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From stillness to survival: a deep dive into the
phenomenology of the Freeze response: a systematic
review

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Abstract

Background: Everybody reacts differently to situations. How an individual responds to a traumatic experience is shaped not only by the intensity but also by the duration of the experience. Yet, the impact of the same stressful situation can vary among individuals, largely due to differences in their genes, environment, social support, and physical and mental well-being (Cardinali, 2018).

Objective: Within this systematic review, research is summarized which evaluates the psychological experiences of people experiencing a freeze response during a traumatic event (acute-, chronically response, tonic- or collapsed immobility).

Method: A systematic search for publications was conducted using APA psycINFO. Out of the initial pool of 668 identified studies exploring the physiological experiences of people experiencing a freeze response during a traumatic event, the final analysis incorporated 10 studies comprising a total sample size of 872 participants.

Results: The findings consistently underscore the correlation between tonic immobility (TI) during trauma and enduring psychological repercussions, particularly in the development of post-traumatic stress disorder (PTSD). Emotional experiences, such as guilt and self-blame, heighten this association, especially when coupled with passive trauma responses. Sexual assault survivors display lasting guilt and shame stored in the 'fear network.' TI's robust predictive capacity for PTSD, surpassing panic responses, underscores its significance. Recommending Tonic Immobility Psychoeducation (TIP) integration in PTSD treatments, particularly for sexual assault survivors, is crucial. Peritraumatic dissociation is acknowledged as a notable PTSD risk factor. Sexual abuse survivors confront an increased risk of recurring trauma, PTSD, and TI, notably triggered by instances involving vaginal penetration. Longitudinal risk factors, including anger and shame, are identified for PTSD. Explorations of unique contexts, like grief-related trauma, unveil TI as a mediating factor. Diverse cognitive

processing styles, encompassing mental confusion, elevate PTSD risk. The intricate nature of peritraumatic responses and their connection to PTSD and depressive symptoms necessitate further investigation, emphasizing tailored interventions, such as TIP, for vulnerable populations.

Conclusion: Tonic immobility (TI) consistently emerges as a pivotal predictor of enduring psychological consequences, notably post-traumatic stress disorder (PTSD). The intricate interplay of emotional experiences, such as guilt and self-blame, amplifies this association, particularly in passive trauma responses. Sexual assault survivors, marked by persistent guilt and shame, display heightened vulnerability to TI. Its robust predictive capacity for PTSD, surpassing panic responses, underscores its relevance in trauma-related psychopathology. Recommending the integration of Tonic Immobility Psychoeducation (TIP) in PTSD interventions, especially for sexual assault survivors, becomes imperative. Distinct TI responses in various traumatic contexts, coupled with enduring risk factors like anger and shame, accentuate the need for nuanced, tailored interventions.

Introduction

Consider a scenario wherein an individual is engaged in social activities with companions at a venue, and an elderly male approaches, initiating unwanted physical contact. Rather than vocalizing objections or instructing the individual to desist or depart, the individual's entire physiological response is one of immobility. The person remains motionless and may find themselves incapable of offering a physical or emotional response, resulting in a sensation of paralysis. Manifestations of this state may include a localized sense of entrapment, frigidity or numbness, physical rigidity or a weightiness in the extremities, a reduction in heart rate, and breath-holding.

This illustrative instance elucidates the manner in which an individual may respond to a threatening situation by exhibiting a freeze response. Despite the inclination to retaliate and thwart unwarranted physical contact, the individual's physiological reactions are notably inadequate within this context.

Within the framework of this narrative review, the primary research inquiry under consideration is: *“What are the psychological experiences of people experiencing a freeze response during a traumatic event?”* Concentrating on the psychological aspect, as opposed to the physical encounter, although the latter being indirectly referenced. This acknowledgment recognizes the inherent difficulty in fully isolating the psychological and physical dimensions of the experience.

Individual responses to situations vary widely. How an individual responds to a traumatic experience is shaped not only by the intensity but also by the duration of the experience. Yet, the impact of the same stressful situation can vary among individuals, largely due to differences in their genes, environment, social support, and physical and mental well-being (Cardinali, 2018). In a healthy situation it is possible that there is a stress response in reaction to danger. Arousal, as the initial response to a potential threat, sets the stage for

activating the defense cascade (Kozłowska et al., 2015). The nature of the threat's characteristics guides the brain in choosing a defense cascade (Baldwin, 2013). This selection can lead to active defense responses like 'flight' or 'fight,' or passive defense responses such as 'freezing' (Kozłowska et al., 2015).

In scenarios where individuals sense entrapment and perceive no avenue for escape, or when the 'flight or fight' response proves unsuccessful, tonic immobility may be activated. Tonic immobility is marked by a lack of movement in response to a threat, as the brain suppresses all motor activity (Kozłowska et al., 2015).

Humans are equipped by evolution with a range of automatic, ingrained defense behaviours known as the **defense cascade**. In the grand scheme of evolution, the components of the defense cascade represent basic emotional states—well-coordinated patterns of motor, autonomic, and sensory responses. These states are readily and automatically triggered in the presence of danger.

The initiation of this cascade begins with arousal, setting the stage for the activation of subsequent defense responses. The **fight-or-flight** mechanism is an active defense strategy employed in response to threats, while freezing temporarily halts the flight-or-fight response. **Tonic immobility** and **collapsed immobility** represent the last-resort reactions to unavoidable threats, occurring when active defenses prove ineffective. **Quiescent immobility**, on the other hand, is a state of tranquility that fosters rest and healing. The 'freeze' response is seen as an efficient coping mechanism, rendering the individual less noticeable by inducing immobility (Ataria, 2015).

Distinctive neural patterns underlie each of these defense reactions, orchestrated through a shared neural pathway involving the amygdala, hypothalamus, periaqueductal gray, and sympathetic and vagal nuclei. Unlike animals, humans may struggle to revert to their normal functioning after a danger has passed, often becoming trapped in recurrent response

patterns linked to the initial trauma. Recognizing the unique components that contribute to these innate responses is crucial for developing effective treatment interventions (Kozłowska et al., 2015). In his (1872) work ‘the expression of the emotions in man and animals’, Darwin asserted that human emotional expressions closely resemble those of lower animals. He argued that emotions are adaptive, triggering actions that benefit the organism. Positive emotions encourage social-engagement behaviors, while negative emotions often activated by threats elicit defensive response (Gross, 2010).

When defense responses kick in for humans, the abrupt shift in both motor and physiological states can feel overpowering, often surpassing conscious control. These experiences are prevalent in clinical settings, spanning various disorders and presentations such as posttraumatic stress disorder (PTSD), reactions during traumatic events (like assaults, accidents, or natural disasters), complex trauma, borderline personality disorder, and intense distress states that may escalate to self-harm (Baldwin, 2013).

The specific defense response in a given situation depends on the unique defense repertoire of the species, genetic variations within strains, features of the threat, and the context in which it unfolds—all shaped by individual differences.

Initiating the defense cascade requires arousal, a crucial initial step shared by both animals and humans. Arousal can directly lead to the flight-or-fight response or, more commonly, trigger the freeze response. Under certain conditions, arousal may progress to tonic immobility or collapsed immobility, particularly if these responses have been primed by past experiences. The hypothalamus plays a significant role in arousal by increasing tone in both the sympathetic branch of the autonomic nervous system and the somatomotor nervous system. Some reactions prepare the body for immediate action: a high-pitched voice, posture is stabilized and all muscles, smooth and striated, heighten in tone; heart rate and respiration accelerate (Lanius et al., 2003).

Additionally, the freeze response effectively readies individuals for subsequent defensive reactions by increasing their attention and sensitivity to threat cues, priming their bodies for immediate action. Usually lasting mere seconds, this freeze response is frequently succeeded by efforts to flee or engage in combat. In a 'flight or fight' response, the sympathetic nervous system induces heightened heartbeat, increased respiration, and narrowed blood vessels in internal organs (Kozłowska et al., 2015).

After these defense responses, individuals must regain stability following a collapsed state. This involves assisting the ANS in returning to its typical pattern of oscillation between sympathetic and parasympathetic activation, maintaining a normal level of arousal (Brantbjerg, 2021). Nevertheless, in situations of severe stress, the coordination between the brain and the human survival systems may be disrupted, potentially leading to the manifestation of trauma-related symptoms (Baldwin, 2013).

The human model adds complexity as compared to the model for animals. Individuals form subjective representations of their body states, attributing meaning to their experiences. Moreover, humans employ their minds to construct internally generated representations of threats—images capturing emotional states and past events or envisioning potential future scenarios. These mental images, akin to actual external threats, possess the ability to activate the body's defense systems even in the absence of a real external threat. Consequently, fear states can be triggered by a mix of internal and external stimuli, which can be consciously processed while others remain beyond conscious awareness (Felmingham et al., 2008).

As mentioned earlier, the objective of this review is to explore more profoundly the experience of a freeze response and if these are acute or chronically after a traumatic experience.

Method

In conducting and reporting, this study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, as outlined by (Page et al., 2021).

Search criteria

By conducting a literature review, pertinent physiological markers linked to the experience of the freeze response were discerned (Bovin et al., 2014; Fusé et al., 2007; Katz et al., 2020; Katz et al., 2021; Lee et al., 2020; Lloyd et al., 2019; Morabito & Schmidt, 2023; Rizvi et al., 2008; Rocha-Rego et al., 2009; TeBockhorst et al., 2015). Following that, the search criteria for the systematic review included the integration of these psychological markers. A systematic literature search was carried out using APA psycINFO. The search string consisted of the combination of the following key words: [(freez* OR tonic immobility or collapsed immobility) AND (phenomenology or experience)]. No data restrictions were imposed to guarantee the inclusion of all potentially relevant research studies. The search was carried out on november 5th 2023.

Selection criteria

All studies had to be written in English and undergo peer review. Inclusion criteria comprised: 1) articles investigating information about freeze responses and experience or phenomenology. 2) articles exploring differences in the passive defense response among individuals. 3) articles only including human beings. 4. Articles involving experimental studies. Exclusion criteria included: 1) articles not addressing freeze response, tonic immobility, or collapsed immobility, 2) articles conducted on animals, and 3) articles that didn't contain experiences or phenomenology, and 4) systematic reviews and meta-analyses.

Study characteristics

Among the pool of 668 articles, it was discerned that there was a total of 18 instances of duplicated content, indicating the presence of replicated materials within the dataset. Once removed 650 articles were further analyzed. After the initial search, 44 studies satisfied the inclusion criteria and were retained for further analysis. Seventeen articles were excluded due to not containing tonic immobility, two articles did eventually reveal the use of animals in the study, two studies had an incorrect study design, two studies were not available online or elsewhere and therefore not used, and another ten articles were too specific for my research question or not useful. (refer to Figure 1).

Consequently, a total of ten studies were incorporated into the final analysis.

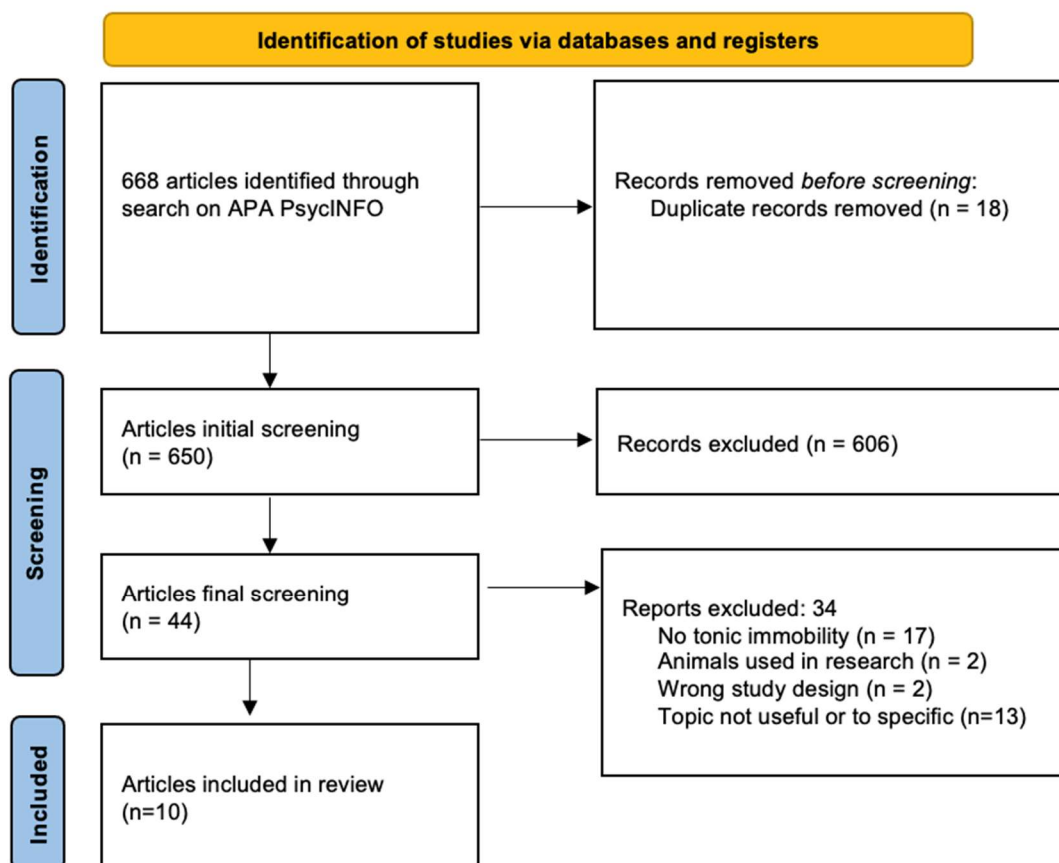


Figure 1. PRISMA Flowchart of literature search and study identification.

Data extraction

A spreadsheet was used to systematically gather data from each included study in the review. This spreadsheet contained comprehensive data, including general study characteristics such as sample size, whether the participants had PTSD, their mean age, their sex, whether it was acute or chronically, whether the article contained tonic or collapsed immobility and the way the data was perceived (interview/questionnaire/therapy). This systematic data compilation process fostered a comprehensive understanding of the diverse facets of passive defense responses across the included studies.

Results

General study characteristics

In total, ten studies have identified the psychological experiences of people experiencing a freeze response during a traumatic event. These investigations displayed a spectrum of sample sizes, with participant counts ranging from $n = 7$ to $n = 462$, leading to a cumulative total of 1541 participants. The average age of participants in these studies ranged from 7.95 years to 41 years. It is outstanding that four of the studies concentrated exclusively on female participants (Bovin et al., 2014; Fusé et al., 2007; Rizvi et al., 2008; TeBockhorst et al., 2015), the other studies encompassed both female and male participants (Katz et al., 2020; Katz et al., 2021; Lee et al., 2020; Lloyd et al., 2019; Morabito & Schmidt, 2023; Rocha-Rego et al., 2009). While the search string encompasses the term "collapsed immobility," it is noteworthy that all ten retrieved articles specifically address tonic immobility and focus on the chronic effects of experiencing tonic immobility (Bovin et al., 2014; Fusé et al., 2007; Katz et al., 2020; Katz et al., 2021; Lee et al., 2020; Lloyd et al., 2019; Morabito & Schmidt, 2023; Rizvi et al., 2008; Rocha-Rego et al., 2009; TeBockhorst et al., 2015). The data were procured through a variety of methodological approaches, including interviews, and questionnaires. One study got their data by performing an interview (Katz et al., 2020), five studies obtained their data by conducting questionnaires (Fusé et al., 2007; Katz et al., 2021, Lee et al., 2020; Lloyd et al., 2019; Morabito & Schmidt, 2023) and four studies acquired their data by using questionnaires and an interview (Bovin et al., 2014; Rizvi et al., 2008; Rocha-Rego et al., 2009; TeBockhorst et al., 2015).

Interviews that had been used are Clinician-Administered PTSD Scale for DSM-IV (CAPS-IV) (Bovin et al., 2014; Rizvi et al., 2008), SCID-5 interview (Bovin et al., 2014), The self-report Traumatic Life Events Questionnaire (TLEQ) (Bovin et al., 2014), Tonic immobility Scale-Adult version (TIS-A) (Bovin et al., 2014; TeBockhorst et al., 2015), Tonic

Immobility Demographic Data Form (TIS Demographic Data Form) (Fusé et al., 2007), Life Experiences Questionnaire (LEQ)(Fusé et al., 2007), Sexual Experiences Survey (SES))(Fusé et al., 2007), Penn State Worry Questionnaire (PSWQ-A) (Lee et al., 2020), Somatic Symptom Scale-8 (SSS-8) (Lee et al., 2020), Tonic Immobility Scale (TIS) (Fusé et al.,2007; Lee et al., 2020; Rocha-Rego et al., 2009; TeBockhorst et al., 2015), Persistent Complex Bereavement Inventory (PCBI) (Lee et al., 2020), Prolonged Grief Disorder (PG-13) (Lee et al., 2020), Scale for tonic immobility occurring post-trauma (STOP) (Lloyd et al., 2019), PTSD checklist for DSM-5 (PCL-5) (Morabito & Schmidt, 2023; Roga-Rego et al., 2009), Patient Health Questionnaire (PHDQ-4) (Lloyd et al., 2019) , Peri-Traumatic Dissociative Experiences Questionnaire (PDEQ) (Lloyd et al., 2019), Dissociative symptoms scale (DSS) (Lloyd et al., 2019),Tonic Immobility Questionnaire–Revised (TIQ-R) (Morabito & Schmidt, 2023), Life events checklist for DSM-5 (LEC-5) (Morabito & Schmidt, 2023), Positive and Negative Affect Schedule (PANAS) (Morabito & Schmidt, 2023; Rocha-Rego et al., 2009), Posttraumatic Cognitions Inventory (PTCI) (Morabito & Schmidt, 2023), Physical Reactions Subscale (PRS) (Rocha-Rego et al., 2009) and the Beck Depression Inventory (BDI) (Rizvi et al., 2008).

Six articles have been undertaken to scrutinize the nuanced relationship between tonic immobility (TI) and the severity of symptoms characterizing posttraumatic stress disorder (PTSD) (Fusé et al., 2007; Lloyd et al., 2019; Morabito & Schmidt, 2023; Rizvi et al., 2008; Rocha-Rego et al., 2009; TeBockhorst et al., 2015). The other four articles don't mention PTSD in their articles (Bovin et al., 2014; Katz et al., 2020; Katz et al., 2021; Lee et al., 2020). Interviews that had been used: the Structured Clinical Interview for DSM-5 (SCID-5) (Bovin et al., 2014), the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I) (Reiter-Scheidl et al., 2018), trauma interview (Katz & Nicolet, 2020; Rizvi et al., 2008). The questionnaires that had been used are the Penn State Worry Questionnaire for

Adults (PSWQA) (Lee et al., 2020), the questionnaire for the big five personalities HEXACO-PI-R (Perry & Sibley, 2013), and Trauma Interview, Clinician Administered PTSD Scale (CAPS), Beck Depression Inventory (BDI), Peritraumatic Dissociative Experiences Questionnaire–Rater Version (PDEQ) (Rizvi et al., 2008).

In this review there are different experiences that triggered the freeze response and thus tonic immobility, eight articles encompassed sexual abuse/assault/victimization (Bovin et al., 2014; Fusé et al., 2007; Katz et al., 2020; Katz et al., 2021; Morabito & Schmidt, 2023; Rizvi et al., 2008; Rocha-Rego et al., 2009; TeBockhorst et al., 2015). One article didn't specify the traumatic experience (Lloyd et al., 2019), the other article explored the relationship of grief and worrying with tonic immobility (Lee et al., 2020).

Within the work of by Bovin et al. (2014), the reported traumatic experiences extend beyond instances of sexual abuse. These encompass diverse scenarios, including motor vehicle accidents, exposure to other life-threatening events, witnessing or learning about death, and instances of being stalked. In the work of Morabito & Schmidt (2023) physical assault, mass violence, having an accident, a sudden violent death and having a life-threatening illness were other experiences that were encountered. In the study of Rocha-Rego et al (2009) armed robbery, motor vehicle accidents, attempted rape and burns were experiences that could be experienced.

In four articles dissociation was mentioned and researched in combination with tonic immobility ((Lloyd et al., 2019; Rizvi et al., 2008; Rocha-Rego et al., 2009, TeBockhorst et al., 2015), in the other articles dissociation wasn't mentioned or researched (Bovin et al., 2014; Fusé et al., 2007; Katz et al., 2020; Katz et al., 2021; Lee et al., 2020; Morabito & Schmidt, 2023; Rizvi et al., 2008).

Table 1

General characteristics

Author & Article	Sample size participants	Mentioned PTSD	Mean age	Female or male	Acute or Chronically	Tonic or collapsed	Interview or questionnaire or therapy	Experience or situation	Mentioned Dissociation
Bovin, Dodson, 2014	63	/	34.48	n=63 Female	Chronically	Tonic immobility	Clinician-Administered PTSD Scale for DSM-IV (CAPS-IV), SCID-5 interview, The self-report Traumatic Life Events Questionnaire (TLEQ), Tonic Immobility Scale-Adult Version (TIS-A)	Childhood sexual/physical abuse (68.3%), adult sexual/physical abuse (52.4%), motor vehicle accidents (36.5%), another life-threatening event (82.5%), witnessing or learning about death (79.4%), and being stalked (33.3%)	No dissociation
(Fusé et al., 2007)	204	PTSD	19.41	n=204 Female	Chronically	Tonic immobility	The Tonic Immobility Scale (TIS), Tonic Immobility Demographic Data Form, Life Experiences Questionnaire (LEQ), Sexual Experiences Survey (SES)	Sexual victimization	No dissociation
(Katz et al., 2020)	20	/	7.95	n=16 Female, n=4 Male	Chronically	Tonic immobility	Interview	Child sexual abuse	No dissociation
(Katz et al., 2021)	180	/	31.40	n= 167 Female, n=13 Male	Chronically	Tonic immobility	Literature review, and qualitative exploration	Sexuale Abuse in childhood	No dissociation
(Lee et al., 2020)	231	/	19.75	n=185 Female, n=46 Male	Chronically	Tonic immobility	Penn State Worry Questionnaire (PSWQ-A), Somatic Symptom Scale-8 (SSS-8), Tonic Immobility Scale (TIS), Persistent Complex Bereavement Inventory (PCBI), Prolonged Grief Disorder (PG-13)	Bereavement	No dissociation
(Lloyd et al., 2019)	462	PTSD	34.33	n=253 Female, n=209 Male	Chronically	Tonic immobility	Scale for tonic immobility occurring post-trauma (STOP), PTSD checklist for DSM-5 (PCL-5), Patient Health Questionnaire (PHDQ-4), Peri-Traumatic Dissociative Experiences Questionnaire (PDEQ), Dissociative symptoms scale (DSS)	Traumatic experience (not specified)	Dissociation
(Morabito & Schmidt, 2023)	46	PTSD	21.57	n=39 Female, n=2 Male, n=5 Non binary	Chronically	Tonic immobility	PTSD Checklist for DSM-5 (PCL-5), Tonic Immobility Questionnaire-Revised (TIQ-R), Life events checklist for DSM-5 (LEC-5), Positive and Negative Affect Schedule (PANAS), Posttraumatic Cognitions Inventory (PTCI)	Sexual assault (n=18), Physical assault (n=15), Mass violence (n=3), Accident (n=3), Sudden violent death (n=6), Life-threatening illness (n=1)	No dissociation
(Rizvi et al., 2008)	296	PTSD	32.20	n=296 Female	Chronically	Tonic immobility	Trauma Interview, Clinician Administered PTSD Scale (CAPS), Beck Depression Inventory (BDI), Peritraumatic Dissociative Experiences Questionnaire-Rater Version (PDEQ)	Sexually or physically assaulted within the previous 2 months	Dissociation
(Rocha-Rego et al., 2009)	32	PTSD	41	n= 13 Female, n=19 Male	Chronically	Tonic immobility	Peritraumatic Dissociative Experiences Questionnaire (PDEQ), Tonic Immobility Scale (TIS-C), Physical Reactions Subscale (PRS), Post-Traumatic Stress Disorder Checklist (PCL-C), Positive and Negative Affect Schedule — Trait Version (PANAS-T)	Armed robbery (n = 25), motor vehicle accident (n = 5), attempted rape (n = 1), and burns (n = 1)	Dissociation
(TeBockhorst et al., 2015)	7	PTSD	18-22	n=7 Female	Chronically	Tonic immobility	Tonic Immobility Scale-Adult Form (TIS-A), phenomenological design, semi-structured interviews, triangulation, member checks, and an audit trail	Sexual abuse	Dissociation

Noot. PTSD & Dissociation are not always mentioned are researched in the studies. / Means that PTSD isn't mentioned or researched. When dissociation isn't mentioned or researched this is categorized with a 'no

Chronic course

The reviewed studies exhibited numerous parallels in their findings about the chronic course of tonic immobility, albeit discernible divergences were also identified, offering valuable insights into nuanced associations and shared patterns. Bovin et al. (2014) and Katz et al. (2020) both underscore the enduring repercussions of sexual assault, emphasizing the storage of traumatic memories in the 'fear network' and the persistent self-blame and guilt experienced by survivors. These themes echo in various traumatic experiences, including grief (Lee et al., 2021), where TI serves as a mediating factor between trait worry and grief-related pain.

Bovin et al. (2014) demonstrated that- while a definitive causal mechanism remains elusive, one plausible proposition involves the emotional experience of guilt, which denotes a negative assessment of either an action undertaken or abstained from. Specifically, individuals who exhibit passivity during traumatic incidents may be susceptible to feelings of guilt, manifesting as a self-reproach for their perceived failure to act. This inclination toward passive behavior peritraumatically is posited to amplify the likelihood of experiencing subsequent guilt and self-blame when contrasted with individuals who engage in active responses. Guilt was posited as a prospective mechanism establishing a linkage between TI and PTSD. In Fusé et al. (2007) they also found that tonic immobility appears to be associated with self-attribution of blame by survivors and an inclination among external entities to ascribe responsibility to the survivor for perceived failure to resist. Concurrently, deficient social support quality may exacerbate the vulnerability of individuals to heightened severity in PTSD symptomatology. Furthermore, self-blame has been identified as a correlate with diminished prospects for recovery following incidents of sexual assault.

Intriguingly, the inclination toward passive behavior during trauma emerges as a common thread, linking guilt, self-blame, and heightened vulnerability to PTSD across

studies (Fusé et al., 2007; Lloyd et al., 2019). The intricate interplay between peritraumatic passivity, guilt, and the chronicity of TI further establishes a thematic coherence, indicating a potential pathway for intervention strategies.

In Lloyd et al (2019) they found evidence for the chronic course of experiencing tonic immobility during a traumatic event. Notwithstanding its role as an adaptive acute defense response, peritraumatic tonic immobility is associated with heightened psychological impairment in the long-term. Its correlation extends to the development and severity of PTSD among survivors exposed to physical, sexual, and non-sexual psychological trauma. Within a cohort of individuals exhibiting PTSD symptoms, peritraumatic tonic immobility emerged as a more robust predictor of PTSD development and prognosis compared to peritraumatic panic. Consistent with this perspective, antecedent experiences of TI have recently been linked to an augmented proneness to TI in both individuals with PTSD and healthy controls during exposure to stressful stimuli. In terms of discriminant validity, both subscale and global scores on the STOP (Self-Trauma Outcome Profile) demonstrated substantial positive correlations with other indicators of dissociation and PTSD symptomatology. Despite serving as an adaptive acute defense response, peritraumatic TI is related to increased psychological impairment over the long term. It has been associated with the development and severity of PTSD in survivors of physical as well as of sexual and non-sexual psychological trauma. In a sample of men and women with PTSD, for example, peritraumatic TI was a better predictor of PTSD development and prognosis than peritraumatic panic. Consistent with this notion, prior TI experiences have been recently linked to increased TI proneness in both healthy controls and individuals with PTSD during stressful stimuli presentation. Subscale and global STOP scores demonstrated strong positive associations with other measures of dissociation and PTSD symptomatology. The intricate associations between dissociation and TI come to the forefront, underscoring their co-occurrence and shared impact (Lloyd et al., 2019; Katz et al.,

2020).

In Katz et al. (2020), it was also discerned that the narratives unequivocally conveyed a pronounced sense of self-blame, guilt, and shame arising from their responses—or lack thereof—to instances of abuse. These adverse self-attributions not only permeated their formative years but endured into adulthood. Prevalent among these self-attributions were feelings of self-blame and shame. The survivors articulated a pervasive apprehension, asserting a lack of self-trust when confronted with challenging circumstances in adulthood. Sexual abuse emerges as a consistent context with heightened vulnerability to repeated trauma exposure and PTSD (Morabito & Schmidt, 2023). Katz et al. (2021) further expands the narrative, exploring visible behavior patterns in children's responses to maltreatment, challenging conventional fight-or-flight perspectives.

In the study conducted by Morabito & Schmidt (2023) there was also a linkage between experiencing tonic immobility and developing PTSD. They discerned that individuals who encountered tonic immobility in the course of their traumatic experiences may exhibit heightened susceptibility to avoiding stimuli associated with the trauma. This avoidance tendency has the potential to perpetuate posttraumatic stress symptoms and impede the individual's capacity to gather evidence counteracting maladaptive beliefs. Considering the established link between tonic immobility and diminished recovery rates PTSD, incorporating Tonic immobility Psychoeducation (TIP) into gold-standard evidence-based treatments for PTSD, aimed at addressing TI-specific beliefs and behaviors, holds particular promise. Notably, survivors of sexual assault, given their heightened vulnerability to recurring trauma exposure and PTSD, may also be at an elevated risk of experiencing TI during traumatic incidents. In Rizvi et al. (2008) they found similar outcomes regarding tonic immobility as a strong predictor for developing PTSD. Tonic immobility demonstrated predictive validity concerning adult depressive and Post-Traumatic Stress Disorder (PTSD)

symptoms. Unlike peritraumatic behaviors, peritraumatic emotions assume a pivotal role in the diagnosis of PTSD. Notably, peritraumatic fear, helplessness, and horror exhibited positive associations with heightened PTSD levels, yielding an average effect size of 0.26. Longitudinally, anger and shame have been identified as PTSD risk factors. Individual beta weights in the final model underscore the distinctive contributions of trauma type, dissociation, the active response factor, and the freeze response to the Clinician-Administered PTSD Scale (CAPS) total score, wherein instances of rape, increased dissociation, reduced active responses, and elevated freeze responses were associated with greater severity of PTSD symptoms.

The findings further indicate the substantial influence of these factors on models predicting both PTSD and depressive symptoms, even after accounting for trauma type and peritraumatic dissociation. Additionally, peritraumatic emotions, excluding fear and anxiety, emerged as significant predictors of posttrauma distress, specifically depression, rather than PTSD symptoms. Nevertheless, it is imperative to acknowledge that a considerable amount of variance remained unexplained by the model, emphasizing the complex nature of the relationship between peritraumatic responses and the manifestation of PTSD and depressive symptoms. Rizvi et al. (2008) reinforces the substantial role of peritraumatic dissociation as a risk factor for PTSD onset, aligning with Rocha-Rego's (2009) exploration of dissociation's strength as a predictor of posttraumatic stress symptoms.

In the study of Rocha-Rego (2009) they elaborated on the increased focus and impact of panic reactions during a traumatic event and a possible relation to developing PTSD. This phenomenon was not observed in the additional studies. It was found that increased focus has been directed towards examining the impact of peritraumatic panic reactions. A prevalence of over fifty percent has been documented regarding trauma survivors experiencing panic attacks during the investigated traumatic events. The study explored peritraumatic dissociation, panic

attacks, and emotional reactions as potential predictors of Post-Traumatic Stress Disorder (PTSD). Furthermore, peritraumatic tonic immobility was identified as being linked to a less favorable response to pharmacological treatment with antidepressants. Notably, while tonic immobility maintained its significant association with PTSD symptoms, the association of dissociation exhibited only borderline significance, and panic reactions lost their statistical significance. Comparatively, Rocha-Rego (2009) introduces the unique focus on panic reactions during traumatic events, emphasizing the need for a more comprehensive exploration of diverse peritraumatic responses. TeBockhorst et al. (2015) delves into mental confusion as a cognitive processing style, adding a distinctive dimension to the discussions around TI and PTSD development. These findings underscore the complexity of peritraumatic responses, urging a nuanced understanding beyond fear and anxiety.

Notably, TeBockhorst et al. (2023) introduces the qualitative distinction in instances involving vaginal penetration during sexual assault, highlighting the relevance of specific traumatic elements in influencing TI responses. The relation of mental confusion and developing PTSD is explored. This association remains unexplored in the remaining articles. They discussed that individuals commonly exhibit diverse cognitive processing styles in response to crises, with sexual assault being no exception. Mental confusion is identified as one such cognitive processing style, and those individuals who undergo mental confusion during a sexual assault are found to be at an elevated risk of developing Post-Traumatic Stress Disorder (PTSD). Additionally, both experiential avoidance and peritraumatic dissociation demonstrate correlations with heightened levels of long-term impairment and increased susceptibility to PTSD following a traumatic event.

In Lee et al.'s (2021) study, an exploration of a distinct form of trauma, namely grief, deviates from the focus of other studies. However, it presents significant interest as it pertains to tonic immobility. Tonic immobility is considered a mediating factor between trait worry

and grief-related pain in this study. Individuals characterized by high trait worry exhibit an increased susceptibility to elevated levels of depression, suicidal ideation, insomnia, and health complaints. Specifically, trait worry demonstrated positive correlations with somatization ($r = .35$), tonic immobility ($r = .26$), grief-related pain ($r = .25$), and grief-related dysfunction ($r = .19$). Somatization exhibited positive correlations with tonic immobility ($r = .74$), grief-related pain ($r = .25$), and grief-related dysfunction ($r = .19$). Tonic immobility was correlated with grief pain ($r = .42$) and grief-related dysfunction ($r = .40$). Additionally, grief-related pain and grief-related dysfunction demonstrated a positive correlation ($r = .37$). The preliminary analysis results indicated that the variance in grief-related outcomes was exclusively predicted by tonic immobility. Specifically, when grief-related pain served as the outcome variable, tonic immobility emerged as a significant predictor ($\beta = .37, p < .001$), while somatization ($\beta = .04, p = .64, ns$) did not reach significance, $F(2, 228) = 24.27, p < .001$.

Dissociation

In certain articles, a co-occurrence of dissociation and tonic immobility was observed during the traumatic event. In Lloyd et al. (2019) there was found that despite existing insights into the influence of peritraumatic tonic immobility on the onset and trajectory of Post-Traumatic Stress Disorder (PTSD), there remains a dearth of understanding regarding post-traumatic TI. An observed positive correlation between global STOP scores and current Dissociative Symptoms (DSS) was evident, alongside a weaker yet positive association with the Posttraumatic Dissociative Experiences Questionnaire (PDEQ). Conversely, less significant associations were identified with non-dissociative PTSD symptom severity and peritraumatic dissociative symptoms. Dissociation was also observed in the study conducted by Katz et al. (2020). Within their narratives, respondents reported experiencing gaps in their

memories and instances of blackouts during the incidents of sexual abuse. Several respondents disclosed attempts to intentionally induce dissociation, describing actions such as fixating their gaze on walls or ceilings and actively endeavoring to enter a detached mental state. In Rizvi et al. (2008) they found that the preponderance of longitudinal investigations spanning diverse cohorts exposed to trauma consistently identifies peritraumatic dissociation as a substantial risk factor for the onset of Post-Traumatic Stress Disorder (PTSD) and depressive symptoms. These assessments were aggregated to formulate a metric for peritraumatic dissociation, wherein elevated scores corresponded to heightened levels of peritraumatic dissociation. Notably, this scale has exhibited commendable internal consistency and convergent validity, aligning with measurements of PTSD and physiological indicators, particularly within the context of female rape victims. In Rocha-Rego et al. (2009) they found that Peritraumatic dissociation was the strongest predictor of the development of posttraumatic stress symptoms. While tonic immobility maintained its association with PTSD symptoms, dissociation presented only a borderline significance, and panic reaction lost its statistical significance. In TeBockhorst et al. (2023) they found that it is imperative to differentiate between dissociation and tonic immobility, emphasizing that these phenomena are not necessarily mutually exclusive. The authors propose that "emotional numbing may be linked to dissociation and mediated by biological mechanisms akin to those underpinning freezing behavior", aligning with the emotional numbing phenomenon discussed. Having an avoidant coping style and experiencing peritraumatic dissociation are correlated with higher levels of long-term impairment and PTSD after trauma.

Sexual abuse

In research of Bovin et al. (2014) it is suggested that for survivors of sexual assault with PTSD, memories about the assault are stored in the 'fear network' in the brain. It was discussed that individuals who behave passively peritraumatically are more likely to

experience guilt and self-blame than individuals who behave actively. The feelings of guilt and self-blame are not solely seen by sexual assault victims, but more often than with other traumatic experiences such as, seen in (Lee et al., 2021; Lloyd et al., 2019; Morabito & Schmidt., 2023; Rocha-Rego et al., 2009). In the study conducted by Katz et al. (2020), similar results can be seen. The enduring repercussions of childhood sexual abuse manifest across the entire lifespan, evident in pervasive sentiments of guilt, shame, self-blame, and insecurity.

In research conducted by Katz et al. (2021) the researchers utilized a scale of "preferred strategies," derived from four self-protection actions endorsed by abuse prevention programs: insisting on being left alone, yelling/screaming, threatening to tell, and actually telling. Findings revealed that children exposed to comprehensive abuse prevention programs exhibited a higher frequency of employing these strategies compared to their counterparts without exposure. Katz et al. (2021) focused on discerning visible behavior patterns in children's responses to maltreatment, employing coding for spontaneous reactions inclusive of fight and flight behaviors. The study delineated a three-class model for automatic responses, comprising freeze and dissociate (34.4%), fight and flight (24.4%), and absence of automatic response (41.1%). The tend to fight and flight class exhibited heightened physiological arousal, challenging conventional perspectives on fight-or-flight responses. This response pattern was linked to behavioral tendencies such as no response or mere survival, indicative of the distinctive context of childhood sexual abuse (CSA). CSA often involves repeated victimization within the familial setting, diminishing the efficacy of conventional fight-or-flight reactions. The study's findings resonate with existing literature suggesting that CSA may induce alterations in neurobiological development, fostering increased vigilance to potential dangers and threats in the brain.

In Morabito & Schmidt (2023) is found that Sexual assault survivors are particularly more at risk for repeated trauma exposure, PTSD and tonic immobility during a traumatic experience.

In Rizvi et al. (2008) they found similar effects as in the research of Bovin et al. (2014), that the anger and shame that have been identified by sexual assault survivors are longitudinally risk factors for PTSD. In survivors of sexual assault, the study revealed that peritraumatic emotions, beyond fear and anxiety, emerged as significant predictors of posttraumatic distress, specifically influencing the manifestation of depression rather than symptoms associated with post-traumatic stress disorder (PTSD).

In research of TeBockhorst et al. (2023) they found that instances involving vaginal penetration during the sexual assault were characterized as qualitatively distinct from other occurrences. This differentiation could be ascribed, at least in part, to the participants' strong aversion to proximity to the perpetrators. Women who underwent penile–vaginal penetration during a SA were more prone to experiencing tonic immobility compared to those who encountered a SA without such penetration. Additionally, individuals reporting penetration scored higher on the immobility scale of the Tonic Immobility Scale (TIS), albeit not on the fear scale. Undoubtedly, the conjunction of eye contact with proximity, particularly in the context of facial interaction, vaginal penetration, and the departure of the perpetrator, represents crucial cues concerning the physical distance between the assailant and the victim. These cues likely play a role in influencing tonic immobility (TI). The specific stimulus, possibly in tandem with the realization that the sexual assault (SA) has concluded, might contribute to the attenuation of a TI response. It is plausible that the highly vivid memories commonly associated with TI reach their zenith at distinct and significant moments.

Discussion

In this review I aimed to identify the psychological experiences of people experiencing a freeze response during a traumatic event. Amidst the then selected articles, diversity was observed across multiple attributes, encompassing differences in sample size and methodological approaches and topics of interest. Several psychological markers were identified to negatively impact the outcome of individuals who have experienced a traumatic event and tonic immobility. These markers are; self-blame, guilt, having experienced dissociation, fear, anger, panic reactions, (cognitive) coping style, mental confusion (Bovin et al., 2014; Fusé et al., 2007; Katz et al., 2020; Katz et al., 2021; Rizvi et al., 2008; Rocha-Rego et al., 2009, TeBockhorst et al., 2023).

Chronic course

The exploration of tonic immobility across various studies reveals consistent themes in its chronic course, accompanied by nuanced variations. Bovin et al. (2014) propose a link between tonic immobility and guilt, where passive behavior during trauma may lead to self-reproach. This guilt is considered a potential mechanism linking tonic immobility to PTSD symptoms. . In Fusé et al. (2007) they also found that tonic immobility appears to be associated with self-attribution of blame by survivors and an inclination among external entities to ascribe responsibility to the survivor for perceived failure to resist. Concurrently, deficient social support quality may exacerbate the vulnerability of individuals to heightened severity in PTSD symptomatology. Furthermore, self-blame has been identified as a correlate with diminished prospects for recovery following incidents of sexual assault. In Katz et al. (2020), it was also discerned that the narratives unequivocally conveyed a pronounced sense of self-blame, guilt, and shame arising from their responses—or lack thereof—to instances of abuse. These adverse self-attributions not only permeated their formative years but endured into adulthood. Prevalent among these self-attributions were feelings of self-blame and

shame. The survivors articulated a pervasive apprehension, asserting a lack of self-trust when confronted with challenging circumstances in adulthood. Expanding upon these insights, Katz et al. (2020) reinforces the enduring impact of self-blame in the aftermath of traumatic experiences, particularly in instances of abuse. The narratives presented in the study unequivocally convey a pronounced sense of self-blame, guilt, and shame arising from survivors' responses—or lack thereof—to instances of abuse. These adverse self-attributions not only permeate their formative years but endure into adulthood, creating a lasting psychological burden. Feelings of self-blame and shame are prevalent among these self-attributions, contributing to a pervasive apprehension and a declared lack of self-trust when confronted with challenging circumstances in adulthood. Katz et al. (2020) thus aligns with Fusé et al. (2007) in highlighting the enduring and complex interplay of self-blame, social support, and the psychological aftermath of traumatic events, especially in the context of tonic immobility. Lloyd et al. (2019) emphasizes the long-term psychological impact of peritraumatic tonic immobility, correlating it with PTSD development and severity. They advocate for the inclusion of Tonic Immobility Psychoeducation (TIP) in gold-standard evidence-based treatments for PTSD, aiming to address TI-specific beliefs and behaviors, which holds particular promise. Rocha-Rego (2009) explores panic reactions, particularly in traumatic events, revealing varied focus across studies. Lloyd et al. (2019) reveals the chronic impact of peritraumatic tonic immobility on psychological well-being, serving as a robust predictor for PTSD development. Antecedent experiences amplify proneness to tonic immobility. Discriminant validity, assessed through the STOP profile, shows strong correlations with dissociation and PTSD indicators. Tonic immobility, despite its adaptive role, relates to long-term psychological impairment and PTSD severity across diverse traumas. In contrast, Rocha-Rego (2009) emphasizes panic reactions during traumatic events, a perspective not prevalent in additional studies. Over fifty percent of trauma survivors

experience panic attacks, and peritraumatic tonic immobility is linked to a less favorable response to antidepressant treatment. While dissociation has borderline significance, panic reactions lose statistical significance compared to tonic immobility in predicting PTSD symptoms. These studies collectively highlight the intricate dynamics of peritraumatic responses, showcasing tonic immobility's lasting impact and the unique focus on panic reactions in Rocha-Rego (2009).

Dissociation

Dissociation frequently intertwines with tonic immobility experiences during traumatic events, revealing nuanced patterns across various studies. Lloyd et al. (2019) contributes to this understanding, highlighting a positive correlation between global STOP scores and current Dissociative Symptoms (DSS). Despite existing insights into peritraumatic tonic immobility's influence on PTSD onset, the study underscores a gap in comprehending post-traumatic tonic immobility.

In Katz et al. (2020), dissociation emerges in sexual abuse survivors, evident through memory gaps and intentional efforts to induce dissociation. Respondents actively seek a detached mental state by fixating on walls or ceilings. This intentional dissociation underscores the complex coping mechanisms employed during traumatic experiences, showcasing the interplay between tonic immobility and dissociation.

Rizvi et al. (2008) consistently identifies peritraumatic dissociation as a substantial risk factor for PTSD onset. Longitudinal investigations across diverse cohorts highlight its robust association. The study formulates a metric for peritraumatic dissociation, exhibiting commendable internal consistency and convergent validity, particularly within the context of female rape victims. This emphasizes the universal predictive power of peritraumatic dissociation for PTSD and depressive symptoms.

In Rocha-Rego et al. (2009), peritraumatic dissociation stands out as the strongest predictor of posttraumatic stress symptoms. While tonic immobility maintains its association with PTSD symptoms, dissociation shows borderline significance, highlighting the nuanced interplay between these peritraumatic responses.

TeBockhorst et al. (2023) accentuate the need to differentiate between dissociation and tonic immobility, proposing a link between emotional numbing and dissociation. This aligns with the emotional numbing phenomenon discussed, revealing shared biological mechanisms. The study underscores that an avoidant coping style and peritraumatic dissociation correlate with higher levels of long-term impairment and PTSD after trauma. This distinction elucidates the shared impact of dissociation and tonic immobility on post-traumatic outcomes, providing a nuanced perspective on their interdependence in trauma responses.

In comparing these studies, a consistent theme emerges – the intricate relationship between dissociation and tonic immobility in shaping post-traumatic outcomes. Each study contributes unique insights, collectively emphasizing the need for a comprehensive understanding of these peritraumatic responses to inform trauma interventions effectively.

Sexual abuse

In

Bovin et al.'s (2014) exploration of sexual assault survivors with PTSD, memories were proposed to be stored in the 'fear network' of the brain, particularly accentuating the impact of passive peritraumatic behavior on guilt and self-blame. This resonates with findings in (Lee et al., 2021; Lloyd et al., 2019; Morabito & Schmidt, 2023; Rocha-Rego et al. (2009), emphasizing the recurrent theme of guilt and self-blame in the aftermath of trauma.

Katz et al.'s (2020) investigation into childhood sexual abuse reveals enduring repercussions across the lifespan, manifesting in pervasive sentiments of guilt, shame, and insecurity. In Katz et al.'s (2021) examination of abuse prevention strategies, children exposed to comprehensive programs exhibited a range of responses, challenging conventional notions of

fight-or-flight. These findings align with Morabito & Schmidt's (2023) observation of sexual assault survivors facing elevated risks during traumatic experiences.

Rizvi et al. (2008) further corroborate the longitudinal impact of anger and shame in sexual assault survivors, with peritraumatic emotions emerging as significant predictors of posttraumatic distress. TeBockhorst et al.'s (2023) nuanced exploration of vaginal penetration during assault highlights qualitative distinctions, influencing tonic immobility responses. This differentiation, observed in individuals reporting penetration, underscores crucial cues influencing tonic immobility, contributing to a nuanced understanding of trauma responses. In summary, these studies collectively underscore the complex interplay of emotions, self-blame, and distinct traumatic elements, enriching our comprehension of trauma's enduring impact.

Limitation of the studies

In the following articles the sample size was modest to small (Katz et al., 2020; Morabito & Schmidt, 2023; Rocha-Rego et al., 2009; TeBockhorst et al., 2015). A small sample size in a psychological study can compromise the reliability and generalizability of the findings by, increasing the sample error, reducing the statistical power or limiting the external validity.

Four articles only use female participants (Bovin et al., 2014; Fusé et al., 2007; Rizvi et al., 2008; TeBockhorst et al., 2015). Men, too, manifest tonic immobility and undergo emotional states such as fear, guilt, and self-blame. The inclusion of male participants may enhance our comprehension of gender-related distinctions in the manifestation of tonic immobility, along with other pertinent characteristics influencing its occurrence.

There is a need to investigate these outcomes through diverse cultures, because culture has a great influence on how sexual abuse is perceived. A comprehensive exploration of these outcomes across diverse cultural contexts is imperative, as cultural nuances significantly

shape the perception of sexual abuse. Considerable variability exists in the conceptualization of abuse and sexual assaults; for instance, certain cultures may not acknowledge marital or relational rape, contrasting with the majority of cultures where such acts are deemed punishable.

It is imperative to acknowledge that personality traits exert reciprocal influence, impacting both mental states and being susceptible to alteration by them (Widiger, 2011).

It is pertinent to note that retrospective self-report data is frequently employed in numerous studies (Bovin et al., 2014; Fusé et al., 2007; Lee et al., 2020; Lloyd et al., 2019; Rizvi et al., 2008; Rocha-Rego et al., 2009; TeBockhorst et al., 2023). Retrospective self-reporting poses challenges due to memory biases, social influences, and the malleability of recollections. Telescoping, order effects, and response biases further complicate accurate data retrieval.

Conclusion and future research

In conclusion, in this review, I reviewed the psychological experiences of people experiencing a freeze response during a traumatic event. The examined studies consistently highlight the lasting impact of tonic immobility in trauma survivors. Passivity during traumatic incidents is linked to feelings of guilt and self-blame, contributing to prolonged psychological impairment and increased vulnerability to post-traumatic stress disorder (PTSD). The proposed Tonic Immobility Psychoeducation (TIP) emerges as a promising intervention, particularly for survivors of sexual assault. While studies focus on panic reactions and mental confusion as divergent aspects, dissociation consistently co-occurs with tonic immobility during traumatic events, posing a significant risk factor for PTSD onset. The section on sexual abuse underscores the enduring repercussions, including guilt, shame, and self-blame. Children exposed to abuse prevention programs exhibit varied responses, highlighting the distinctive context of childhood sexual abuse. In summary, this systematic

review synthesizes findings, emphasizing the chronic nature of tonic immobility and its associations with guilt, dissociation, and PTSD. The proposed interventions, like TIP, aim to address these challenges, acknowledging the complex relationship between peritraumatic responses and long-term psychological outcomes.

For future research these implications can be taken into account. The exploration of the ramifications of peritraumatic behavioral responses on subsequent posttraumatic symptomatology has been inadequately investigated in academic literature. There should be more attention to the longitudinal effects. Research on tonic immobility during traumatic events should prioritize exploring its elusive causal mechanisms, emphasizing emotional experiences like guilt and self-blame. Understanding its role in the chronic course of post-traumatic stress disorder (PTSD) is crucial, with potential implications for refining interventions, especially compared to other peritraumatic responses. Incorporating Tonic Immobility Psychoeducation (TIP) into PTSD treatments, particularly for survivors of sexual assault, is recommended. Education about the involuntary nature of TI may reduce guilt about peritraumatic behavioral passivity, which may in turn reduce PTSD symptoms. Future studies should diversify traumatic experiences considered, investigate cultural influences, include male participants, and examine the interaction between personality traits and tonic immobility. Cultural nuances in the conceptualization of abuse must be explored, and researchers should address limitations like small sample sizes and retrospective self-reporting. Conducting longitudinal studies can offer insights into the trajectory of tonic immobility and associated psychological outcomes over time.

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