 2017). There are, to our knowledge, no studies assessing the occurrence of TI and the underlying factor structure of the TIS in a younger, clinical sample. The need to study TI in a younger sample is clear since TI may be especially prevalent in adolescents and young adults (Hagenaars, 2016; Kalaf et al., 2017). In addition, adolescents and young adults may show a distinct pattern of peritraumatic reactions compared to adults resulting from developing coping mechanisms and emotion regulation (e.g., Skinner & Zimmer-Gembeck, 2007). Speculatively, dissociative reactions might be more independent in this age group, given that factors concerning affect became more interrelated with increasing age (Allan et al., 2015). Moreover, TI has been found to be related to psychopathology, including posttraumatic stress disorder (PTSD; e.g., Möller et al., 2017). Thus, the practical application of the TIS lies in assessing symptomology and treatment needs in clinical practice. However, the factor structure of the TIS has not yet been studied in a clinical sample. Therefore, the aim of the current study was to explore the factor structure of the TIS in a clinical sample of adolescent and young adult victims of a rape, using an exploratory factor analysis (EFA).

Method

Participants

The data for the present study were collected in a Dutch psychotrauma center specialized in outpatient psychological services for adolescent and young adult rape victims. For this study, rape was defined as "an event that occurred without the victim's consent that involved the use or threat of using force in vaginal, anal or oral intercourse" (Tjaden & Thoennes, 2006, p. 3). This definition includes both attempted and completed rape, with the term *completed* referring to vaginal, oral, anal, or multiple penetrations.

In total, 131 female rape victims who were referred to a psychotrauma center for specialized trauma-focused treatment completed the questionnaires at intake and were included in the study between May 2005 and December 2011. The victims' age ranged from 13 to 25 years, with a median age of 16.42 years ($M = 17.28$, $SD = 3.03$). Most victims were younger than 18 (68%). The psychological distress of this sample at intake was evident: The average total score on the Symptom Checklist–90 (Arrindell & Etteman, 2003) was 208 ($SD = 59.26$), which translates to very high dysfunction for a healthy population and average dysfunction for a clinical population. All victims spoke Dutch. Further demographics can be found in Table 1.

Materials

The Dutch-translated version of the TIS (De Kleine et al., 2009) was used to assess peritraumatic reactions. The present study focused on Part 1 of the TIS,[1] consisting of 10 items that were derived from the animal literature on TI "so as to reflect key physiological and behavioral features that are known to accompany TI and fearful responding" (Fusé et al., 2007, p. 268). Items are scored on a 7-point Likert scale (range 0–6, total score range 0–60). Fusé et al. (2007) originally identified two factors: TI (seven items) and Fear (three items). The TI factor consists of "froze or felt paralyzed," "unable to move," "unable to call or scream," "felt numb or no pain," "felt cold," "feared for life," and "detached from yourself." The Fear factor consists of "trembling/shaking," "feelings of fear/panic," and "detached from around you."

Procedure

During admission, all patients completed a psychological assessment as part of a larger test battery, consisting of a structured interview for obtaining demographic and postrape characteristics, and the TIS. According to the Ethical Medical Committee of the University Medical Centre Utrecht, the Declaration of Helsinki and the Dutch Medical Research involving Human Subjects Act concerning scientific research were not applicable to the present study since data were collected as part of routine outcome monitoring. Written informed consent for the use of these data for research was obtained from both patients and parents at admission.

Data Analysis

Because the sample of the present study differs significantly from previous studies, an EFA was conducted to identify the underlying factor structure of the TIS. Similar to Fusé et al. (2007), principal axis factor analysis was used. However, as suggested by Fusé et al. (2007) as a next step, we used an oblimin rotation because this method allows factors to be correlated, which would help to clarify the relation between the factors. The factors were analyzed in three ways: using Kaiser's criterion of eigenvalues over 1, analyzing the scree plot, and parallel analysis. All data analysis was performed using IBM SPSS statistics Version 25. Subscale reliability was examined using interitem correlations, which is the recommended method to determine (sub)scale reliability in relatively short (sub)scales (i.e., in contrast to Cronbach's alpha values, which are quite sensitive to the number of items; Briggs & Cheek, 1986).

[1] Part 2 of the TIS indexes the contextual assault circumstances.

Table 1
Sample Demographics

Variable	*N* (%)
Ethnicity[a]	
Dutch	112 (86)
Moroccan	3 (2)
Surinam	3 (2)
Other	13 (10)
Education level[b]	
Low	71 (54)
Middle	30 (23)
High	29 (22)
Living situation	
At parents' home	110 (84)
Other	21 (16)
Perpetrator of assault	
Stranger	45 (34)
Acquaintance	51 (39)
Friend, partner, family	36 (27)
Single assailant	
Yes	120 (92)
No (group rape)	11 (8)
Prior negative sexual experience	
Yes	21 (16)
No	110 (84)

[a] Dutch origin was defined as being a child from parents born in the Netherlands. Other ethnicities were self-reported. [b] After 6 years of general primary school, at the age of 12 years, students enter low (4 years), medium (5 years), or high (6 years) secondary education level.

Results

The total score of the 10 TIS items ranged from 13 to 48, with an average score of 32.49 ($SD = 6.25$). Mean scores per TIS item can be found in Table 2. The Kaiser–Meyer–Olkin (KMO) measure revealed acceptable sampling adequacy (KMO = .64; Kaiser, 1974). Bartlett's test was significant ($p < .001$). The KMO and Bartlett's test confirm that the data are appropriate for factor analyses. The initial analysis showed three factors with eigenvalues over 1 (i.e., Kaiser's criterion). These three factors explained a total variance of 34.5% (i.e., 17.1%, 12.2%, and 5.2%, respectively). The scree plot was indistinct with elbows at three and four factors, justifying retaining either two or three factors. Parallel analysis indicated two factors with eigenvalues exceeding the corresponding criterion value for a randomly generated data matrix of the same size (10 variables × 131 participants). The criterion value of the third factor in the parallel analysis was 1.20, which is just above the eigenvalue (1.19) of the third factor in the EFA. Analysis of the three-factor structure (see Table 3) showed correlations between factors of $r = .17$ (Factors 1 and 2), $r = .27$ (Factors 1 and 3), and $r = -.15$ (Factors 2 and 3). Zero-order interitem correlations are shown in Table 2.

Because the scree plot and parallel analysis were inconclusive in deciding for two or three factors, we also performed an EFA with extraction of two factors in order to compare the explained variance and correlations of the two-factor structures. The two factors explained a total variance of 29% (i.e., 17% and 12%, respectively) and correlated with $r = .06$.

Comparing the two- and three-factor solutions, the three-factor structure was deemed better fitting due to the added explained variance and higher internal consistency based on item correlations (i.e., as the recommended index of reliability) for the resulting subscales. These ranged from |.32| to |.57| for the items comprising the first factor, from |.14| to |.35| for the items comprising the second factor, and |.29| for the items comprising third factor. In contrast, the item correlations in the two-factor structure were considerably lower and not in the optimal range from |.04| to |.57| for the first factor and from |.14| to |.35| for the second factor (Briggs & Cheek, 1986). For illustrative purposes, we also examined the interitem correlation of the original factors as proposed by Fusé et al. (2007) in the current sample. Most of the interitem correlations were not above .20 and therefore not in the optimal range. Based on factor loading of .30 or higher in the structure matrix (Izquierdo et al., 2014; Thompson, 2004), we identified the three factors (see Table 3) as a TI subscale (three items), a Fear subscale (five items), and a Detachment subscale (two items).

A comparison between the original two subscales and their respective items as proposed by Fusé et al. (2007) and the factors found in the current study can be found in Table 4. There are two substantial differences between the original and the current factors. First, three former TI items now loaded on the Fear factor (i.e., Items 5, 6, and 8). Second, two items now loaded on a new factor (i.e., Detachment; Items 9 and 10). Thus, the three assessed peritraumatic reactions (TI, fear, and detachment) now all made up their own factor.

Discussion

This study set out to explore the factor structure of the TIS (Forsyth et al., 2000) in a clinical sample of adolescent and young

Table 2
Interitem Correlations of the Tonic Immobility Scale

Item	*M* (*SD*)	1	2	3	4	5	6	7	8	9
1. Froze or felt paralyzed	4.10 (1.42)									
2. Unable to move	3.92 (1.35)	.57**								
3. Trembling/ shaking	3.09 (1.68)	−.20*	−.15							
4. Unable to call or scream	3.97 (1.96)	.33**	.32**	.01						
5. Felt numb or no pain	3.66 (1.68)	.07	.15	.14	.10					
6. Felt cold	2.56 (1.93)	.07	.19*	.15	.26**	.24**				
7. Feelings of fear/ panic	2.56 (1.93)	.05	−.01	.23*	.05	.19*	.14			
8. Feared for life	1.78 (1.65)	−.09	.05	.25**	.09	.16	.35**	.33**		
9. Detached from yourself	3.50 (1.71)	.23*	.25*	−.13	.10	−.03	.24**	.00	.11	
10. Detached from around you	3.43 (1.80)	.27**	.17	.03	.03	−.18*	.09	.01	−.08	.29**

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

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Table 3

Communalities, Pattern Matrix, and Structure Matrix for Factor Analysis With Oblimin Rotation of Three-Factor Solution of Tonic Immobility Scale Items

Item	Pattern matrix			Structure matrix			Communalities
	Factor 1	Factor 2	Factor 3	Factor 1	Factor 2	Factor 3	
1. Froze or felt paralyzed	**.73**	−.22	.13	**.73**	−.11	**.35**	.68
2. Unable to move	**.73**	−.07	.08	**.74**	.04	.28	.50
4. Unable to call or scream	**.44**	.10	−.01	**.45**	.18	.09	.23
8. Feared for life	−.04	**.67**	.07	.09	**.65**	−.04	.50
6. Felt cold	.16	**.54**	.20	**.31**	**.53**	.17	.32
7. Feelings of fear/panic	.03	**.42**	−.03	.09	**.43**	−.09	.19
3. Trembling/shaking	−.18	**.42**	−.08	−.13	**.40**	−.19	.21
5. Felt numb or no pain	.29	.27	**−.31**	.25	**.36**	−.27	.25
9. Detached from yourself	.12	.15	**.55**	.28	.10	**.53**	.67
10. Detached from around you	.03	−.02	**.52**	.18	−.09	**.56**	.15

Note. Factor loadings ≥ .30 are in bold. In oblique rotation exploratory factor analysis, the pattern matrix is used to interpret factors (Osborne, 2015). Communalities represent the proportion of common variance in the variable.

adult rape victims. The results of the EFA did not support the original two-factor model by Fusé et al. (2007) but showed support for a three-factor model[2] consisting of a TI, Fear, and Detachment subscale, with factor items showing a good conceptual fit (i.e., separate subscales for Fear, TI, and Detachment). In addition, the item content of the subscales was conceptually mixed. The original TI subscale by Fusé et al. (2007), for example, also includes a fear-associated item (i.e., "Feared for your life or felt as though you were going to die") and a depersonalization item (i.e., "Felt detached from yourself"), while the Fear subscale also includes a derealization item (i.e., "Felt detached from what was going on around you").

Several explanations can be named for the discrepancy between our findings and those of Fusé et al. (2007). First, although Fusé et al. (2007) did not report standard deviations of the TIS items, the mean item scores in their sample of undergraduate students are notably lower than those in our sample, indicating fewer peritraumatic reactions. Moreover, the current sample scored higher on psychopathological problems. The clinical characteristics of the current sample may have rendered a clearer differentiation in peritraumatic reactions (i.e., immobility, fear, and dissociation). Second, lower education levels may also account for the differences between Fusé et al. (2007) and our findings: More than half of our sample had a low education level, whereas the sample of Fusé et al. (2007) consisted solely of undergraduate students. Third, the undergraduate students in Fusé et al. (2007; Study 1) seem older than the sexual assault victims in our sample (M = 19.42, range 18–41 and M = 17.28, range 13–25, respectively). Possibly, age may influence the factor structure of the TIS, for example, because symptoms are more pronounced or less intertwined in adolescents and young adults. Future research can explore the role of age on peritraumatic reaction in even younger samples.

On the other hand, Reichenheim et al. (2014) found evidence for a one-factor solution. Importantly, their sample was considerably older (aggregated M = 41.1 and 39.5; range: 38.5–42.0 and 41.9–45.5 for women and men, respectively), suggesting again that age may indeed be a relevant factor that impacts the factor structure of the TIS. Moreover, the sample of Reichenheim et al. (2014) included males and other trauma types, that is, events that may trigger grief rather than TI, such as a life-threatening illness of a close person.

Our findings further highlight the importance of separating peritraumatic reactions. In some studies, TI referred to peritraumatic physical immobility (i.e., TI subscale of the TIS; see Lima et al., 2010), whereas in other studies, the term referred to a combination of several peritraumatic reactions (i.e., all TIS items; see Kalaf et al., 2015). Conceptually distinguishing between different peritraumatic reactions, instead of grouping these reactions under the collective name of "Tonic Immobility," may aid future studies in delineating the specific relations between symptoms and their specific contributions to psychopathology. In fact, Lima et al. (2010) found that peritraumatic physical immobility was related to poor treatment outcomes for PTSD treatment, but panic and dissociation were not. If peritraumatic reactions are grouped in clinical practice, the effect on treatment outcomes can be over- or underestimated. Furthermore, our results are informative regarding the construct of TI (i.e., peritraumatic reactions). They suggest a dynamic model of TI symptom profiles that vary rather than a fixed set of symptoms. Possibly, some symptoms are at the core of TI, whereas others may vary or be dependent on age and psychopathology. For example, relationships between TI symptoms may become stronger when they co-occur repeatedly over a longer period of time or when coping is already affected by psychopathology, such as preexisting PTSD or anxiety disorders. Our results therefore point out relevant avenues for future research, which may specify core symptoms and varying symptoms of TI, as well as factors affecting these exact symptom profiles.

Although the sample size in the current study was sufficient according to Pearson and Mundform (2010), who supported a sample of at least 100 cases, future studies might benefit from using even larger samples. Tabachnick and Fidell (2013), for example, suggested that "as a general rule of thumb, it is comfort-

[2] The three-factor model fit the data best. Still, it is worth noting that the two-factor model that was explored in this study (Table 4) found two factors that differed from those found by Fusé et al. (2007). Our structure loaded Items 5, 6, and 8 on the Fear factor, whereas these items loaded on TI factor in the structure of Fusé et al. (2007). Additionally, Item 10 loaded on the TI factor instead of Fear.

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Table 4
Comparison of the Original Factors in Adults by Fusé et al. (2007) and Factors Found in This Study

Brief description	Fusé et al. (2007)	Current study
1. Froze or felt paralyzed	TI	TI
2. Unable to move even though not restrained	TI	TI
3. Trembling/shaking	Fear	Fear
4. Unable to call out or scream	TI	TI
5. Felt numb or no pain	TI	Fear
6. Felt cold	TI	Fear
7. Feelings or fear/panic	Fear	Fear
8. Feared for your life or felt as though you were going to die	TI	Fear
9. Felt detached from yourself	TI	Detachment
10. Felt detached from what was going on around you	Fear	Detachment

Note. TI = tonic immobility.

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ing to have at least 300 cases for factor analysis" (p. 613). Moreover, the time between the assault and the reporting of TI was unknown in our sample, so we could not examine possible recall biases. Also, prior research has found gender differences in TI (Kalaf et al., 2015). Because our sample included females only, our findings cannot be generalized to males. Additionally, this study opted for factor analysis with oblique rotation to allow for correlation between factors, as peritraumatic reactions are conceptually likely to be related. Using oblique rotation is in contrast to Fusé et al. (2007), who used orthogonal rotation. This difference in technique may (partly) justify the results.

In conclusion, this study set out to explore the factor structure of the TIS (Forsyth et al., 2000) among a clinical sample of victims of a sexual assault aged 13–25 years. We found support for a conceptually clear three-factor solution distinguishing TI, Fear, and Detachment. Our results suggest that the factor structure of the TIS varies with age and psychopathology. We also highly recommend the investigation of gender, trauma type, and educational level as additional factors that may affect the interplay between peritraumatic symptom clusters, as well as the use of oblique rotation in studying the factors of TI.

References

Abrams, M. P., Carleton, R. N., Taylor, S., & Asmundson, G. G. (2009). Human tonic immobility: Measurement and correlates. *Depression and Anxiety*, *26*(6), 550–556. https://doi.org/10.1002/da.20462

Allan, N. P., Lonigan, C. J., & Phillips, B. M. (2015). Examining the factor structure and structural invariance off the PANAS across children, adolescents, and young adults. *Journal of Personality Assessment*, *97*(6), 616–625. https://doi.org/10.1080/00223891.2015.1038388

Arrindell, W. A., & Etteman, J. H. M. (2003). *SCL-90. Symptom checklist*. Swets Test Publishers.

Bovin, M. J., Jager-Hyman, S., Gold, S. D., Marx, B. P., & Sloan, D. M. (2008). Tonic immobility mediates the influence of peritraumatic fear and perceived inescapability on posttraumatic stress symptom severity among sexual assault survivors. *Journal of Traumatic Stress*, *21*(4), 402–409. https://doi.org/10.1002/jts.20354

Briggs, S. R., & Cheek, J. M. (1986). The role of factor analysis in the development and evaluation of personality scales. *Journal of Personality*, *54*(1), 106–148. https://doi.org/10.1111/j.1467-6494.1986.tb00391.x

De Kleine, R., Van Minnen, A., & Hagenaars, M. A. (2009). *The Tonic Immobility Scale, Dutch translation* [Unpublished manuscript].

Fiszman, A., Mendlowicz, M. V., Marques-Portella, C., Volchan, E., Coutinho, E. S., Souza, W. F., Rocha, V., Lima, A. A., Salomao, F. P., Mari, J. J., & Figueira, I. (2008). Peritraumatic tonic immobility predicts a poor response to pharmacological treatment in victims of urban violence with PTSD. *Journal of Affective Disorders*, *107*(1), 193–197. https://doi.org/10.1016/j.jad.2007.07.015

Forsyth, J. P., Marx, B., Fusé, T. M. K., Heidt, J., & Gallup, G. G. (2000). *The Tonic Immobility Scale–Adult Form*.

Fragkaki, I., Stins, J., Roelofs, K., Jongedijk, R. A., & Hagenaars, M. A. (2016). Tonic immobility differentiates stress responses in PTSD. *Brain and Behavior*, *6*(11), e00546. https://doi.org/10.1002/brb3.546

Fusé, T., Forsyth, J. P., Marx, B., Gallup, G. G., & Weaver, S. (2007). Factor structure of the Tonic Immobility Scale in female sexual assault survivors: An exploratory and confirmatory factor analysis. *Journal of Anxiety Disorders*, *21*(3), 265–283. https://doi.org/10.1016/j.janxdis.2006.05.004

Galliano, G., Noble, L. M., Travis, L. A., & Puechl, C. (1993). Victim reactions during rape/sexual assault: A preliminary study of the immobility response and its correlates. *Journal of Interpersonal Violence*, *8*(1), 109–114. https://doi.org/10.1177/088626093008001008

Hagenaars, M. A. (2016). Tonic immobility and PTSD in a large community sample. *Journal of Experimental Psychopathology*, *7*(2), 246–260. https://doi.org/10.5127/jep.051915

Hagenaars, M. A., & Putman, P. (2011). Attentional control affects the relationship between tonic immobility and intrusive memories. *Journal of Behavior Therapy and Experimental Psychiatry*, *42*(3), 379–383. https://doi.org/10.1016/j.jbtep.2011.02.013

Heidt, J. M., Marx, B. P., & Forsyth, J. P. (2005). Tonic immobility and childhood sexual abuse: A preliminary report evaluating the sequela of rape-induced paralysis. *Behaviour Research and Therapy*, *43*(9), 1157–1171. https://doi.org/10.1016/j.brat.2004.08.005

Humphreys, K. L., Sauder, C. L., Martin, E. K., & Marx, B. P. (2010). Tonic immobility in childhood sexual abuse survivors and its relationship to posttraumatic stress symptomatology. *Journal of Interpersonal Violence*, *25*(2), 358–373. https://doi.org/10.1177/0886260509334412

Izquierdo, I., Olea, J., & Abad, F. J. (2014). Exploratory factor analysis in validation studies: Uses and recommendations. *Psicothema*, *26*(3), 395–400. https://doi.org/10.7334/psicothema2013.349

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, *39*(1), 31–36. https://doi.org/10.1007/BF02291575

Kalaf, J., Coutinho, E. S. F., Vilete, L. M. P., Luz, M. P., Berger, W., Mendlowicz, M., Volchan, E., Andreoli, S. B., Quintana, M. I., de Jesus Mari, J., & Figueira, I. (2017). Sexual trauma is more strongly associated with tonic immobility than other types of trauma: A population based study. *Journal of Affective Disorders*, *215*, 71–76. https://doi.org/10.1016/j.jad.2017.03.009

Kalaf, J., Vilete, L. P., Volchan, E., Friszman, A., Coutinho, E. S. F., Andreoli, S. B., Quintana, M. I., Mari, J. J., & Figueira, I. (2015). Peritraumatic tonic immobility in a large representative sample of the general population: Association with posttraumatic stress disorder and female gender. *Comprehensive Psychiatry*, *60*, 68–72. https://doi.org/10.1016/j.comppsych.2015.04.001

Kuiling, J. M. E., Klaassen, F., & Hagenaars, M. A. (2019). The role of tonic immobility and control in the development of intrusive memories after experimental trauma. *Memory*, *27*(6), 772–779. https://doi.org/10.1080/09658211.2018.1564331

Lima, A. A., Fiszman, A., Marques-Portella, C., Mendlowicz, M., Coutinho, E. S. F., Maia, D. C. B., Berger, W., Rocha-Rego, V., Volchan, E., Mari, J. J., & Figueira, I. (2010). The impact of tonic immobility reaction on the prognosis of posttraumatic stress disorder. *Journal of Psychiatric Research*, *44*(4), 224–228. https://doi.org/10.1016/j.jpsychires.2009.08.005

Marx, B. P., Forsyth, J. P., Gallup, G. G., Fusé, T., & Lexington, J. M. (2008). Tonic immobility as an evolved predator defense: Implications for sexual assault survivors. *Clinical Psychology: Science and Practice*, *15*(1), 74–90. https://doi.org/10.1111/j.1468-2850.2008.00112.x

Möller, A., Söndergaard, H. P., & Helström, L. (2017). Tonic immobility during sexual assault: A common reaction predicting posttraumatic stress disorder and severe depression. *Acta Obstetricia et Gynecologica Scandinavica*, *96*(8), 932–938. https://doi.org/10.1111/aogs.13174

Osborne, J. W. (2015). What is rotating in exploratory factor analysis? *Practical Assessment, Research & Evaluation*. Advance online publication. https://doi.org/10.7275/hb2g-m060

Pearson, R. H., & Mundform, D. J. (2010). Recommended sample size for conduction exploratory factor analysis on dichotomous data. *Journal of Modern Applied Statistical Methods*, *9*(2), 359–368. https://doi.org/10.22237/jmasm/1288584240

Portugal, L. C. L., Pereira, M. G., Alves, R. D. C. S., Tavares, G., Lobo, I., Rocha-Rego, V., Marques-Portella, C., Mendlowicz, M. V., Coutinho, E. S., Fiszman, A., Volchan, E., Figueira, I., & Oliveira, L. D. (2012). Peritraumatic tonic immobility is associated with posttraumatic stress symptoms in undergraduate Brazilian students. *Revista Brasileira de Psiquiatria*, *34*(1), 60–65. https://doi.org/10.1590/S1516-44462012000100011

Reichenheim, M., Souza, W., Coutinho, E. S., Figueira, I., Quintana, M. I., de Mello, M. F., Bressan, R. A., de Jesus Mari, J., & Andreoli, S. B. (2014). Structural validity of the Tonic Immobility Scale in a population exposed to trauma: Evidence from two large Brazilian samples. *PLoS One*, *9*(4), e94367. https://doi.org/10.1371/journal.pone.0094367

Skinner, E. A., & Zimmer-Gembeck, M. J. (2007). The development of coping. *Annual Review of Psychology*, *58*(1), 119–144. https://doi.org/10.1146/annurev.psych.58.110405.085705

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson Education.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. American Psychological Association. https://doi.org/10.1037/10694-000

Tjaden, P. G., & Thoennes, N. (2006). *Extent, nature, and consequences of rape victimization: Findings from the National Violence Against Women Survey*. U.S. Department of Justice.

Volchan, E., Souza, G. C., Franklin, C. M., Norte, C. E., Rocha-Rego, V., Oliveira, J. M., David, I. A., Mendlowicz, M. V., Coutinho, E. S., Fiszman, A., Berger, W., Marques-Portella, C., & Figueira, I. (2011). Is there tonic immobility in humans? Biological evidence from victims of traumatic stress. *Biological Psychology*, *88*(1), 13–19. https://doi.org/10.1016/j.biopsycho.2011.06.002

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