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“FROZEN”: TONIC IMMOBILITY AND POSTTRAUMATIC OUTCOMES AMONG SURVIVORS OF SEXUAL ASSAULT

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By

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Abstract

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"Frozen": Tonic Immobility and Posttraumatic Outcomes Among Survivors of Sexual Assault

Chairperson: Christine Fiore, PhD

Tonic immobility (TI), a temporary, involuntary state of paralysis marked by motor inhibition and vocal suppression, has been a well-documented occurrence among animals. Humans also experience TI, which has previously been referred to as trauma- or rape-induced paralysis and freezing. TI among survivors of sexual assault has been associated with greater PTSD and increased risk of depression. Existing studies have not adequately explored additional posttraumatic outcomes of TI beyond PTSD diagnostic criteria, nor has prior research sufficiently tested the mechanistic relationship between TI and PTSD. The objective of the current study was to integrate and expand upon prior research regarding the impact of TI on sexual assault survivors. Quantitative methods examined several cognitive, emotional, behavioral, and social posttraumatic outcome variables among university college students who experienced sexual violence to understand how TI impacts these outcome variables and whether they help explain the mechanisms of the TI-PTSD association. Participants were a subset of university students who volunteered to complete an additional component of the campus-wide Safe Campus Survey. Analyses revealed that TI was significantly associated with and a stable predictor of negative posttraumatic cognitions, guilt, self-blame, negative social reactions, lower perceived social support, maladaptive coping, and trauma symptomology even after controlling for sexual assault severity, recency of sexual assault, and revictimization. Mediation and moderated mediation analyses tested the indirect and conditional indirect effects of the variables on the TI-PTSD relationship. The relation between TI and trauma symptomology was partially mediated by negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping. Negative social reactions did not significantly moderate the direct and indirect relationship between TI and trauma symptomology through negative posttraumatic cognitions. TI and negative social reactions were shown to be significant predictors of negative posttraumatic cognitions and trauma symptomology, lending support to significant main effects rather than significant moderation effects. Results inform trauma response theories and reveal clinically relevant information that could help shape targeted therapeutic interventions and supportive services for survivors who experience TI during sexual assault. Results also contribute to efforts to correct societal misconceptions about trauma responses and decrease victim-blaming attitudes and negative social reactions that harm survivors.

Keywords: tonic immobility, sexual assault, trauma, outcomes, coping

Contents

"Frozen": Tonic Immobility and Posttraumatic Outcomes Among Survivors of Sexual Assault

"I can't get over the fact that I didn't fight back. I am plagued with the thought that I should've done more to stop the assault from happening. Why didn't I do more? Why did my body fail me? I'm stuck thinking that I should've done more. If I had just done more I wouldn't be suffering today or feeling the intense power it has over me."

– Anonymous (shared with permission)

The quote above came from a student who reported to a university advocacy resource center after an experience of sexual assault during which she experienced tonic immobility (TI). TI is a temporary state of motor inhibition believed to be a response to situations involving extreme fear. TI has been extensively written about and described in the animal literature for decades. Through analysis of the natural and laboratory conditions known to elicit TI in animals – such as fear, contact, restraint, and the possibility of predation or threat to safety – in conjunction with clinical research that revealed the ways women respond in the face of childhood and adulthood sexual assault, a striking similarity was drawn between the peritraumatic defensive reactions of humans and nonhuman animals. Indeed, TI among humans presents itself in very similar ways to what is observed among nonhuman animals (Burgess & Holmstrom, 1976; Gallup, 1998; Marx et al., 2008; Suarez & Gallup, 1979).

There have been many attempts to explain TI and understand its possible significance. There is now considerable evidence in support of the adaptive nature of TI. For example, ducks that are hunted by fox have exhibited TI upon attack and often survived predation unharmed. Cats in pursuit of a mouse will lose interest when the mouse remains motionless, only to make a deadly pounce when the mouse attempts movement again (Gallup, 1998). Survivors of sexual assault who experience TI and are verbally and physically immobile during victimization have been shown to be less likely to be seriously injured and have force used against them (de Heer &

Jones, 2017). When the opportunity to flee is gone and fighting is futile, TI is an unconscious, reflexive response to fear and perceived entrapment that promotes survival.

Despite TI's conceptualization as an adaptive defensive response to threat and the preservation of bodily safety, TI has been associated with greater PTSD symptomatology among survivors of trauma and has since been gaining the attention of researchers and clinicians for its prevalence in traumatic events (Abrams et al., 2009; Bovin et al., 2008; Bovin et al., 2014; Hagenaars, 2016; Hagenaars & Hagenaars, 2020; Heidt et al., 2005; Humphreys et al., 2010; Kalaf et al., 2015; Lima et al., 2010; Magalhaes et al., 2021; Maia et al., 2014; Möller et al., 2017; Portugal et al., 2012; Rizvi et al., 2008; Rocha-Rego et al., 2009; Van Buren & Weierich, 2015). Previous studies have alluded to the severity of posttraumatic challenges for individuals who experienced TI during a traumatic event. However, most studies reduced the residual, long-term consequences of TI to restrictive survey items from psychopathological measures, for example PTSD diagnostic criteria, without exploring the nuances, dimensionality, or range of participants' psychological, emotional, cognitive, physical, or relational impacts. Most of the studies that comprise the following literature review speculated about the aftermath of TI and the mechanisms that might contribute to higher rates of posttraumatic distress and functional impairment, such as negative social reactions or self-blame, without directly assessing or measuring these constructs. Evidently, considerable work is still needed in exploring TI and its impacts on survivors of sexual violence.

The present study will explore the posttraumatic impacts of TI among university students who have experienced sexual assault. Participants will complete surveys assessing their posttraumatic cognitions, trauma-related guilt and self-blame, social support, coping strategies, and posttraumatic stress symptom severity. These factors will be explored to determine whether

they differ based on the presence and severity of TI and, further, whether they contribute to the mechanisms underlying the TI-PTSD association. Results and specific recommendations for helping professionals will be provided in the service of advancing trauma-competent care and intervention strategies for individuals who have experienced TI during sexual violence and who may face a unique set of post-trauma difficulties.

Literature Review

Tonic Immobility (TI)

Definition, Historical Development, and Theoretical Underpinnings of TI

Many animals begin and conclude their lifespan following fixed and regular routines and sequences. However, the world is not always a stable place, environmental circumstances change, and the possibility of adversity and threat endangers the safety, survival, and reproductive success of any given organism. As a result, an animal's behavioral responses, changes, and ability to adapt in the face of startling, threatening, or painful stimuli became the focal point of study long ago. Theories related to the sequencing and continuum of fear and defensive response behaviors date back to the early 20th century, but published literature on the topic spans across centuries (Gallup, 1998; Kozlowska et al., 2015). Research with animals has determined that there are distinct defensive reactions, organized along a continuum, that enable them to respond to mild and severe levels of threat and function to ensure their safety and survival. The continuum of defensive responding has been termed the *defense cascade*, which describes the mobilizing and immobilizing responses that humans and non-human animals experience in the face of threat and fear (Fanselow, 1994; Ratner, 1967).

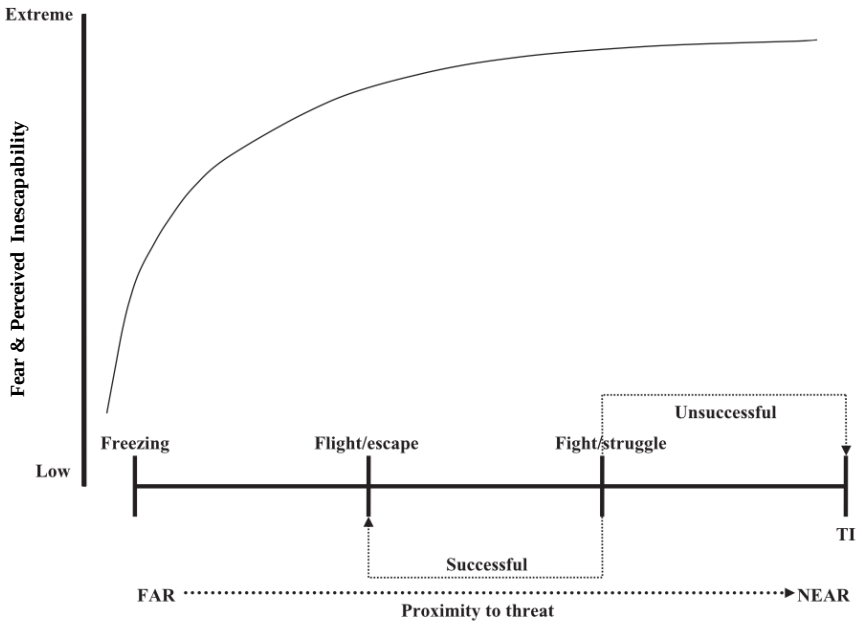
The defense cascade model (see Figure 1) posits that defensive responses, including freezing, flight or fight, and tonic immobility (TI), occur depending on the degree of threat, fear,

and increasing proximity to danger. Within this framework, fear and proximity to threat propels the sequential defensive cascade and results in behavioral responses that are associated with attempts to protect and preserve safety and livelihood (Marx et al., 2008). The sequence of defensive behaviors consists of three stages, each associated with distinct behavioral responses. The *pre-encounter stage* of the defense cascade occurs prior to threat or predator detection. Defense responses are not yet engaged until the second stage, the *encounter stage*, at which time a predator or threat is detected. The primary response associated with predator detection is freezing, which is a suspension of all movement and appetitive behavior. The freeze response is often accompanied by focused attention and alertness, cessation of movement, and shallow respiration. These responses help the animal maintain sustained attention towards the threatening stimulus, minimize detection, and prepare for action. In the animal world, many predators depend on movement to detect and successfully catch prey, which makes freezing adaptive in its ability to minimize prey detection (Marx et al., 2008).

Continued approach by the predator commences the flight or fight response that characterizes the *post-encounter stage.* Most prey will first attempt to escape to safety. However, if flight proves futile or the animal is prevented from fleeing, the prey animal will attempt to fight, struggle, or resist the threatening predator. The ultimate defensive response in the defense cascade model is tonic immobility (TI), once referred to as “playing dead” or “death feigning” in the early ethological research. TI is characterized by motor inhibition, muscular rigidity, suppressed vocalization, analgesia, intermittent periods of eye closure, fixed and focused stare, and decreases in body temperature and respiration. TI is believed to occur after unsuccessful escape or struggle (Marx et al., 2008).

Figure 1

Defense Cascade Model (adapted from Marx et al., 2008)



The well-known phrase "fight-or-flight," first described by physiologist Walter Cannon in the early 1920's to describe the activation of the sympathetic nervous system in response to significant environmental stressors, has since been critiqued, expanded, and advanced by comparative psychology, evolutionary biology, and psychophysiology research. Theorists now posit that "fight-or-flight" mischaracterizes the nuanced and ordered sequence of stress responses that humans and non-human animals demonstrate in response to danger and threat, as portrayed in the defense cascade model (Bracha, 2004; Bracha et al., 2004).

Importantly, "the responses that make up the defense cascade are primitive emotional states – coordinated patterns of motor-autonomic-sensory response – that are available to be automatically activated in the context of danger" (Kozlowska et al., 2015, pg. 264). The instinctive defensive and protective reactions exhibited by animals and humans are believed to have been shaped by phylogenetic history and evolved to ensure survival in a world containing

many types and sources of threat (Bolles, 1970; Fanselow, 1997; Fanselow & De Oca, 1998). The defenses described in the defense cascade model are primitive, innate, instinctual, involuntary, and automatically-driven behavioral changes that occur in response to environmental threats. They are also adaptive, and one response is not "better" than another. "All [defensive responses] are potentially adaptive and effective at diminishing threat, depending on the particular circumstances" (Ogden et al., 2006, pg. 89). The adaptive nature of TI in animal predatory encounters is well-established. According to Gallup (1998), many predators rely on the feedback they receive from prey, and TI may serve to inhibit the aggression in predators, often resulting in the prey's increased chance of survival.

TI is now a well-documented phenomenon in animal research and has been observed in a large number of vertebrates and invertebrates. TI is most often associated with predatory attack but can also be stimulated in the laboratory. In both naturalistic and laboratory settings, TI occurs during perceived or actual physical restraint, and intense fear (Gallup, 1998). The most widely accepted and compelling theoretical model to understand and explain TI is referred to as the fear hypothesis (FH). The FH model supposes that a certain magnitude of fear is the foundational condition that predicts the TI response. However, fear is not the sole cause nor sufficient condition for the TI response. The FH model states that TI occurs most frequently and severely under conditions of perceived restraint, entrapment, or inescapability, physical contact, and overwhelming fear (Marx et al., 2008).

Freezing and TI have been confused terms and used interchangeably. While freezing and TI may resemble one another in motor inhibition, the two responses have been shown to be distinct phenomena (Bovin & Marx, 2011; Levine, 1997; Marx et al., 2008; Nijenhuis et al., 1998; Roelofs, 2017). Freezing is associated with increased startle responsivity to stimuli, alert

posturing, and capacity for volitional action tendencies, whereas TI is associated with passive, catatonic-like immobile posturing, decreased startle response, and unresponsiveness to pain stimuli (Marx et al., 2008; Ogden et al., 2006; Roelofs, 2017). In addition, the freeze response, often lasting only a few seconds in humans, typically occurs prior to physical contact between predator and prey, whereas TI occurs during and after physical contact has been made and can continue for as long as an animal remains in danger (from several seconds to several hours until its abrupt ending) (Bracha et al., 2004; Gallup, 1977; Kozlowska et al., 2015).

Drawing from clinical wisdom and comparative psychology, many authors have since written about the striking similarities between animal defensive responses and aspects of peritraumatic responses in humans (Gallup, 1998; Levine, 1997; Nijenhuis et al., 1998; Marx et al., 2008; Ogden et al., 2006; Porges, 2001; Siegel, 2012; van der Kolk, 2014). TI is now conceptualized as an evolutionarily adaptive defense to predatory attack (Gallup, 1998; Marx et al., 2008). While the study of TI among humans is a newer field of study, emerging evidence shows that this response is common among survivors of trauma. TI appears to be especially common among survivors of sexual violence. In one recent study of sexual assault survivors, approximately 70% of them reported that they experienced TI for a portion of the assault (Möller et al., 2017).

The remainder of this paper will review the translational work of the TI phenomenon from nonhuman subjects to human experiences of TI. The following sections will also review the empirical findings related to peritraumatic TI and its effects on psychosocial functioning and outcomes among survivors of sexual assault. Finally, this paper will describe a prospective study that seeks to expand the field's understanding of how sexual assault impacts the lives of survivors by considering the specific impact of TI.

Application to Survivors of Sexual Assault

Under certain conditions, humans, too, show the cascade of defensive responses similar to those demonstrated among non-human animals. Anecdotal and clinical reports of humans having survived traumatic experiences first informed the basis of the TI response among humans. Burgess and Holmstrom (1976) interviewed 92 women who survived rape and assessed their peritraumatic physical, verbal, and cognitive coping strategies. The researchers repeatedly heard words from survivors' statements, such as "faint," "trembling," "cold," "limp," "froze," and "paralyzed," which led them to question the relationship between physiological responses and conditions of threat and rape trauma (Burgess & Holmstrom, 1976, pg. 415-416). Suarez and Gallup (1979) later referred to the phenomenon of sexual assault survivors' descriptions of losing their ability to move or call out for help during an assault as "rape-induced paralysis." They noted the striking similarity between the peritraumatic responses of rape victims and behaviors of animals experiencing TI. They further highlighted the parallel features of fear, predation, physical contact, restraint, and inescapability common to both sexual assault and the conditions that induce TI among animals in prey-predator contexts. Ultimately, the researchers concluded that rape-induced paralysis and TI are identical phenomena and that subjective reports of temporary involuntary paralysis during the intense threat of sexual assault are an expression of TI in humans (Suarez & Gallup, 1979).

Galliano and colleagues (1993) were among the first researchers to systematically assess TI in female victims of sexual assault to evaluate the degree of similarity between the features of immobility during rape and TI observed in the animal laboratory. The researchers translated the behaviors observed during TI states in animals to a self-report questionnaire asking participants to rate the degree to which they froze and felt paralyzed during the assault even though not

physically restrained. The researchers also assessed the degree to which participants' experienced tremors, eye closures, increased respiration, and coldness. The findings revealed that the degree of biobehavioral characteristics that defined TI among animals was significantly higher in the group of women who reported the highest degree of rape-induced paralysis, providing preliminary empirical support to the construct similarity between rape-induced paralysis among humans and TI in animals (Galliano et al., 1993). Of note, the authors did not assess all the defining characteristics of TI known from the prior animal literature, such as inability to vocalize or analgesia. The authors also omitted previous characteristics of TI specific to the human experience, namely feelings of fear, numbness, and memory of the event.

Remediating these concerns, Heidt et al. (2005) explored the prevalence and sequelae of TI among participants with a history of childhood sexual abuse (CSA) using a more systematic and comprehensive measure of TI. The researchers assessed TI using the *Tonic Immobility Scale – Child Form* (Forsyth et al., 2000), a measure developed specifically to assess for features of TI in humans based on the observable characteristics of TI in nonhuman animal species. The findings of the study showed that over half of the sample (n = 80) experienced TI during an episode of CSA, especially among CSA experiences involving rape or attempted rape over other forms of nonconsensual sexual contact. Moreover, the presence of TI during CSA was correlated with increased reports of depression, anxiety, and PTSD among participants (Heidt et al., 2005). Heidt and colleagues (2005) provided support to Galliano et al.'s (1993) groundbreaking study and provided evidence that the occurrence of TI is not exclusive to adulthood sexual assault, but that it also extends to CSA and is associated with heightened psychological distress and impairment.

Continuing and expanding the work of translating the TI construct from the nonhuman animal literature to a human one, a phenomenological study by TeBockhorst and colleagues (2015) sought to explore the descriptive qualities of peritraumatic TI among survivors of sexual assault. Seven undergraduate women ranging from 18 to 20 years of age were interviewed and asked to describe their experience of TI during sexual assault. Again, several common themes emerged among participants that were consistent with the TI phenomenon among nonhuman species and that revealed important areas for further research into TI as it is experienced by humans. All seven participants described initial concurrent overwhelming confusion and terror as the sexual assault began. They described the presence of uncontrollable racing thoughts and a sense that their minds went "blank" until a point at which terror faded to a feeling of "nothingness" and "distance" from their emotional experiences (pg. 173). The participants described feeling a strong urge to mentally or emotionally avoid the present moment during the sexual assault, which appeared to take some voluntary effort in order to achieve some sense of relief from confusion and terror. Despite attempts to mentally and emotionally escape the trauma, participants described remembering vivid memories and details of the assault. Participants all reported feeling an intense desire to avoid visual contact with the perpetrator. Four participants disclosed having closed their eyes when they realized the assault was unavoidable. Several participants reported fixing their gaze on certain features of the room, such as the designs on the bedsheets, or attending to clocks or mirrors within the room (TeBockhorst et al., 2015).

All seven participants described an inability to move their bodies voluntarily for most or much of the sexual assault. Participants described the onset of paralysis as sudden and marked by physical and emotional numbness and an inability to vocalize. The physical numbness caused

particular distress among participants, as it was paired with an intense urge to flee or run away from the traumatic experience, but paralysis rendered them unable to escape. The inability to leave was often externally imposed by the perpetrator's physical control, strength, or weight coupled with the realization that volitional movement was absent. Participants described having clear, vivid and acutely sensory detailed memories at the moment of penetration and at the departure of the perpetrator. After the assault was over and the perpetrator had left, participants described a continued sense of immobility lasting for some time until a specific goal enabled movement, such as the decision to get dressed. There was then a gradual return to movement marked by a period of lying still and/or crying as they tried to return to the physical sensations, movement, and control of their bodies. This immediate post-assault period was marked by bodily shaking, shivering, feeling a sensation of coldness creep over the body, and muscle soreness. All except one participant felt no pain during the assault and only became aware of pain after the assault ended. Psychologically, there was an immediate experience of confusion after realizing the assault was over. Participants described feeling uncertain about what happened or what they should do next post-assault. They also reported feeling concerned and worried about what others would think about them after having been assaulted and unable to flee to protect themselves. Five of the seven participants in the study voiced that TI intensified and exacerbated their feelings of guilt and shame of having been sexually assaulted. These five participants blamed themselves for their inability to escape or stop the sexual assault from occurring (TeBockhorst et al., 2015).

A recent study by Gbahabo and Duma (2021) also described the lived experiences of peritraumatic TI. Qualitative interviews with a small sample of Nigerian female victims of rape revealed similar themes to the study by TeBeckhorst and colleagues (2015). Thematic analysis

identified four overarching themes described by the women in the study: physical paralysis; mental paralysis; painful loss of self-defense; and persistent feelings of self-blame. The researchers concluded that TI among Nigerian survivors of rape is a real construct despite there being little to no documented data on the phenomenon within the country. The researchers discussed the study's clinical, judicial, and legal implications, stating that knowledge of TI could help stimulate stronger health reform policies and more just legal proceedings (Gbahabo & Duma, 2021).

While first studied among nonhuman animals, the theoretical extension of the TI response to humans has shown that the highest rates and severity of TI are observed among survivors of sexual trauma, indicating that the conditions of sexual victimization may be most closely aligned to the conditions of extreme fear and perceived inescapability that induce a TI response (Hagenaars, 2016; Kalaf et al., 2015; Kalaf et al., 2017). In two large samples of adult sexual assault survivors, it was found that 41.5% and 41.7% of participants reported significant TI during a recent sexual assault (Fusé et al., 2007). In one study, the prevalence of TI among women during a recent sexual assault was 69.8% (Möller et al., 2017). Collectively, these findings show that a considerable number of women who experience sexual victimization as either adults or as children experience peritraumatic TI during assault.

The translational work to date supports the comparative evaluation of nonhuman and human expressions of TI. Among the shared components of the experience of TI in humans and nonhuman animals are diminished or absent volitional movement accompanied by weakened vocal capacity occurring in the context of significant fear and life threat. Eye closure, tremors or shaking, lowered body temperature, and endogenous analgesia or numbing are also consistent with prior literature (Galliano et al., 1993; Gallup & Rager, 1996; Marx et al, 2008). Similar to

animal studies, there may be an adaptive and protective nature to an immobile response during sexual assault. Researchers analyzed a nationwide sample of rape cases collected by the Federal Bureau of Investigation (FBI) to understand the consequences of various victim resistance strategies. From a sample of 389 rape victims (89% stranger rapes), the researchers found that rape victims who were verbally and physically immobile during the assault were less likely to be injured and have force used against them. These results signal that immobility may protect a victim from increased injury, force, and severity of attack (de Heer & Jones, 2017).

Historically, investigation of TI among humans has been limited to women who experienced sexual assault. While TI has been shown to be more common and severe among survivors of sexual trauma, more recent studies have since found that TI occurs among demographically diverse samples and among individuals who have experienced a variety of traumatic events (Fiszman et al., 2008; Kalaf et al., 2017). Experiences of peritraumatic TI have been reported by mixed gender samples exposed to interpersonal trauma (e.g., physical, psychological, or sexual abuse), accident-related trauma (e.g., motor vehicle accidents), unexpected death of a loved one, armed robbery, social exclusion, and natural disaster (Abrams et al., 2009; Bados et al., 2008; Bados et al., 2015; Fiszman et al., 2008; Hagenaars, 2016; Kalaf et al., 2015; Kalaf et al., 2017; Lima et al., 2010; Massazza et al., 2021; Mooren & van Minnen, 2014; Portugal et al., 2012; Rocha-Rego et al., 2009). Additionally, individuals in professions that hinge on saving or protecting others from life-threatening situations or individuals routinely exposed to high-risk critical incidents, such as emergency responders, firefighters, police officers, and military personnel, have also been shown to be vulnerable to TI (Ly et al., 2017; Maia et al., 2014; Solomon & Mikulincer, 2006).

Overall, we now know that the types of traumas that may elicit a TI response can be quite diverse. According to the FH model, TI is most often produced by a sense of overwhelming fear and a sense of perceived restraint, entrapment, inescapability, or physical contact. Since humans have advanced capabilities in cognitive, verbal, and symbolic representation, it is possible for them to perceive broad traumatic contexts as indicative of restraint or inescapability (Marx et al., 2008). For example, feeling trapped in an abusive relationship or unable to escape a catastrophic accident or unexpected death of a loved one may elicit similar contextual elements and mental interpretations as an experience of actual physical restraint. Furthermore, individuals vary in what they perceive as fearful. Perceptions and judgments of fear are influenced by many factors, including prior life experiences, predicted outcomes, coping and attributional styles, temperament, and cultural and contextual variables. Two people who experience identical situations may experience different levels of fear on the basis of these variables (Marx et al., 2008). As a result of individual differences in the perception of fear and inescapability, it is possible for humans to experience TI in broader traumatic contexts, which complicates the predictability of an occurrence of TI.

Measurement and Prevalence

Prevalence statistics of TI among sexual assault survivors have ranged from 37% to as high as 70% (Fusé et al., 2007; Galliano et al., 1993; Heidt et al., 2005; Möller et al., 2017). The most frequently cited questionnaire used to assess the occurrence and severity of TI is the *Tonic Immobility Scale* (TIS; Forsyth et al., 2000). The TIS is a two-part self-report instrument originally developed specifically with female victims of sexual assault. Several researchers have since studied the factor structure of the TIS and suggested modifications to extend and adapt the questionnaire for use in the assessment of a wider variety of trauma types and diverse

populations. Fusé and researchers (2007) were the first to evaluate the factor structure of the TIS among two samples of female undergraduate students who reported experiences of sexual victimization. Exploratory and confirmatory factor analysis revealed that the 10-item TIS measures two latent constructs: physical immobility (7 items) and fear (3 items). Results from the study indicated that the two-factor solution was a good approximation to the data, but the construct validity of the fear factor could be strengthened through the addition of items (Fuse et al., 2007).

In contrast, other studies evaluating the structural validity of the TIS have found three-factor or one-factor structures to be the best fit. Abrams and colleagues (2009) found that dissociation was revealed to be an additional factor loading of the TIS when it was administered to a mixed-gender undergraduate sample with trauma broadened to include interpersonal trauma (i.e., physical or sexual assault), accident-related trauma, death exposure, and other trauma (i.e., experience of a natural disaster). In this study, 51% of the variance in TI scores was accounted for by peritraumatic dissociation, demonstrating that TI and dissociation, while possible to occur separately, may occur together as part of an emotional response to traumatic events (Abrams et al., 2009). A similar study that assessed the TIS in a clinical sample of adolescent and young adults with experiences of rape showed support for a three-factor model, with factors TI, Fear, and Detachment (Covers et al., 2021).

Reichenheim et al. (2014) assessed the structural validity of the TIS in a large, diverse population-based sample in Brazil who reported at least one traumatic experience from a wide variety of traumatic events. The researchers noted item content redundancies and reduced the number of survey items from ten to six, stating that a briefer format of the TIS is viable and more appropriate for use in diverse, epidemiologic studies. Similar concerns were raised in another

study by Bados and Pero (2015) who studied a large sample (n = 392) of undergraduate students from the University of Barcelona and found that a modified 5-item version of the TIS was more suitable in assessing populations with diverse trauma experiences. The authors argued for the removal or reformulation of the Fear subscale, stating concern that fear demonstrated low internal consistency when type of traumatic event was broadened from exclusively sexual victimization (Bados & Pero, 2015).

In summary, most studies that have assessed TI in humans have used some version of the TIS, which closely aligns and maps onto what is known and observed of TI in animals, namely inability to move or vocalize, feeling numb and cold, and trembling or shaking in the context of fear and perceived threat to life. The cognitive aspects of TI measured in the TIS (e.g., feeling of detachment from oneself or one's surroundings), however, are nearly impossible to map onto the animal literature, but appear to be relevant factors for TI's occurrence among humans (Fusé et al., 2007). While previous studies are limited and the factor structure of the original 10-item TIS appears to vary based on age, educational level, gender, and trauma type, which warrants further study and validation, the 10-item TIS appears to be a valid measure of TI and have markedly strong construct validity when used with female survivors of sexual assault (Covers et al., 2021).

Health and Posttraumatic Correlates of TI During Sexual Assault

Exposure to violence, especially interpersonal violence in the form of sexual abuse, has long been associated with significant negative health outcomes. Among the deleterious mental health consequences of sexual assault, symptoms of Posttraumatic Stress Disorder (PTSD) are especially prominent (Campbell, 2008; Campbell et al., 2009; Chen et al., 2010; Goodman et al., 1993). PTSD is a psychological response to the experience of intense traumatic events. People with PTSD often have distressing thoughts and feelings related to their experience that last long

after the traumatic event has ended. They may feel as though they reexperience the event through flashbacks, nightmares, or intrusions. They may avoid stimuli that remind them of the traumatic event. They also may experience hyperarousal symptoms in the form of hypervigilance, a heightened startle reaction, or concentration difficulties. They may experience mood disturbances, such as ongoing sadness, fear, anger, guilt, and shame. The symptoms of PTSD tend to negatively interfere with one's ability to successfully complete occupational or social demands (American Psychiatric Association, 2013).

Recently, there has been growing empirical interest into whether and how pre-, peri-, and post-traumatic factors help predict physical and mental health outcomes among survivors of trauma. While the exact etiology of PTSD remains elusive, compelling evidence has emerged into the way peritraumatic reactions (i.e., cognitive, emotional, and physiological responses experienced by a victim during a traumatic event) predict subsequent PTSD symptomatology and severity. A meta-analysis by Ozer and colleagues (2003) showed that peritraumatic dissociation was among the strongest predictors of the development of posttraumatic stress symptoms among survivors of diverse forms of trauma. Attention has also been given to the role of peritraumatic panic, which also appears to be a strong predictor of the development of PTSD (Lawyer et al., 2006). Since its theoretical extension from animals to humans, TI has emerged as yet another important peritraumatic factor worthy of empirical investigation. More and more studies have revealed the importance of TI on posttraumatic outcomes, especially as they relate to sexual assault trauma, which is the focal point of the following section.

PTSD. TI is a peritraumatic response that has been associated with the development, severity, and prognosis of PTSD among survivors of sexual and non-sexual trauma. A seminal study by Heidt and colleagues (2005) revealed that survivors of childhood sexual abuse (CSA)

marked by an experience of TI reported significantly greater psychological distress and PTSD symptomatology in adulthood compared to survivors who did not experience TI during an episode of CSA. Later studies corroborated this finding among CSA survivors and survivors of adulthood physical and sexual assault, confirming that the occurrence of TI during interpersonal trauma is strongly associated with greater PTSD symptom severity (Abrams et al., 2009; Bovin et al., 2008; Bovin et al., 2014; Hagenaars, 2016; Hagenaars & Hagenaars, 2020; Heidt et al., 2005; Humphreys et al., 2010; Kalaf et al., 2015; Lima et al., 2010; Magalhaes et al., 2021; Maia et al., 2014; Möller et al., 2017; Portugal et al., 2012; Rizvi et al., 2008; Rocha-Rego et al., 2009; Van Buren & Weierich, 2015). One study found that women who experienced TI during sexual assault were nearly three times more likely to have developed PTSD at a 6-month post-rape assessment compared to survivors of sexual assault who did not experience TI (Möller et al., 2017). Another longitudinal study found that TI remained a strong predictor of PTSD severity in a 2-year post-trauma assessment procedure, even after controlling for initial PTSD symptoms. This finding was especially true among victims of childhood or adulthood sexual or physical abuse, indicating that an experience of TI during interpersonal trauma can result in chronic PTSD and potentially hinder the recovery process over a lengthy period of time (Hagenaars & Hagenaars, 2020).

A research study by Bovin and colleagues (2008) sought to assess how TI relates to PTSD symptom severity and specific PTSD symptom clusters among adult sexual assault survivors. Mediation analyses revealed that TI fully mediated the relationship between perceived inescapability and overall PTSD symptom severity. Further, TI fully mediated the relations between perceived inescapability and the reexperiencing/intrusion and avoidance symptom clusters of PTSD (Bovin et al., 2008). A similar study by Humphreys et al. (2010) conducted

mediational analyses that controlled for assault severity and found that TI continued to fully mediate the relation between fear and PTSD reexperiencing symptoms among adult survivors of CSA. In both of these mediation studies, no significant relationships were found between TI and PTSD hyperarousal symptoms (Bovin et al., 2008; Humphreys et al., 2010). Taken together, the findings of past research suggests that TI is a critical and highly contributing peritraumatic factor through which survivors of sexual violence may go on to develop PTSD symptoms, especially in regard to reexperiencing/intrusion and avoidance symptoms of PTSD.

The predictive influence and statistical strength of peritraumatic TI on PTSD severity has been shown to be more robust than other well-established peritraumatic response predictors, including dissociation and panic, even when controlling for confounding variables, such as demographic characteristics, time elapsed since the traumatic event, history of trauma, and affect variability (Lima et al., 2010; Portugal et al., 2012; Rocha-Rego et al., 2009). To date, only one study has revealed conflicting evidence against TI being a unique predictor of greater posttraumatic stress symptoms. In this study, TI did not significantly predict posttraumatic stress symptom severity after controlling for dissociation and trait anxiety (Abrams et al., 2012). As a result of general findings, some researchers have wondered whether the TI-PTSD association might suggest "a specific PTSD subtype responding differently and deserving alternative treatment approaches that should be tested in randomized controlled trials" (Kalaf et al., 2017, pg. 74).

Naturally, there have been calls for further investigation into possible mechanisms that may contribute to the strong association between TI and increased PTSD symptom severity. Much of the literature exploring peritraumatic TI mentions the possible role of guilt and self-blame as important to the onset and maintenance of posttraumatic symptomatology and impaired

functioning among trauma survivors. Indeed, one of the driving forces between TI and subsequent PTSD is guilt. A study by Bovin and colleagues (2014) revealed that posttraumatic guilt significantly mediated the association between TI and PTSD symptoms among a sample of 63 female trauma survivors who reported experiencing a range of traumatic events. This study, the first and only of its kind to directly and empirically assess the role of guilt in the TI-PTSD relationship, as opposed to speculating about its involvement, was limited in its abbreviated measure of guilt. The authors used a single item question that was part of the assessment of the outcome variable (i.e., PTSD) to assess guilt (Bovin et al., 2014).

A follow-up study by Van Buren & Weierich (2015) found that negative posttraumatic self-appraisals mediated the relationship between TI and PTSD among survivors of CSA. The researchers did not find an association between self-blame, TI, and PTSD symptom severity, but the measure of self-blame was deemed insufficient by the researchers (Van Buren & Weierich, 2015). These findings expose inconsistencies and methodological shortcomings in the TI literature base and warrant further study. The findings suggest that future research should more completely explore, replicate, and validate the relationships between TI, self-blame, guilt, and PTSD symptomatology. Further analyses should also include additional constructs that have yet to be examined but are known to impact posttraumatic outcomes. Certainly, other researchers have called for expanded work in this area (Bovin et al., 2008; Bovin et al., 2014; Fusé et al., 2007; Hagenaars, 2016; Hagenaars & Hagenaars, 2020; Heidt et al., 2005; Humphreys et al., 2010; Kalaf et al., 2017; Magalhaes et al., 2021; Zoellner, 2008).

Overall, TI has been clinically underappreciated until recently, when it emerged as an influential factor on posttraumatic outcomes. Notably, TI has been associated with chronic and severe PTSD, yet the intricacies and mechanisms of this relationship remain an empirical

question (Hagenaars & Hagenaars, 2020; Magalhaes et al., 2021). A clearer understanding of the mechanistic properties and impact of TI on post-trauma functioning could allow for the implementation of appropriate intervention strategies that promote healing and stability among trauma-exposed groups.

Poor treatment response. TI has been associated with poor treatment prognosis. Individuals in an outpatient clinical setting who experienced TI during a traumatic event have been shown to demonstrate poorer response to pharmacological treatment for PTSD (mainly selective serotonin reuptake inhibitors, SSRIs) compared to patients with PTSD who did not experience peritraumatic TI. Poorer treatment response was shown even after investigators controlled for severity of baseline posttraumatic symptoms, time elapsed since the traumatic event, and duration of treatment (Fiszman et al., 2008; Lima et al., 2010). These notable findings have led investigators to conclude that TI may be an important risk factor for PTSD development and severity among survivors of trauma, and its presence should be routinely assessed in clinical and treatment contexts.

Reexperiencing and intrusions. Individuals who experience peritraumatic TI may experience an immobility response again in situations involving high stress or posttraumatic reminders (Fragkaki et al., 2016). Prospective experimental studies have attempted to explore the occurrence of posttraumatic TI among clinical and non-clinical samples. One study asked trauma-exposed participants with PTSD (n = 18) and without PTSD (n = 15) to listen to a recorded script of their autobiographical trauma experience in a laboratory setting. Subjective reports on the TIS revealed that, on average, participants with PTSD reported a posttraumatic TI response when they listened to their own trauma narrative that was comparable in degree to their peritraumatic experience of TI. Objective measurements, including posturography (i.e., body

sway, balance, and postural control) and electrocardiography (i.e., heart rate and rhythm), revealed that script-induced immobility was associated with restricted body sway, accelerated heart rate, and decreased heart rate variability (Volchan et al., 2011). As such, individuals with PTSD may present with TI responses during reexperiencing episodes and exposure to trauma-related stimuli in the future.

Another study revealed that a substantial majority of outpatients suffering from chronic PTSD (n = 184) disclosed the reoccurrence of TI during at least one reexperiencing episode. Seventy percent of this majority of participants reported experiencing an equal or higher degree of TI during a reexperiencing episode compared to their peritraumatic experience of TI. Further, TI during reexperiencing fully mediated the association between peritraumatic TI and PTSD symptom severity among this sample (de Kleine et al., 2018). Born from this work, Lloyd and colleagues (2019) created and validated the first self-report scale to assess the presence and severity of posttraumatic TI occurring more than one month after acute trauma and in response to traumatic reminders. The authors urged clinicians to assess and identify posttraumatic TI among their clients in order to facilitate effective and complete treatment for trauma-exposed groups (Lloyd et al., 2019).

Researchers have even attempted to simulate TI in the lab to see the effect it may have on participants' post-experimental thoughts, levels of distress, and symptomatology. Physical immobility during the viewing of an aversive film or series of photographs – both naturally occurring, spontaneous immobility as a result of distressing stimuli and experimental conditions set up to restrict the mobility of participants – resulted in more intrusive memories of the experimental trauma condition relative to freely moving participants (Hagenaars et al., 2008; Hagenaars & Putman, 2011; Kuiling et al., 2019). The relationship between TI and intrusion

frequency was not found among participants with high attentional control (i.e., the ability to focus attention, shift attention between tasks, and flexibly control thought), suggesting that attentional control may serve as one potential protective factor against posttraumatic intrusions (Hagenaars & Putman, 2011).

Taken together, the findings of these studies suggest that the reoccurrence of TI in response to trauma-relevant cues or reexperiencing episodes is not uncommon and may be particularly distressing to individuals. Moreover, posttraumatic TI may be a symptom that contributes to chronic PTSD and potentially poor outcome response. The occurrence of posttraumatic TI has important implications for the clinical treatment of individuals who experienced TI during their traumatic experience.

Anxiety and depression. In addition to PTSD, TI has been associated with higher degrees of anxiety and depression among sexual abuse survivors (Heidt et al., 2005; Möller et al., 2017; Rizvi et al., 2008). Möller and colleagues (2017) found that survivors of sexual assault who experienced TI were more than three times more likely to develop severe depression at 6-month post-rape assessment compared to survivors who did not experience TI. Additionally, a higher degree of TI was positively correlated with anxiety and depressive symptom severity among survivors of CSA (Heidt et al., 2005).

Delayed or reduced help-seeking. Women who experience TI during sexual violence appear to have more complicated psychological profiles marked by significant distress and impairment. One possible reason for this may be due to delayed treatment seeking. Stewart and colleagues (1987) discovered that women who experienced paralysis during rape and reported fewer attempts to physically defend themselves during an attack were less likely to seek immediate formal help from health professionals. Similarly, Galliano and colleagues (1993)

found that immobility during sexual assault resulted in less help-seeking behavior among survivors.

While the majority of assault survivors tell someone about their victimization experience, most often a close friend or family member, there are many survivors who never disclose their experience, or wait a long time to do so (Fisher et al., 2003; Ullman, 1999; Ullman, 2007; Ullman & Filipas, 2001). Untreated posttraumatic symptoms can have detrimental impacts on mental and physical health. Delayed treatment seeking among survivors of sexual assault has been associated with higher assault-related distress, PTSD, anxiety, depression, fear, low self-esteem, as well as greater difficulty maintaining interpersonal relationships with family and friends (Cohen & Roth, 1987; Resick, 1993; Stewart et al., 1987). Researchers have speculated that an experience of TI during assault might result in survivors feeling higher levels self-blame and guilt for not having actively fought back or prevented the assault's occurrence, thereby resulting in a lower likelihood of them disclosing their experiences to informal or formal support sources, or believing that they are not worthy or deserving of help. Prior research has indicated that more research is needed surrounding disclosure, quality of social support, and TI, and how these variables may relate to PTSD symptom severity and psychological impairment (Mezey & Taylor, 1988; Stewart et al., 1987; Heidt et al., 2005).

Unhelpful reactions from support sources. Disclosure and social support have been shown to play a critical role in the recovery and healing from sexual victimization. However, disclosure in and of itself may not improve the mental health and adjustment of survivors. A disclosure of sexual victimization may result in negative reactions from others, such as victim blame, disbelief, distraction, and minimization, all of which have been shown to impede victims' well-being and contribute to adverse psychological outcomes (Orchowski & Gidycz, 2015;

Ullman, 1996a; Ullman, 1996b; Ullman & Peter-Hagene, 2014). Poor social support places survivors at an increased risk for more severe post-assault symptomatology (Ullman & Filipas, 2001). The adverse effects of these unsupportive reactions are so damaging that researchers have considered an adverse disclosure experience to be a second form of victimization (Campbell, 2008).

Certain sexual assault characteristics have been correlated with greater likelihoods of positive or negative reactions among support sources. For example, Starzynski and colleagues (2005) found that sexual assault victims received more positive and supportive reactions from helping sources when they experienced greater life threat and the offender used a weapon during the assault. This finding suggests that social support sources are more likely to provide positive social reactions to victims who have experienced more severe and overtly life-threatening forms of assault. In another study measuring social reactions to assault, participants were asked to read several vignettes of rape descriptions and assign blame for each incident. Participants tended to attribute more blame to the perpetrator of the assault as the perceived level of victim resistance strategies increased, whereas victims were more likely to be blamed for the assault if they did not show active struggling against the assailant (McCaul et al., 1990). Furthermore, survivors themselves report believing that greater resistance on their part would have stopped the assault or led to more people believing they were raped (Galliano et al., 1993).

Taken together, overall perception of danger and increased victim resistance appear to influence the quality of social reactions that survivors receive from support sources. Sexual assault survivors who experience TI and are physically unable to resist the perpetrator may receive less emotional, tangible, and social support for not having done more to resist against or stop the assault. They may be blamed for their trauma response or asked why they did not fight

back, which may contribute to increased levels of posttraumatic guilt or unhelpful cognitions that further negatively affect victims' posttraumatic functioning. To date, no studies have directly compared how social reactions might differ among survivors of sexual assault who did or did not experience TI.

Relational problems. A qualitative study by TeBockhorst and colleagues (2015) called for further research into what researchers labeled the "shadow" of tonic immobility, an emergent theme during interviews with survivors of sexual assault in which participants described feeling threatened by the possibility of TI reoccurring in their lives during times of consensual sexual contact, or by situations involving heightened fear, anger, or overwhelming emotion (pg. 174). As a result of the ongoing fear of TI's reoccurrence, participants of the study described feeling unable or hindered in their ability to emotionally engage and practice vulnerability with significant others, a requirement for most deep, supportive, and fulfilling relationships (TeBockhorst et al., 2015).

Trauma Response Theories

There are multiple trauma response theories that are useful in understanding and conceptualizing sexual assault survivors' reactions and experiences after sexual violence. While a complete review of all the trauma response theories is outside the scope of the current study, the following section will discuss three trauma response theories that will be used to predict associations between variables of interest, select survey items, and contextualize findings for the current study.

Janoff-Bulman's (1989) shattered assumptions theory posits that people possess three kinds of fundamental assumptions that comprise their "assumptive world": 1) the world is benevolent; 2) the world is meaningful; and 3) the self is worthy. Assumptions about how the

world and others function are believed to develop at an early age through interactions with primary caregivers and serve as a conceptual system in which individuals make sense of the world and their role within it. These three core assumptions are hypothesized to promote personal feelings of safety, capability, and control, allowing individuals to function at healthy levels rather than living in constant fear. According to the theory of shattered assumptions, traumatic events contradict, alter, and disrupt the basic core assumptions of benevolence, meaningfulness, and self-worth, resulting in posttraumatic adaptation difficulties and ineffective coping strategies, such as self-blame, denial, avoidance, and intrusive, recurrent thoughts (Janoff-Bulman, 1989). Ultimately, trauma has the power to shatter individuals' prior beliefs about self, others, and the world, exposing survivors to intense feelings of vulnerability, helplessness, fear, isolation, and difficulty finding meaning and purpose in their lives. It is theorized that after the assumptions of the world and self are shattered by a traumatic event, survivors of trauma face a "cognitive dilemma" as their primary coping task, which requires that they reconcile previous assumptions with new, modified assumptions, or create new assumptions altogether (Janoff-Bulman, 1989, pg. 121).

Foa and Kozak's (1986) emotional processing theory also acknowledges the influence of pre- and post-trauma schemas on the development of pathology after trauma. Broader in scope, emotional processing theory postulates interrelationships between pre-trauma schemas, trauma memory representations, and post-trauma reactions of self and others on trauma survivors' outcomes. Emotional processing, which is believed to facilitate recovery from trauma, is hypothesized to be impeded by several factors: 1) when the trauma violates knowledge of oneself as competent and the world as safe; 2) when the trauma activates previously held beliefs of oneself as incompetent and the world as dangerous; 3) when there are generalized stimulus-

danger associations maintained by overestimated threat severity and avoidance behaviors; and 4) when survivors receive negative reactions from others or interpret the reactions of others as negative. Emotional processing theory posits that people who experience a traumatic event may develop an overactive fear network in which distressing trauma reminders and severe fear responses occur frequently. The person may cope with triggered fear responses through the avoidance of trauma-relevant stimuli, which ultimately results in them not effectively diminishing or extinguishing their overactive fear responding. According to emotional processing theory, erroneous perceptions generated by traumatic events, such as "The world is dangerous" and "I am incompetent," prevent effective emotional processing and maintain PTSD symptoms (Foa & Rothbaum, 1998).

The shattered assumptions theory and emotional processing theory have been applied to survivors of sexual trauma to understand how maladaptive cognitions and beliefs about self and world relate to posttraumatic outcomes. These theories have also been used to guide the development of effective cognitive-behavioral treatments for trauma survivors (Ehlers & Clark, 2000; Foa & Rothbaum, 1998). Janoff-Bulman (1989) developed the World Assumptions Scale (WAS; Janoff-Bulman, 1989) to measure perceptions of world benevolence and self-worth. The scale was found effective in discriminating between victims and non-victims of rape. Generally, victims of rape perceived themselves more negatively and perceived the world as more malevolent (Janoff-Bulman, 1989). Similarly, Foa and colleagues (1999) developed the Posttraumatic Cognitions Inventory (PTCI; Foa et al., 1999) to measure trauma-related thoughts and beliefs. The researchers also sought to compare the usefulness of the PTCI to the WAS. The PTCI survey items yielded three factors, Negative Cognitions About Self, Negative Cognitions About the World, and Self-Blame, all of which were associated with the subsequent development

of PTSD symptoms among adult survivors of sexual assault. The PTCI was comparable to the WAS in its ability to measure trauma-related cognitions, but it demonstrated superior ability in discriminating between posttraumatic psychopathology (Foa et al., 1999). These findings suggest that posttraumatic cognitions and beliefs play an important role in the development, persistence, and severity of trauma-related symptomology.

Prior research has consistently recognized the added distressing physical, affective, and cognitive elements of the peritraumatic TI response and the way TI renders victims physically powerless and unable to fight back or defend themselves during sexual assault. The shattered assumptions theory and emotional processing theory may provide useful frameworks through which to understand and compare how sexual violence affects posttraumatic outcomes among survivors of sexual assault who did and did not experience TI. Survivors of sexual assault whose victimization experience involved TI may face heightened self-blame, guilt, and negative posttraumatic cognitions, which could help explain the relationship between TI and PTSD symptom severity among this population.

Jones and Barlow's (1990) etiology theory of PTSD focused on expanding the conceptualization of posttraumatic stress to include consideration of the role of biological and psychological vulnerabilities, negative life events, fear reactions, perceptions of controllability, social support, and coping strategies. Explicit attention given to the effect of social support and coping strategies on posttraumatic outcomes has since inspired many other researchers to contribute to the empirical knowledge base. As a result, over the past 30 years researchers have gathered an overwhelming amount of empirical evidence to support the understanding that negative social reactions and maladaptive coping strategies exacerbate PTSD and negatively affect post-trauma adjustment among trauma survivors.

The Social Reactions Questionnaire (SRQ; Ullman, 2000) was created to measure the positive and negative social responses to sexual assault disclosure and to assess the effects of social reactions on survivors' posttraumatic adjustment. Among survivors of sexual assault, negative social support (e.g., blaming or disbelieving victims) has been shown to impede survivors' well-being and contribute to further adverse psychological outcomes (Burgess & Holmstrom, 1978; DeCou et al., 2017; Edwards et al., 2015; Orchowski & Gidycz, 2015; Ruch & Chandler, 1983; Ullman, 1996a; Ullman, 1996b; Ullman & Filipas, 2001b; Ullman & Peter-Hagene, 2014). The literature reveals the important influence that social support sources have in the lives of survivors and their posttraumatic outcomes.

Coping involves the use of cognitive and behavioral strategies to manage the demands caused by stressful events that are appraised as taxing or exceeding an individual's resources (Lazarus & Folkman, 1984). Many survivors of trauma feel vulnerable and unable to cope with the emotional and psychological impacts of a traumatic event. Perceived inability to cope can cause significant anxiety and heighten traumatic symptomology, whereas perceived control over the recovery process is associated with fewer PTSD symptoms (Foa & Rothbaum, 1998; Frazier, 2003). A common coping response to traumatic events is effortful attempts to avoid or escape difficult thoughts, feelings, or reminders of the trauma. Maladaptive coping strategies, including denial, self-distraction, substance misuse, social withdrawal, and self-blame, may provide trauma survivors with short-term relief from symptoms, but they ultimately hinder the recovery process in the long-term. Indeed, avoidant and maladaptive coping strategies have been associated with PTSD symptom maintenance among survivors of sexual assault (Bal et al., 2003; Brewin et al., 2000; Gutner et al., 2006; Leiner et al., 2012; Littleton et al., 2007; Ozer et al., 2003; Rosenthal et al., 2005; Ullman et al., 2007; Ullman & Peter-Hagene, 2014).

The two prior research studies that sought to connect a sexual assault experience marked by TI with negative social support reactions and help-seeking, while an important beginning, did not directly quantify actual, received negative social reactions, nor conceptualize help-seeking within the entire spectrum of coping strategies (Galliano et al., 1993; Stewart et al., 1987). Furthermore, social reactions and coping strategies have not been examined through mediation analysis to consider their impact on the severity of PTSD after TI during sexual assault.

The Current Study

Considering the trauma response theories described above and the previous research conducted on TI, especially findings related to its unique impact on the development and severity of PTSD, the current study sought to investigate significant variables of interest within a large university sample. Specifically, past research has not yet thoroughly assessed how the presence and severity of TI among sexual assault survivors relates to additional posttraumatic outcomes beyond PTSD diagnostic criteria, such as posttraumatic cognitions, guilt, self-blame, quality of social reactions and social support, and coping strategies. Extant studies have not yet comprehensively explored how and to what degree sexual assault survivors are impacted by an experience of assault marked by TI. PTSD is one of many constellations of symptoms that sexual assault survivors might experience but the PTSD diagnosis itself may capture only a portion of assault and TI-related distress. The current study aimed to investigate the range of post-assault reactions and outcomes among survivors of sexual assault by considering the specific impact TI may have on broader post-trauma symptomology, functioning, and adjustment. Several post-trauma outcomes and responses to TI among sexual assault survivors can be gleaned from the literature, but more work is needed to understand the emotional, psychological, cognitive, behavioral, and social-relational effects of this peritraumatic reaction.

Additionally, there have been repeated requests for more studies to investigate the possible mechanisms through which TI influences PTSD. Therefore, the current study also sought to test a theoretical model that assessed whether negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping strategies were mechanisms or processes through which experiencing TI might increase the severity of PTSD following sexual assault. Moreover, the current study examined whether negative social reactions moderated or affected the strength of the TI-PTSD relationship. Currently, no research studies have explored the role of social reactions or coping strategies as they relate to the TI-PTSD association. The two past research studies that assessed whether guilt or self-blame mediated PTSD symptomology among trauma survivors who experienced TI were limited and inadequate in their measurement of the constructs.

The broad objective of the current study was to better understand the aftereffects of having experienced TI during sexual assault. Accordingly, the current study employed a quantitative approach to data collection and analysis. Quantitative methods allowed for a selective exploration of the impacts and associations of TI, including examination of possible mechanisms through which TI relates to trauma symptomology. Quantitative methods also offered enhanced generalization of results by reaching a greater number of participants. Because rates of sexual assault are particularly high among college-aged persons, the current study sampled individuals from a university population.

The investigation and recognition of the range of distress experienced by survivors whose sexual assault involved TI, as well as how posttraumatic outcomes and symptoms may be similar or different from survivors who did not experience TI, will help inform trauma response theories. Further examination of TI will offer valuable information that may be useful in helping to correct

societal misconceptions about trauma responses. Furthermore, the current study could provide information that could be beneficial in decreasing victim-blaming attitudes and negative social reactions that harm survivors. Lastly, the findings of the current study may reveal clinically relevant information about a sub-population of sexual assault survivors. The results regarding TI and its impact on survivors could be used to expand existing clinical interventions or pave the way for new clinical interventions that more adequately address the full range of symptoms experienced by survivors. Advanced understanding of the TI-PTSD relationship could provide direction for targeted trauma interventions that prevent or reduce PTSD and the psychological burden of individuals exposed to sexual trauma marked by TI.

Hypotheses of the Current Study

Hypothesis 1a: Consistent with past research, it is expected that TI severity will be positively correlated with trauma symptom severity. It is expected that participants who experienced increasing levels of TI during sexual violence will report greater PTSD symptomology.

Hypothesis 1b: Theories describing the cognitive processes of posttraumatic distress, including shattered assumptions theory (Janoff-Bulman, 1989) and emotional processing theory (Foa & Kozak, 1986), suggest that negative cognitions about self and world serve as risk factors for trauma symptomology. Research into how specific peritraumatic responses, such as TI, might impact the development and nature of posttraumatic cognitions and beliefs is needed and could be useful in expanding the cognitive-based trauma response theories. Based on the preliminary findings from Bovin and colleagues (2014) and Van Buren and Weierich (2015), but expanding and improving the assessment measures, it is hypothesized that TI severity will be positively correlated with negative posttraumatic cognitions, trauma-related guilt cognitions, global guilt

feelings, and self-blame. It is expected that participants who experienced increasing levels of TI during sexual violence will report more negative posttraumatic cognitions and trauma-related guilt cognitions, as well as higher degrees of guilt and self-blame feelings.

Hypothesis 1c: According to Jones and Barlow's (1990) etiology theory of PTSD, it is important to consider individuals' coping responses and their personal and social resources for coping when trying to understand the development of psychopathology and post-trauma adjustment. Past research has shown that TI is associated with the avoidance symptom cluster of PTSD, suggesting that the impact of peritraumatic reactions on coping responses should be considered and explored further (Bovin et al., 2008). Additionally, because past researchers have theorized that TI severity may heighten feelings of posttraumatic guilt, self-blame, and shame among survivors, it is expected that individuals who experienced increasing levels of TI during sexual assault will engage in higher levels of maladaptive coping strategies.

Hypothesis 1d: Helpful social support and quality of social reactions facilitates posttraumatic adjustment and recovery among sexual assault survivors (Brewin et al., 2000; Burgess & Holmstrom, 1978; Ozer et al., 2003; Ruch & Chandler, 1983). However, certain sexual assault characteristics have been associated with the likelihood a survivor receives positive or negative reactions from support sources. Based on past research by McCaul and colleagues (1990) and Galliano and colleagues (1993), empirical investigation of victim resistance strategies and resulting social reactions is a worthwhile area of study in need of further exploration. It is hypothesized that participants who experienced increasing levels of TI during sexual violence will experience more frequent negative social reactions from social support sources and will perceive social support sources as less adequate.

Hypothesis 2: The relationships between TI and the dependent variables of interest will remain statistically significant even while controlling for the possible influence of sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization.

Hypothesis 3: There will be significant linear relationships between posttraumatic outcome measures based on TI presence and severity even after controlling for the possible influence of confounding variables, including sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization. Specifically, individuals who experienced increasing levels of TI will have significantly higher scores of negative posttraumatic cognitions, trauma-related guilt cognitions, global guilt, self-blame, negative social reactions, maladaptive coping, and trauma symptomology. Individuals who experienced increasing levels of TI will have significantly lower scores of perceived social support.

Hypothesis 4: Negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping will mediate the relationship between TI and trauma symptom severity among sexual assault survivors.

Hypothesis 5: Negative social reactions will moderate the relationship between TI and negative posttraumatic cognitions and between TI and trauma symptoms through the mediation of negative posttraumatic cognitions.

Methods

Participants

Participants for the current study were a subset of individuals from a larger study conducted by Dr. Ali Pepper and Dr. Chris Fiore at the University of Montana (UM) that investigated student and campus safety through use of the Safe Campus Survey (SCS). The SCS anonymously measured students' knowledge, attitudes, perceptions, and experiences of sexual

assault, intimate partner violence, and stalking, as well as assessed the campus climate surrounding these issues. The SCS was accessible to all UM students to take from mid-October to mid-December 2021. The survey was administered via Qualtrics Online Survey System. Participants of the campus-wide SCS were 18 years of age or older and had current student status at UM.

UM students who completed the SCS and reported a past experience of sexual assault were notified that they qualified to answer additional questions related to their emotional and psychological well-being that would be used for additional research purposes. This subsample agreed to the current study's informed consent before proceeding (Appendix A). Participants were again informed that their participation in the current study was entirely voluntary and anonymous, and that they could discontinue the survey at any time.

Measures

Demographic questionnaire. Each participant completed questions related to their demographic information. Items included participants' age, gender identity, sexual orientation, and ethnicity/race. See Appendix B.

Sexual assault. An abbreviated portion of the Sexual Experiences Survey (SES; Koss & Oros, 1982) was used to detect cases of unwanted sexual contact and rape. This section of the survey consisted of six multiple choice questions that identified survivors of rape, attempted rape, and participants who had experiences of unwanted sexual contact, sexual harassment, and sexual coercion. Participants had the choice to indicate, "Yes, in the past year since I've been at UM," "Yes, since I've been at UM but not within the past year," "Yes, in my lifetime (not at UM), or "No." See Appendix C. If participants indicated any sexual assault victimization, they were asked follow-up questions regarding the single event that they considered to be the "most

significant." The abbreviated sexual experience survey was used to determine inclusion into the study. Participants for the current study were included if they indicated a positive response to having experienced nonconsensual sexual advances, sexual contact, invasive sexual contact, or sexual intercourse. Koss and Gidycz (1985) reported an internal reliability of .74 among women and .89 among men, indicating that this survey has good internal consistency and making it an acceptable measure for detecting unwanted sexual experiences.

Adverse childhood experiences. Participants were provided definitions of childhood physical and sexual abuse and asked whether or not they had any experiences of abuse prior to the age of 18. The response options included "Yes, physical abuse only," "Yes, sexual abuse only," "Yes, both physical and sexual abuse," and "No." See Appendix C. Participants were included in the current study if they reported childhood sexual abuse.

Tonic immobility. The Tonic Immobility Scale (TIS; Forsyth et al., 2000) is a 10-item self-report measure used to assess the presence and severity of TI. The scale contains two parts, but only the first part has been subject to psychometric analysis. The TIS asks participants to retrospectively rate the extent to which they experienced the core features and components of TI during an unwanted sexual experience (i.e., paralysis, trembling, incapacity to vocalize, numbness, sensation of cold, fear, and feeling disconnected from oneself or surroundings). The scale items are rated from 0, "not at all," to 6, "extremely." An example item is: "Rate the degree to which you froze or felt paralyzed during a past experience of unwanted sexual contact." See Appendix D. Scores range from 0 to 60 with higher scores indicating a greater degree of immobility. Studies using the TIS with survivors of sexual assault have supported the validity of the questionnaire as a valid measure of the TI response and its correlates (Fusé et al., 2007; Heidt et al., 2005; Möller et al., 2017). Fusé and colleagues (2007) found the TIS to demonstrate strong

internal consistency on the tonic immobility factor (α = .94) and the fear factor of the scale (α = .90). In the current sample, the scale had a high level of internal consistency (*M* = 23.65, *SD* = 16.07, α = 0.92).

Posttraumatic cognitions. Posttraumatic cognitions were assessed through use of the Posttraumatic Cognitions Inventory (PTCI; Foa et al., 1999), a 36-item questionnaire that measures the presence and strength of cognitions related to a specified traumatic event. Items assess the extent to which participants agree with cognitions on three independent subscales: Negative Cognitions About Self (e.g., "I am inadequate); Negative Cognitions About the World (e.g., "People can't be trusted"); and Self-Blame ("The event happened because of the way I acted"). Participants were asked to rate the level to which they agreed with each item on a Likert scale ranging from 0 ("totally disagree") to 6 ("totally agree"). See Appendix E. According to Foa and colleagues (1999), three scale items were used for experimental purposes and were therefore not included in the current study. The total score of posttraumatic cognitions is computed by summing the inventory across 33 items (range 0-198). Higher scores indicated higher negative posttraumatic cognitions. The PTCI has demonstrated strong internal consistency on the total score (α = .97) and each of the subscales (Negative Cognitions About Self, α = .97; Negative Cognitions About the World, α = .88; Self-Blame, α = .86). The PTCI has demonstrated good validity and test-retest reliability (total score, *r* = .85) (Foa et al., 1999). Internal consistency for the current study was high (*M* = 54.22, *SD* = 42.77, α = 0.97).

Self-blame. Some research has suggested that the PTCI may not adequately capture self-blame (Startup et al., 2007; Van Buren & Weierich, 2015). Therefore, the Rape Attribution Questionnaire (RAQ; Frazier, 2003), a 25-item self-report questionnaire, was also used to assess self-blame. The scale is comprised of five subscales with five items in each subscale: 1)

Characterological Self-Blame; 2) Behavioral Self-Blame; 3) Rapist Blame; 4) Society Blame; and 5) Chance. Participants were asked to rate each item using a 5-point Likert scale ranging from 0 ("never") to 4 ("very often") using the following stem: "I had an unwanted sexual experience occur without my consent because…." See Appendix F. The current study used a sum of Characterological Self-Blame and Behavioral Self-Blame responses to comprise a Total Self-Blame Score (range 0-40). High scores indicated high self-blame. Internal consistency (α = .87) of the RAQ has been demonstrated to be adequate (Frazier, 2003). The present study showed good internal consistency for the Total Self-Blame Score (*M* = 9.97, *SD* = 9.84, α = 0.93).

Guilt. The Trauma-Related Guilt Inventory (TRGI; Kubany et al., 1996) is a 32-item self-report inventory that assesses multiple dimensions of trauma-related guilt. The inventory consists of three scales, a four-item Global Guilt scale, a six-item Distress scale, and a 22-item Guilt Cognitions scale. The Guilt Cognitions scale has three subscales, including Hindsight-Bias/Responsibility, Wrongdoing, and Lack of Justification. Responses to the questions are made using a 5-point Likert scale and response options vary depending on the scale and question. See Appendix G. Several items are reverse worded to minimize biased responding. These items were subsequently reverse scored. The current study used the four-item Global Guilt scale (range 0-16) to understand the frequency, intensity, and overall severity of feelings of guilt, and the 22-item Guilt Cognitions scale (range 0-88) to assess trauma-related guilt cognitions. Higher scores reflected higher global guilt and guilt cognitions. Previous research has shown that the alpha coefficients computed for the Global Guilt, Guilt Cognitions, and Distress scales demonstrated high internal consistency (α = 0.90, 0.86, and 0.86, respectively) and test-retest correlations ranged from 0.84 to 0.86 for the scales (Kubany et al., 1996). In samples of Vietnam veterans (*n* = 74) and battered women (*n* = 68), the TRGI scale scores were significantly correlated with

measures of trait guilt, PTSD symptomatology, depression, trait shame, and social avoidance (Kubany et al., 1996). The current study showed that both the Global Guilt scale (M = 4.36, SD = 4.35, α = 0.93) and the Guilt Cognitions scale (M = 27.97, SD = 16.76, α = 0.92) had good internal consistency.

Social reactions. Participants completed the Social Reactions Questionnaire-Shortened (SRQ-S; Ullman et al., 2017), a 16-item shortened version of the Social Reactions Questionnaire (SRQ; Ullman et al., 2000). The SRQ-S assesses how often survivors receive 16 different social reactions from any support source they told since the assault on a scale ranging from 0 ("never") to 4 ("always"). For all scales, higher scores indicate greater frequency of receiving that kind of reaction. See Appendix H. The SRQ-S reliably measures three general scales of the SRQ, including Turning Against (α = .89), Unsupportive Acknowledgement (α = .71), and Positive Reactions (α = .83) (Ullman et al., 2017). The current study combined the Turning Against scale and the Unsupportive Acknowledgement scale to comprise a Negative Social Reactions total score (range = 0-48). Higher scores reflected higher negative social reactions. The present study showed good internal consistency for the Negative Social Reactions score (M = 20.74, SD = 10.76, α = 0.93).

Social support. The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) was used to capture participant's perception of the adequacy of their social support. The MSPSS is a 12-item self-report scale which measures perceived social support in three areas: friends, family, and significant others. Participants use a 7-point Likert scale from 0 ("very strongly disagree") to 6 ("very strongly agree") to rate the degree to which the statements are true for them. See Appendix I. High scores on the MSPSS indicated high perceived social support, whereas low scores indicated low perceived social support (range = 0-72). Zimet and

colleagues (1988) validated the instrument among a college student sample and found that the overall scale was internally reliable with an alpha coefficient of 0.88. Reliability coefficients of 0.91, 0.87, and 0.85, respectively, were obtained for the significant other, family, and friends subscales. Test-retest reliability coefficients for the overall scale and significant other, family, and friends subscales were 0.85, 0.72, 0.85, and 0.75, respectively, and moderate construct validity was found for the scale (Zimet et al., 1988). Internal consistency for the current study was high (M = 53.47, SD = 16.29, α = 0.94).

Coping strategies. Participants completed the Brief COPE (Carver, 1997), a 28-item self-report scale designed to measure effective and ineffective ways to cope with a stressful life event. Items assess individuals' primary coping styles with scores on the following 14 subscales that each have two items: emotional support, positive reframing, acceptance, religion, humor, active coping, planning, use of informational support, denial, substance use, behavioral disengagement, self-distraction, self-blame, and venting. Respondents are asked to rate items on a 4-point Likert scale, ranging from 0 ("I haven't been doing this at all") to 3 ("I've been doing this a lot"). See Appendix J. The subscales for the current study were combined to distinguish between Adaptive Coping and Maladaptive Coping. Maladaptive Coping included total scores on the denial, substance use, behavioral disengagement, self-distraction, self-blame, and venting subscales. High scores reflected high maladaptive coping strategies (range = 0-36). The Brief COPE has demonstrated good construct validity and internal consistency (Cronbach's alpha between .50 and .90 for each subscale) (Carver, 1997). The current study used the Maladaptive Coping subscale which showed good internal consistency (M = 8.74, SD = 7.23, α = 0.87).

Trauma symptoms. Trauma symptom severity was assessed using the Posttraumatic Symptom Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 is a brief

self-report instrument used to provide a reliable diagnosis of PTSD and a measure of the severity of trauma symptoms based on DSM-5 diagnostic criteria. Respondents are asked to indicate how much each symptom has bothered them in the past month. Responses are rated on a 5-point Likert scale from 0 ("not at all") to 4 ("extremely"). Response items are summed for each participant to provide a total trauma severity score ranging from 0 to 80 with higher scores indicating higher trauma symptom severity. See Appendix K. The 20-item scale has been shown to be a psychometrically sound measure of PTSD symptoms, exhibiting strong internal consistency (α = .94), test-retest reliability (r = .82), and convergent (rs = .74 to .85) and discriminant (rs = .31 to .60) validity (Blevins et al., 2015). The current study exhibited high internal consistency (M = 18.03, SD = 20.22, α = 0.97).

Control variables. The current study controlled for three possible confounding variables that have been shown to be related to PTSD and the other variables in the model. The control variables included sexual assault revictimization, time elapsed since participants' most recent sexual assault experience, and sexual assault severity. Revictimization and time elapsed were coded as continuous variables. Sexual assault severity was coded as a four-level ordinal variable and included sexual harassment (i.e., unwanted sexual advances or requests), unwanted sexual contact (i.e., nonconsensual kissing, touching, grabbing, or fondling), attempted rape (i.e., nonconsensual oral, anal, or vaginal intercourse or invasive sexual contact but penetration did not occur), and rape (i.e., nonconsensual oral, anal, or vaginal intercourse or invasive sexual contact and penetration did occur). See Appendix C.

Procedure

Several recruitment methods were used to obtain a sample for the current study. As a part of the larger study, flyers were posted in academic buildings, dormitories, common areas, and

other places students congregate, to recruit university students to participate in the SCS. Flyers were also be posted in campus service areas likely to interact with survivors, such as the Student Advocacy Resource Center and Curry Health. Additionally, advertisements were posted on the University of Montana webpage and student Moodle page. There was a link posted on the university site (my.umt.edu) that directed students to the SCS. Faculty and staff were notified and given the chance to present the survey as a possible extra credit opportunity for the students in their respective courses. The SCS was made available on the SONA Systems portal, a web-based university research participant pool management software.

The SCS was advertised to all UM students from mid-October through mid-December 2021. Students were informed that, upon completion of the survey, they had the opportunity to enter a drawing to win one of: two $500 Amazon gift cards; three $100 Amazon gift cards; two $50 Amazon gift cards; or twenty $5 campus coffee cards. Because of the possibility of heightened psychological distress upon answering questions about experiences of sexual assault and its impact, participants were repeatedly provided the contact information for psychological and supportive services that could provide free and immediate assistance to them. See Appendix A. Participants were also repeatedly informed that they could discontinue the survey at any time. Participants were presented with the measures in the order they are listed in Appendix B through Appendix K.

Statistical Analysis

The data were analyzed using Statistical Package for Social Sciences (SPSS) version 28 and the PROCESS macro version 4.2 for SPSS Statistics. Prior to analysis, the data and variables were examined to identify ineligible participants and incomplete surveys. Participants were included in the current study if they were 18 years of age or older, a current UM student, and

identified having experienced nonconsensual sexual harassment, sexual contact, attempted sexual assault, or completed sexual assault in their lifetime. Survey participants were removed if they did not meet eligibility criteria or responded inconsistently to survey measures and questions. Participants were not included in analyses if they did not complete the respective questionnaires to 80% completion. Missing values were treated using best-case single imputation, in which missing data were replaced with the best-case value of the questionnaire. Three participants were removed for having greater than 80% incompletion of the Tonic Immobility Scale (TIS; Forsyth et al., 2000) and 13 participants were removed for inconsistent responding on the TIS and Trauma-Related Guilt Inventory (TGIS; Kubany et al., 1996). The remaining participants comprised the sample for the study. The total sample size was 631. Table 1 summarizes each analysis by hypothesis.

Table 1

Analysis by Hypothesis

Hypothesis	Measuring	Test
1a-d	Correlation between TI and posttraumatic outcomes, including negative posttraumatic cognitions, trauma-related guilt cognitions, global guilt feelings, self-blame, negative social reactions, perceived social support, maladaptive coping, and trauma symptomology	Bivariate Pearson Correlation
2	Correlation between TI and posttraumatic outcome measures controlling for sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization	Partial Correlation

Table 1 (continued)

Hypothesis	Measuring	Test
3	Linear relationship of TI on posttraumatic outcome measures after controlling for sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization	Multivariate Multiple Linear Regression
4	Indirect effect of TI on trauma symptoms through negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping	Mediation (multiple linear regression) Model 4 with Bootstrapping
5	Conditional indirect effect of negative posttraumatic cognitions as a mediator for the effect of TI on trauma symptoms, whereby negative social reactions moderates the indirect and direct relationship	Moderated Mediation (multiple linear regression) Model 8 with Bootstrapping

Results

Demographic Results

Of the 631 participants, 493 identified as cisgender women (78.1%), 78 identified as cisgender men (12.4%), 56 identified as gender non-conforming/transgender/questioning (8.9%), and two identified as “other” (0.3%). The remaining demographic characteristics of the participants can be found in Table 2.

Table 2

Demographic Characteristics of Participants

Demographic Characteristic	Full sample	
	n	%
Gender		
Cisgender Woman	493	78.1
Cisgender Man	78	12.4
Gender Non-Conforming/Transgender/Questioning	56	8.9
Other	2	.3
Race/Ethnicity		
White/Non-Hispanic	545	86.4
Hispanic/Latino	21	3.3
American Indian/Native American/Indigenous/First Nation	12	1.9
Asian	9	1.4
Black/African American	6	1.0
Native Hawaiian/Other Pacific Islander	2	.3
Middle Eastern/North African	2	.3
Biracial	22	3.5
Multiracial	8	1.3
Other	4	.6
Sexual Orientation		
Straight/Heterosexual	406	64.3
Bisexual	106	16.8
Pansexual	31	4.9
Queer	21	3.3
Questioning	20	3.2
Lesbian	19	3.0
Gay	14	2.2
Asexual	6	1.0
Other	7	1.1
Age		
18-25	487	77.1
26-30	60	9.5
31-40	47	7.4
41-50	16	2.5
51-60	6	1.0
61+	1	.2
Class Standing		
Undergraduate Freshman	202	32
Undergraduate Sophomore	101	16
Undergraduate Junior	119	18.9
Undergraduate Senior	136	21.5
Graduate Student	73	11.6

Note. Not all categories equal 100% due to missing data.

Bivariate Pearson Correlation

Hypothesis 1a-d: TI severity will be positively correlated with trauma symptomology, negative posttraumatic cognitions, trauma-related guilt cognitions, global guilt, self-blame, maladaptive coping strategies, and negative social reactions. TI will be negatively correlated with perceived social support.

Preliminary analysis showed the relationship among variables to be linear, as assessed by visual inspection of the scatterplots. Histograms and Normal Q-Q Plots revealed approximately normally distributed data. Pearson's correlation was run to assess the relationship between tonic immobility (TI), negative posttraumatic cognitions, self-blame, global guilt, guilt cognitions, negative social reactions, perceived social support, maladaptive coping, and trauma symptomology. Table 3 shows the means, standard deviations, and correlations of all variables. There was a statistically significant, moderately strong positive correlation between TI and negative posttraumatic cognitions, $r(628) = .47$, $p < .001$; TI and self-blame, $r(624) = .43$, $p < .001$; TI and global guilt, $r(603) = .47$, $p < .001$; TI and guilt cognitions, $r(589) = .27$, $p < .001$; TI and negative social reactions, $r(467) = .50$, $p < .001$; TI and maladaptive coping, $r(591) = .44$, $p < .001$; and TI and trauma symptoms, $r(586) = .50$, $p < .001$. There was a statistically significant negative correlation between TI and perceived social support, $r(605) = -.20$, $p < .001$. The correlation findings supported hypothesis one.

Table 3

Means, Standard Deviations, and Pearson Correlations Among the Studied Variables

Variables	Mean (*SD*)	1	2	3	4	5	6	7	8	9
1. Tonic Immobility	23.65 (16.07)		.47** (*n*=630)	.43** (*n*=626)	.47** (*n*=605)	.27** (*n*=591)	.50** (*n*=469)	-.20** (*n*=607)	.44** (*n*=593)	.50** (*n*=588)
2. Negative Posttraumatic Cognitions	54.22 (42.77)			.66** (*n*=625)	.58** (*n*=604)	.52** (*n*=591)	.51** (*n*=469)	-.33** (*n*=606)	.61** (*n*=593)	.64** (*n*=588)
3. Self-blame	9.97 (9.84)				.63** (*n*=605)	.64** (*n*=591)	.42** (*n*=469)	-.20** (*n*=606)	.56** (*n*=593)	.59** (*n*=588)
4. Global Guilt	4.36 (4.35)					.64** (*n*=590)	.49** (*n*=462)	-.22** (*n*=594)	.57** (*n*=586)	.64** (*n*=579)
5. Guilt Cognitions	27.97 (16.76)						.33** (*n*=451)	-.19** (*n*=581)	.48** (*n*=575)	.44** (*n*=568)
6. Negative Social Reactions	10.74 (10.76)							-.25** (*n*=468)	.46** (*n*=461)	.56** (*n*=455)
7. Perceived Social Support	53.47 (16.29)								-.25** (*n*=592)	-.29** (*n*=586)
8. Maladaptive Coping	8.74 (7.23)									.73** (*n*=582)
9. Trauma Symptomology	18.03 (20.21)									

**$p < .01$

Partial Correlation

Hypothesis 2: The relationships between TI and the dependent variables of interest will remain statistically significant even after controlling for the possible influence of sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization.

Pearson's partial correlation was run to assess the relationship between TI and the dependent variables of interest after adjusting for assault severity, time elapsed since most recent assault experience, and revictimization. Partial correlation showed that the strengths of the relationships were weaker when considering the control variables, but all remained statistically significant. Partial correlation revealed the following: TI and negative posttraumatic cognitions, $r_{partial}(620) = .37$, $p < .001$; TI and self-blame, $r_{partial}(616) = .36$, $p < .001$; TI and global guilt, $r_{partial}(595) = .36$, $p < .001$; TI and guilt cognitions, $r_{partial}(581) = .20$, $p < .001$; TI and negative social reactions, $r_{partial}(459) = .39$, $p < .001$; TI and perceived social support, $r_{partial}(597) = -.14$, $p < .001$; TI and maladaptive coping, $r_{partial}(583) = .36$, $p < .001$; and TI and trauma symptoms, $r_{partial}(578) = .38$, $p < .001$. The partial correlation findings supported hypothesis two.

Multivariate Multiple Linear Regression

Hypothesis 3: There will be significant linear relationships between posttraumatic outcome measures based on TI presence and severity even after controlling for the possible influence of confounding variables, including sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization. Individuals who experienced increasing levels of TI will have significantly higher scores of negative posttraumatic cognitions, trauma-related guilt cognitions, global guilt, self-blame, negative social

reactions, maladaptive coping, and trauma symptomology. Individuals who experienced increasing levels of TI will have significantly lower scores of perceived social support.

A multivariate multiple regression was run to predict negative posttraumatic cognitions, self-blame, global guilt, guilt cognitions, negative social reactions, perceived social support, maladaptive coping, and trauma symptomology from tonic immobility after controlling for sexual assault severity, time elapsed since most recent sexual assault experience, and revictimization. Preliminary assumption checking revealed that data and residuals were approximately normally distributed, as assessed by histogram and Q-Q plots; there were linear relationships and homoscedasticity, as assessed by visual inspection of scatterplots; there were no multicollinearity issues among variables above the moderate range ($r = .7$); and there were no univariate or multivariate outliers, as assessed by boxplot.

All multivariate tests for TI, including Pillai's Trace = .25, Wilks' Lambda = .75, Hotelling's Trace = .34, and Roy's Largest Root = .34, were significant ($F[8, 419] = 17.79$, $p < .001$, partial $\eta^2 = .25$), suggesting a rejection of the null hypothesis that there is no linear association between TI and the posttraumatic outcome measures while controlling for assault severity, revictimization, and time elapsed since most recent assault experience. Approximately 25.4% of the variance on the linear combination of the dependent variables can be accounted for by TI (partial $\eta^2 = .25$). Regression coefficients, standard errors, *t* statistics, confidence intervals, and partial eta squared values can be found in Table 4.

With all other predictors being held constant, TI significantly predicted negative posttraumatic cognitions ($B = 1.08$, $p < .001$), self-blame ($B = .25$, $p < .001$), global guilt ($B = .12$, $p < .001$), guilt cognitions ($B = .26$, $p < .001$), negative social reactions ($B = .29$, $p < .001$), perceived social support ($B = -.18$, $p < .01$), maladaptive coping ($B = .19$, $p < .001$), and trauma

symptomology ($B = .51$, $p < .001$). As TI severity increased, negative posttraumatic cognitions, self-blame, global guilt, guilt cognitions, negative social reactions, maladaptive coping, and trauma symptomology all increased significantly even when controlling for the confounding variables. A significant inverse relationship was found between TI and perceived social support, such that as TI severity increased perceived social support decreased. The regression findings supported hypothesis three.

Table 4

Multivariate Multiple Regression Results

					95% Confidence Interval		
Dependent Variable	Parameter	*B*	*SE*	*t*	Lower Bound	Upper Bound	Partial η^2
Negative	Intercept	16.96*	6.73	2.52	3.74	30.18	.01
Posttraumatic	TI	1.08***	.14	7.89	.81	1.35	.13
Cognitions	Assault Severity	3.10	1.98	1.57	-.79	6.99	.01
	Revictimization	1.53**	.58	2.64	.39	2.67	.02
	Time Elapsed	-.88	.85	-1.04	-2.54	.79	.00
Self-blame	Intercept	5.74***	1.52	3.79	2.77	8.72	.03
	TI	.25***	.03	8.17	.19	.31	.14
	Assault Severity	1.08*	.45	2.42	.20	1.96	.01
	Revictimization	-.10	.13	-.75	-.35	.16	.00
	Time Elapsed	-.87***	.19	-4.59	-1.25	-.50	.05
Global Guilt	Intercept	1.43*	.68	2.10	.09	2.76	.01
	TI	.12***	.01	8.45	.09	.14	.14
	Assault Severity	.64**	.20	3.21	.25	1.03	.02
	Revictimization	.01	.06	.12	-.11	.12	.00
	Time Elapsed	-.32***	.09	-3.74	-.49	-.15	.03
Guilt	Intercept	18.90***	2.78	6.79	13.43	24.37	.10
Cognitions	TI	.26***	.06	4.65	.15	.37	.05
	Assault Severity	1.24	.82	1.52	-.37	2.85	.01
	Revictimization	-.02	.24	-.08	-.49	.45	.00
	Time Elapsed	-.35	.35	-1.00	-1.04	.34	.00

Table 4 (continued)

Dependent Variable	Parameter	*B*	*SE*	*t*	95% Confidence Interval		Partial η^2
					Lower Bound	Upper Bound	
Negative Social Reactions	Intercept	1.95	1.66	1.18	-1.31	5.22	.00
	TI	.29***	.03	8.52	.22	.35	.15
	Assault Severity	.99*	.49	2.02	.02	1.95	.01
	Revictimization	.39**	.14	2.76	.11	.68	.02
	Time Elapsed	-.51*	.21	-2.45	-.92	-.10	.01
Perceived Social Support	Intercept	56.56***	2.86	19.77	50.94	62.18	.48
	TI	-.18**	.06	-3.04	-.29	-.06	.02
	Assault Severity	-.80	.84	-.96	-2.46	.85	.00
	Revictimization	-.09	.25	-.38	-.58	.39	.00
	Time Elapsed	.75*	.36	2.07	.04	1.45	.01
Maladaptive Coping	Intercept	3.91***	1.13	3.47	1.70	6.13	.03
	TI	.19***	.02	8.45	.15	.24	.14
	Assault Severity	.66*	.33	1.98	.00	1.31	.01
	Revictimization	.11	.10	1.09	-.09	.30	.00
	Time Elapsed	-.41**	.14	-2.89	-.69	-.13	.02
Trauma Symptomology	Intercept	.87	2.95	.29	-4.93	6.67	.00
	TI	.51***	.06	8.41	.39	.62	.14
	Assault Severity	3.74***	.87	4.31	2.04	5.45	.04
	Revictimization	.69**	.25	2.70	.19	1.19	.02
	Time Elapsed	-1.57***	.37	-4.23	-2.30	-.84	.04

Note. (n = 431) Model = "Enter" method in SPSS Statistics; *B* = unstandardized regression coefficient; *SE* = standard error of the unstandardized coefficient; *t* = *t* statistic; Partial η^2 = partial eta squared.

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

Mediation

Hypothesis 4: Negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping will mediate the relationship between TI and trauma symptom severity among sexual assault survivors.

To test mediation and ensure adequate confidence limits and significance testing, PROCESS (model 4) macro version 4.2 for SPSS was used (Hayes, 2022). The PROCESS macro for SPSS utilizes a regression framework with bootstrapping to examine the indirect effect of a predictor variable on an outcome variable through a proposed mediator variable. Bootstrapping is a method that allows for bias-corrected 95% confidence intervals and significance values of the indirect effect. The current study used 10,000 bootstrapped samples. An indirect effect is assumed to be significant if the confidence intervals around the paths do not include zero (Hayes & Rockwood, 2017). Four mediation analyses were performed to examine the mediation models and test the hypotheses stated above. Each analysis included tonic immobility as the continuous independent variable, trauma symptomology as the continuous dependent variable, and the four posttraumatic outcome measures (i.e., negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping) as the continuous mediating variables. The results of the mediation analyses involving negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping are shown in Figures 1, 2, 3, and 4, respectively. In addition, Table 5 summarizes the unstandardized mediation analysis results and Table 6 summarizes the standardized mediation analysis results.

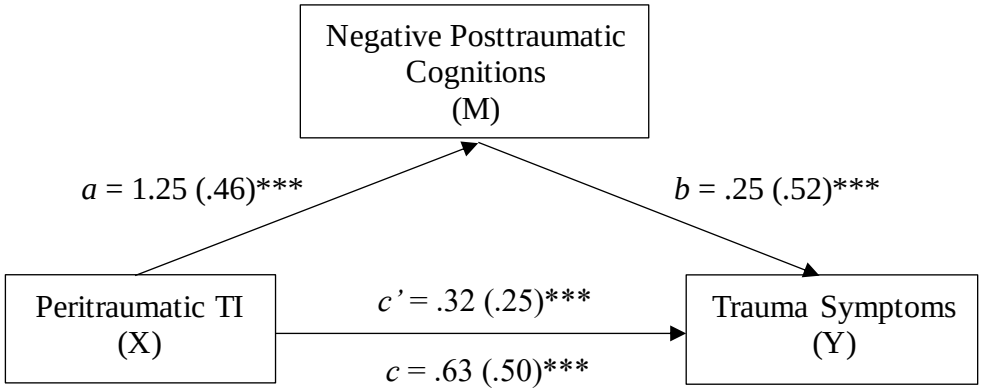
In the mediation analysis with negative posttraumatic cognitions as the mediator (Figure 1), TI significantly predicted negative posttraumatic cognitions (B = 1.25, SE = .10, t(586) = 12.71, 95% CI [1.06, 1.44], $p < .001$) and explained approximately 21.6% of the variance in

negative posttraumatic cognitions (F[1, 586] = 161.53, $p < .001$, $R^2 = .22$). In addition, TI significantly predicted trauma symptoms ($B = .63$, $SE = .05$, $t(586) = 13.83$, 95% CI [.54, .71], $p < .001$) and TI alone explained 24.6% of the variance in trauma symptoms (F[1, 586] = 191.30, $p < .001$, $R^2 = .25$). Moreover, negative posttraumatic cognitions significantly predicted trauma symptoms ($B = .25$, $SE = .02$, $t(585) = 15.24$, 95% CI [.21, .28], $p < .001$). A bootstrap confidence interval for the indirect effect ($B = .31$, $SE = .04$) based on 10,000 bootstrap samples was entirely above zero (.24, .38). Furthermore, the direct effect of TI on trauma symptoms in the presence of the mediator, negative posttraumatic cognitions, was also found significant ($B = .32$, $SE = .04$, $t(585) = 7.38$, 95% CI [.23, .40], $p < .001$). The overall model summary for trauma symptoms with the inclusion of both TI and negative posttraumatic cognitions revealed that the simultaneous inclusion of both variables accounted for approximately 46% of the variance in trauma symptoms (F[2, 585] = 249.54, $p < .001$, $R^2 = .46$). Therefore, negative posttraumatic cognitions partially mediated the relationship between TI and trauma symptoms.

Similar results were found for the remaining mediators and are summarized in the following figures and tables below. Most importantly, negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping were all found to partially mediate the relationship between TI and trauma symptomology, which supported hypothesis four.

Figure 1

Path Coefficients for the TI, Negative Posttraumatic Cognitions, and Trauma Symptomology Mediation Analysis



Note. (*n* = 588) Unstandardized path coefficients are displayed first and standardized coefficients are denoted in parentheses. Path *a* = association between X and M; Path *b* = association between M and Y; Path *c* = association between X and Y (total effect); Path *c´* = association between X and Y after accounting for the effect of M (direct effect).

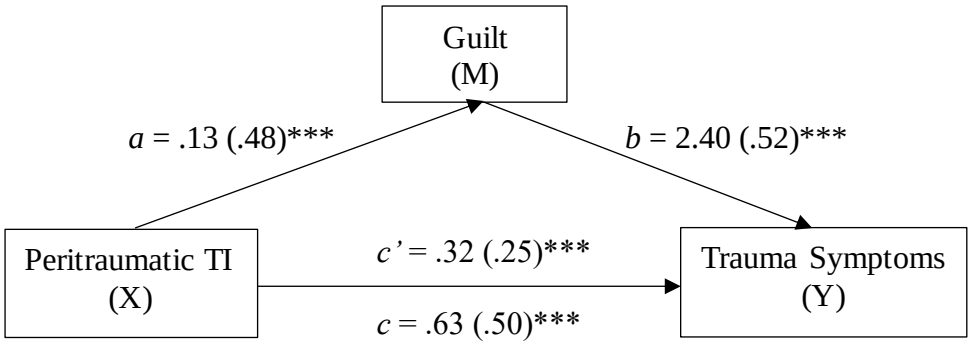
***p* < .01. ****p* < .001

In the mediation analysis with guilt as the mediator (Figure 2), TI significantly predicted guilt (*B* = .13, *SE* = .01, *t*(577) = 13.10, 95% CI [.11, .15], *p* < .001) and explained approximately 22.9% of the variance in guilt (*F*[1, 577] = 171.73, *p* < .001, R^2 = .23). In addition, guilt significantly predicted trauma symptoms (*B* = 2.40, *SE* = .16, *t*(576) = 14.92, 95% CI [2.08, 2.72], *p* < .001). A bootstrap confidence interval for the indirect effect (*B* = .31, *SE* = .04) based on 10,000 bootstrap samples was entirely above zero (.25, .39). Furthermore, the direct effect of TI on trauma symptoms in the presence of the mediator, guilt, was also found significant (*B* = .32, *SE* = .04, *t*(576) = 7.16, 95% CI [.23, .40], *p* < .001). The overall model summary for trauma symptoms with the inclusion of both TI and guilt revealed that the

simultaneous inclusion of both variables accounted for approximately 45.9% of the variance in trauma symptoms (F[2, 576] = 243.94, $p < .001$, $R^2 = .46$). Therefore, guilt partially mediated the relationship between TI and trauma symptoms.

Figure 2

Path Coefficients for the TI, Guilt, and Trauma Symptomology Mediation Analysis



Note. (n = 579) Unstandardized path coefficients are displayed first and standardized coefficients are denoted in parentheses. Path a = association between X and M; Path b = association between M and Y; Path c = association between X and Y (total effect); Path $c´$ = association between X and Y after accounting for the effect of M (direct effect).

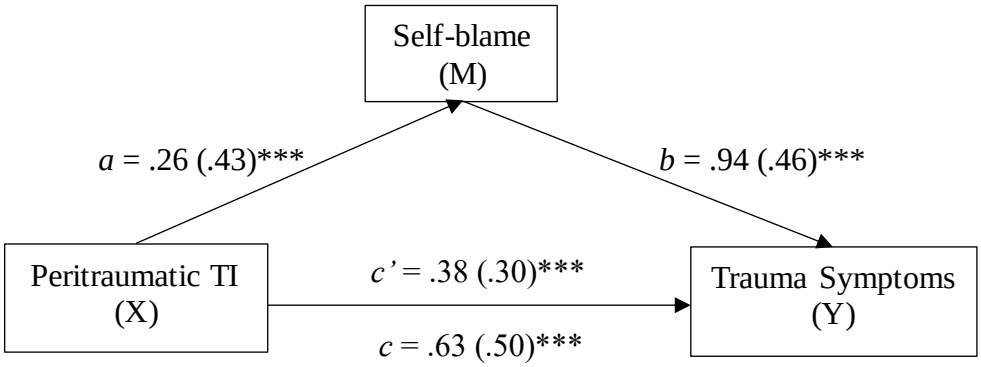
**$p < .01$. ***$p < .001$

In the mediation analysis with self-blame as the mediator (Figure 3), TI significantly predicted self-blame (B = .26, SE = .02, t(586) = 11.59, 95% CI [.22, .31], $p < .001$) and explained approximately 18.6% of the variance in self-blame (F[1, 586] = 134.27, $p < .001$, R^2 = .19). In addition, self-blame significantly predicted trauma symptoms (B = .94, SE = .07, t(585) = 13.05, 95% CI [.80, 1.09], $p < .001$). A bootstrap confidence interval for the indirect effect (B = .25, SE = .03) based on 10,000 bootstrap samples was entirely above zero (.19, .31).

Furthermore, the direct effect of TI on trauma symptoms in the presence of the mediator, self-blame, was also found significant (B = .38, SE = .04, t(585) = 8.53, 95% CI [.29, .46], p < .001). The overall model summary for trauma symptoms with the inclusion of both TI and self-blame revealed that the simultaneous inclusion of both variables accounted for approximately 41.6% of the variance in trauma symptoms (F[2, 585] = 208.48, p < .001, R^2 = .42). Therefore, self-blame partially mediated the relationship between TI and trauma symptoms.

Figure 3

Path Coefficients for the TI, Self-Blame, and Trauma Symptomology Mediation Analysis



Note. (n = 588) Unstandardized path coefficients are displayed first and standardized coefficients are denoted in parentheses. Path a = association between X and M; Path b = association between M and Y; Path c = association between X and Y (total effect); Path c' = association between X and Y after accounting for the effect of M (direct effect).

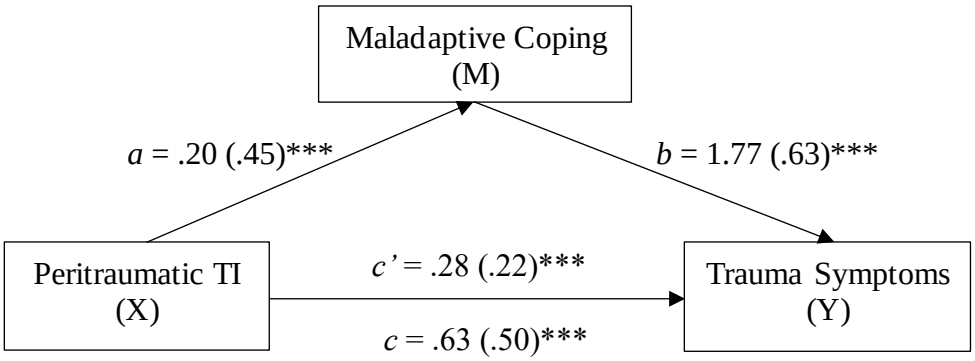
**p < .01. ***p < .001

In the mediation analysis with maladaptive coping as the mediator (Figure 4), TI significantly predicted maladaptive coping (B = .20, SE = .02, t(580) = 12.00, 95% CI [.17, .23], p < .001) and explained approximately 19.9% of the variance in maladaptive coping (F[1, 580] =

144.07, $p < .001$, $R^2 = .20$). In addition, maladaptive coping significantly predicted trauma symptoms ($B = 1.77$, $SE = .09$, $t(579) = 20.57$, 95% CI [1.60, 1.94], $p < .001$). A bootstrap confidence interval for the indirect effect ($B = .35$, $SE = .04$) based on 10,000 bootstrap samples was entirely above zero (.28, .44). Furthermore, the direct effect of TI on trauma symptoms in the presence of the mediator, maladaptive coping, was also found significant ($B = .28$, $SE = .04$, $t(579) = 7.15$, 95% CI [.20, .35], $p < .001$). The overall model summary for trauma symptoms with the inclusion of both TI and maladaptive coping revealed that the simultaneous inclusion of both variables accounted for approximately 56.6% of the variance in trauma symptoms (F[2, 579] = 377.85, $p < .001$, $R^2 = .57$). Therefore, maladaptive coping partially mediated the relationship between TI and trauma symptoms.

Figure 4

Path Coefficients for the TI, Maladaptive Coping, and Trauma Symptomology Mediation Analysis



Note. ($n = 582$) Unstandardized path coefficients are displayed first and standardized coefficients are denoted in parentheses. Path a = association between X and M; Path b = association between M and Y; Path c = association between X and Y (total effect); Path $c´$ = association between X and Y after accounting for the effect of M (direct effect).

$^{**}p < .01$. $^{***}p < .001$

Table 5

Unstandardized Mediation Analysis Summary

Relationship	Total Effect (*c*)	Direct Effect (*c'*)	Indirect Effect (*ab*)	95% Confidence Interval		Conclusion
				Lower Bound	Upper Bound	
TI → Negative posttraumatic cognitions → Trauma symptoms	.63 ($p < .001$) (se = .05)	.32 ($p < .001$) (se = .04)	.31 (se = .04)	.24	.38	Complementary partial mediation
TI → Guilt → Trauma symptoms	.63 ($p < .001$) (se = .05)	.32 ($p < .001$) (se = .04)	.31 (se = .04)	.25	.39	Complementary partial mediation
TI → Self-blame→ Trauma symptoms	.63 ($p < .001$) (se = .05)	.38 ($p < .001$) (se = .04)	.25 (se = .03)	.19	.31	Complementary partial mediation
TI → Maladaptive coping → Trauma symptoms	.63 ($p < .001$) (se = .05)	.28 ($p < .001$) (se = .04)	.35 (se = .04)	.28	.44	Complementary partial mediation

Table 6

Standardized Mediation Analysis Summary

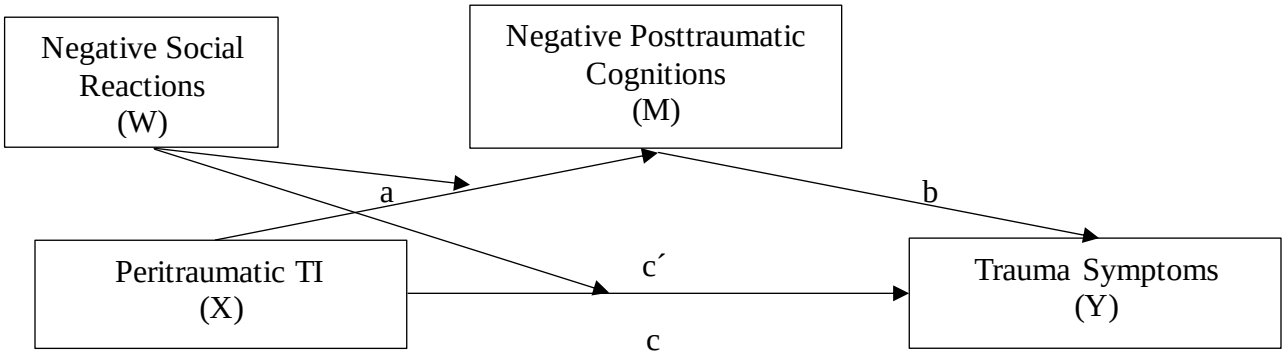
Relationship	Total Effect (*c*)	Direct Effect (*c'*)	Indirect Effect (*ab*)	95% Confidence Interval		Conclusion
				Lower Bound	Upper Bound	
TI → Negative posttraumatic cognitions → Trauma symptoms	.50 ($p < .001$)	.25 ($p < .001$)	.24 (se = .03)	.19	.29	Complementary partial mediation
TI → Guilt → Trauma symptoms	.50 ($p < .001$)	.25 ($p < .001$)	.25 (se = .03)	.20	.30	Complementary partial mediation
TI → Self-blame→ Trauma symptoms	.50 ($p < .001$)	.30 ($p < .001$)	.20 (se = .02)	.15	.24	Complementary partial mediation
TI → Maladaptive coping → Trauma symptoms	.50 ($p < .001$)	.22 ($p < .001$)	.28 (se = .03)	.23	.34	Complementary partial mediation

Moderated Mediation

Hypothesis 5: Negative social reactions will moderate the relationship between TI and negative posttraumatic cognitions and between TI and trauma symptoms via the mediation of negative posttraumatic cognitions (see Figure 5). It is expected that the direct and indirect effects of TI severity on trauma symptomology through negative posttraumatic cognitions will be stronger for participants who received more negative social reactions.

Figure 5

Conceptual Diagram of the Moderated Mediation Model



Note. Proposed moderated mediation model: Negative posttraumatic cognitions as a mediator for the effect of TI during sexual assault on trauma symptom severity, where negative social reactions moderates the indirect and direct relationship. X = independent variable; Y = dependent variable; M = mediator variable; W = moderator variable.

Hypothesis 5 was analyzed using moderated mediation to test whether the mediation mechanism differed in size or strength as a function of a moderator variable (Hayes, 2022). Moderation helps describe how or when the relation between two variables differs across levels of the moderating variable (Hayes, 2022). Moderated mediation is used when there is reason to

suspect conditional indirect effects, whereby values of the indirect effect are conditional on values of a moderator variable (Preacher et al., 2007). A direct effect can also be moderated (Hayes, 2022). The current study proposed that negative social reactions would moderate the direct effect of TI on trauma symptoms and that negative social reactions would also moderate the indirect effect of TI on trauma symptoms through negative posttraumatic cognitions.

To test moderation of a direct and indirect effect, Hayes (2015) recommends a bootstrap confidence interval for the index of moderated mediation, which is implemented by PROCESS model 8. The index of moderated mediation quantifies the degree to which the indirect effect depends on a moderator. A test on this index allows for inference on whether the parameter is different from zero. The PROCESS macro completes seven analyses to test the moderated-mediation model: the direct effect of the independent variable on the mediation variable (a_1, in Figure 6); the direct effect of the mediating variable on the dependent variable (b_1, in Figure 6); the direct effect of the independent variable on the dependent variable (c_1, in Figure 6); the direct effect of the moderator on the mediator (a_2, in Figure 6); the direct effect of the moderator on the dependent variable (c_2, in Figure 6); the interaction between the independent variable and the moderator on the mediator (a_3, in Figure 6); and the interaction between the independent variable and the moderator on the dependent variable (c_3, in Figure 6). Significant conditional effects are supported by the absence of zero within the confidence intervals. Again, the current study used 10,000 bootstrapped samples.

The results of the moderated mediation analysis are displayed in Figures 6-8 and Tables 7-9. Negative posttraumatic cognitions was regressed on TI, negative social reactions, and the interaction between TI and negative social reactions as the a_1-path, a_2-path, and a_3-path, respectively. The overall model summary showed that TI, negative social reactions, and the

interaction term explained approximately 31.6% of the variance in negative posttraumatic cognitions (F[3, 451] = 69.36, $p < .001$, $R^2 = .32$). TI ($B = .68$, $p < .001$) and negative social reactions ($B = 1.39$, $p < .001$) significantly predicted negative posttraumatic cognitions.

Next, trauma symptomology was regressed on TI, negative posttraumatic cognitions, negative social reactions, and the interaction between TI and negative social reactions as the c_1-path, b_1-path, c_2-path, and c_3-path, respectively. The overall model summary for trauma symptoms showed that TI, negative posttraumatic cognitions, negative social reactions, and the interaction term explained approximately 50.5% of the variance in trauma symptoms (F[4, 450] = 114.75, $p < .001$, $R^2 = .51$). In addition, TI ($B = .24$, $p < .001$), negative posttraumatic cognitions ($B = .20$, $p < .001$), and negative social reactions ($B = .49$, $p < .01$) all significantly predicted trauma symptoms.

While the overall models with the outcomes of negative posttraumatic cognitions and trauma symptoms may have been significant, the influence of negative social reactions as a moderating factor was not found to be significant in either model. Results revealed that negative posttraumatic cognitions regressed on the first interaction term between TI and negative social reactions (a_3 path) was not statistically significant ($B = .00$, $p = .743$), suggesting that the direct effect of TI on negative posttraumatic cognitions was not significantly moderated by negative social reactions. A graph visualizing the conditional effect of these variables for the focal predictor of negative posttraumatic cognitions is provided as a line graph in Figure 7.

In addition, trauma symptoms regressed on the second interaction term between TI and negative social reactions (c_3 path) was also not statistically significant ($B = -.00$, $p = .932$), which indicated that the direct effect of TI on trauma symptomology was not significantly moderated by negative social reactions. A graph visualizing the conditional effect of these variables for the

focal predictor of trauma symptoms is provided as a line graph in Figure 8. The test of the index of moderated mediation revealed there was not a significant moderation effect of negative social reactions (W) on the association between TI (X) and trauma symptomology (Y) through negative posttraumatic cognitions (M) due to a bootstrapped confidence interval that, although marginally, included zero (-.004, .005). This means that there was not conclusive data to support moderated mediation.

While the overall model did not support moderated mediation, the general trend of the sample data revealed that the conditional direct effects of TI on negative posttraumatic cognitions varied across levels of negative social reactions (i.e., -1SD, mean, +1SD). The data suggested that increasing severity of TI and negative social reactions were associated with higher negative posttraumatic cognitions (see Figure 7). Individuals who experienced more severe TI and received more negative social reactions appeared to have higher levels of negative posttraumatic cognitions, however, the moderation effect was not statistically significant.

Similarly, as displayed in Table 8, the conditional direct effects of TI on trauma symptoms varied across levels of negative social reactions (i.e., -1SD, mean, +1SD). All three conditional direct effects were positive and significant ($p < .001$), suggesting that individuals who experienced increasingly severe TI and received more negative social reactions demonstrated higher levels of trauma symptomology (see Figure 8).

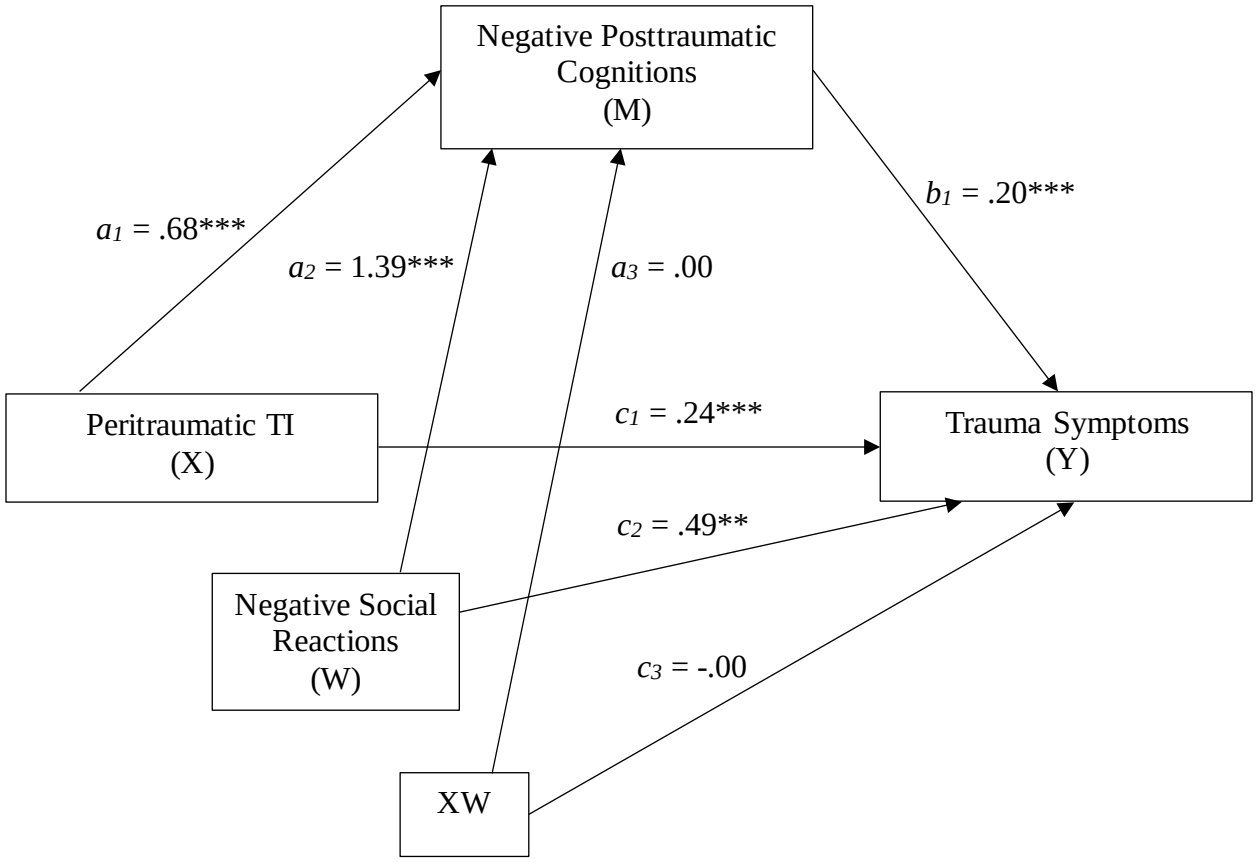
Furthermore, as displayed in Table 9, the conditional indirect effects of TI (X) on trauma symptoms (Y) through negative posttraumatic cognitions (M) in the presence of the moderator (W) (i.e., negative social reactions) at mean level was .14 and had a bootstrapped confidence interval that did not include zero (.08, .21). The conditional indirect effects showed that the indirect effect was highest at high negative social reactions (.15), reduced at average negative

social reactions (.14), and further reduced at lower negative social reactions (.13). All three conditional indirect effects were positive and significant as zero did not fall between the lower and upper bounds of the confidence intervals. However, because the index of moderated mediation was not statistically significant, data and conclusions should be interpreted with caution and suggest that the indirect effect is not significantly moderated by negative social reactions.

Taken together, these results mean that although the moderator was unable to produce a statistically significant moderating impact on the direct and indirect effects, as determined by interaction effects and the index of moderated mediation that were not statistically significant ($p > .05$), the variable of negative social reactions itself was individually significant in explaining the outcome variables of negative posttraumatic cognitions and trauma symptoms. That is, there were significant main effects and not significant moderation effects. Overall, the associations between TI and negative posttraumatic cognitions and TI and trauma symptoms were not conditional upon negative social reactions.

Figure 6

Statistical Diagram of the Unstandardized Path Coefficients for the Moderated Mediation Model



Note. (n = 455) Path a_1 = association between X and M; Path a_2 = association between W and M; Path a_3 = association between the interaction of X and W on M; Path b_1 = association between M and Y; Path c_1 = association between X and Y; Path c_2 = association between W and Y; Path c_3 = association between the interaction of X and W on Y.

**$p < .01$. ***$p < .001$

Figure 7

Conditional Effect of Negative Social Reactions on the Relationship Between Tonic Immobility and Negative Posttraumatic Cognitions

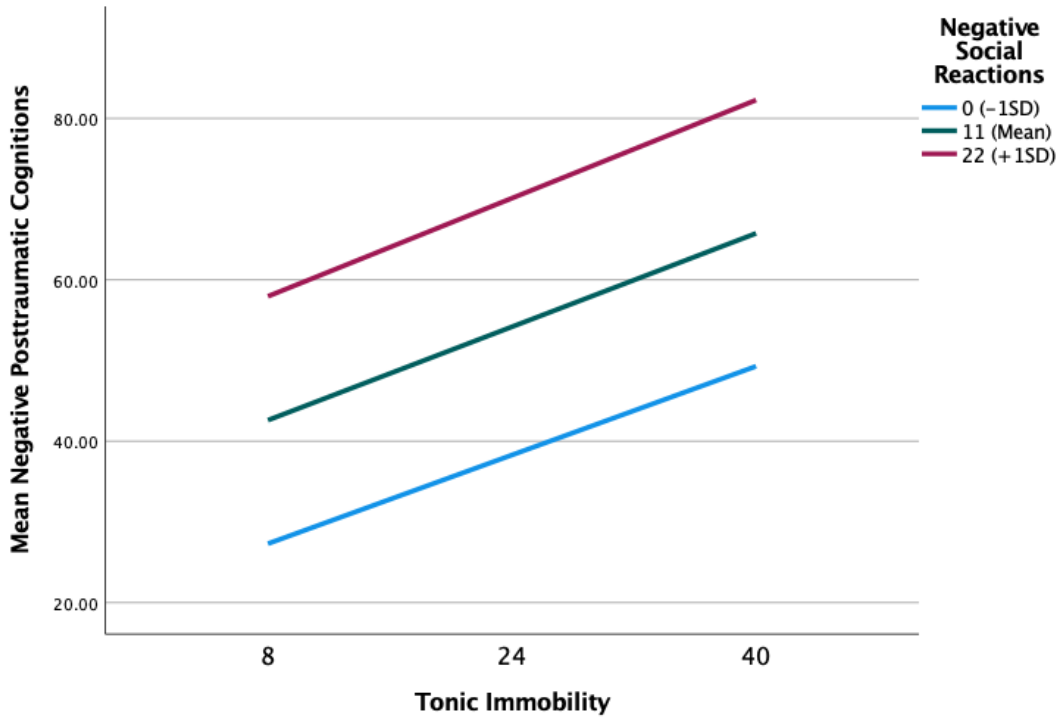


Figure 8

Conditional Effect of Negative Social Reactions on the Relationship Between Tonic Immobility and Trauma Symptoms

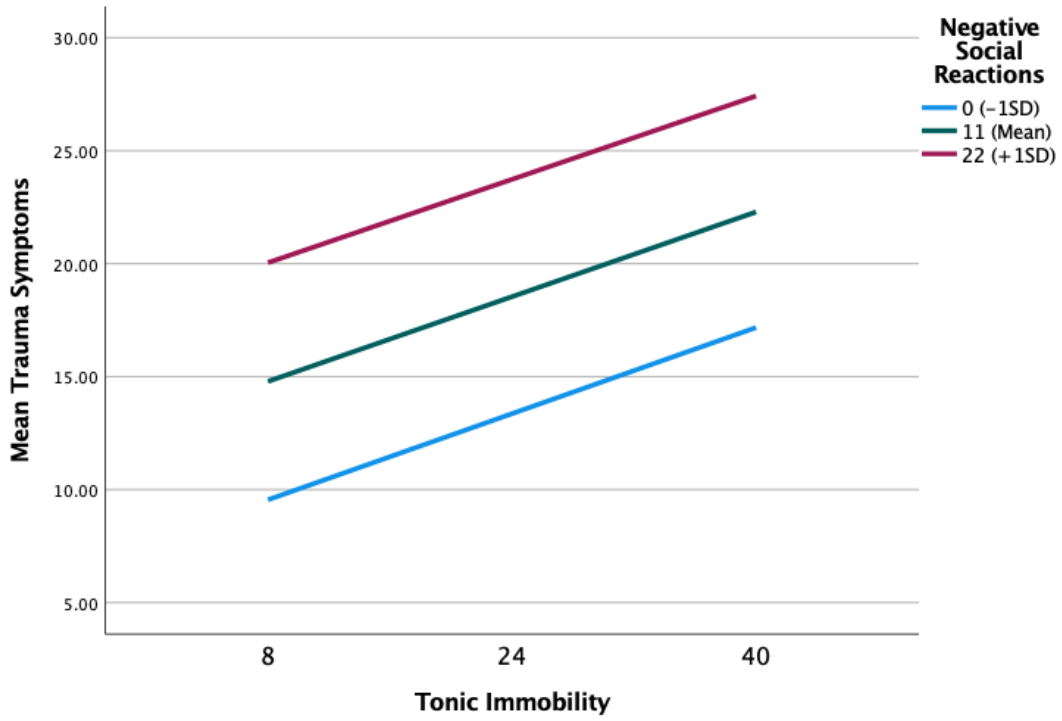


Table 7

Summary of Direct Effects of the Moderated Mediation Model

Direct Effects	Unstandardized Coefficient	Standard Error	T value (*p* value)	95% Confidence Interval	
				Lower Bound	Upper Bound
TI → Negative posttraumatic cognitions	.68	.12	4.38 (*p* < .001)	.38	.98
Negative posttraumatic cognitions → Trauma symptoms	.20	.02	10.48 (*p* < .001)	.16	.24
TI → Trauma symptoms	.24	.06	3.71 (*p* < .001)	.11	.36
Negative social reactions → Negative posttraumatic cognitions	1.39	.37	3.78 (*p* < .001)	.67	2.11
Negative social reactions → Trauma Symptoms	.49	.15	3.26 (*p* < .01)	.19	.78
TI * Negative social reactions → Negative posttraumatic cognitions	.00	.01	.33 (*p* = .743)	-.02	.02
TI * Negative social reactions → Trauma symptoms	-.00	.00	-.09 (*p* = .932)	-.01	.01

Table 8

Conditional Direct Effects Analysis Summary

Conditional Direct Effects of X on Y	Effect	Standard Error	T value (*p* value)	95% Confidence Interval	
				Lower Bound	Upper Bound
Low Level of Negative Social Reactions (-1 SD)	.24	.06	3.71 ($p < .001$)	.11	.36
Mean Level of Negative Social Reactions	.23	.05	4.66 ($p < .001$)	.13	.33
High Level of Negative Social Reactions (+1 SD)	.23	.07	3.29 ($p < .001$)	.09	.36

Table 9

Conditional Indirect Effects Analysis Summary

Conditional Indirect Effects of X on Y	Effect	Standard Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low Level of Negative Social Reactions (-1 SD)	.13	.04	.07	.21
Mean Level of Negative Social Reactions	.14	.03	.08	.21
High Level of Negative Social Reactions (+1 SD)	.15	.04	.07	.24
Index of Moderated Mediation	.001	.00	-.004	.005

Discussion

Peritraumatic TI and its effects on psychosocial functioning is still in its infancy in the trauma literature and merits further study. Preliminary work has indicated that TI during sexual assault is predictive of poorer prognoses among those who experience it compared to those who do not. The current study sought to investigate a broad range of posttraumatic outcomes among survivors of sexual assault by considering the specific impact TI had on posttraumatic symptomology, functioning, and adjustment, including posttraumatic cognitions, guilt, self-blame, quality of social reactions and social support, and coping strategies. Additionally, there have been repeated requests for more studies to investigate the possible mechanisms through which TI influences trauma symptomology. The current study tested a theoretical model that assessed whether negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping strategies were mechanisms through which experiencing TI might increase the severity of trauma symptomology following sexual assault. Moreover, the current study examined whether negative social reactions moderated the strength of the direct and indirect relationship of TI and trauma symptomology through negative posttraumatic cognitions.

In support of hypotheses one through three, the current study found that TI was significantly associated with and a stable predictor of negative posttraumatic cognitions, self-blame, guilt, trauma-related guilt cognitions, negative social reactions, lower perceived social support, maladaptive coping, and trauma symptomology after controlling for sexual assault severity, revictimization, and time elapsed since most recent sexual assault experience. These results corroborate past research that found a significant association between TI and the development of PTSD (Abrams et al., 2009; Bovin et al., 2008; Bovin et al., 2014; Hagenaars, 2016; Hagenaars & Hagenaars, 2020; Heidt et al., 2005; Humphreys et al., 2010; Kalaf et al.,

2015; Lima et al., 2010; Magalhaes et al., 2021; Maia et al., 2014; Möller et al., 2017; Portugal et al., 2012; Rizvi et al., 2008; Rocha-Rego et al., 2009; Van Buren & Weierich, 2015). The results of the current study also add new insights to the posttraumatic outcomes and experiences among survivors who experience peritraumatic TI. Namely, as TI severity increased, negative posttraumatic cognitions, self-blame, global guilt, guilt cognitions, negative social reactions, maladaptive coping, and trauma symptomology all increased significantly even when controlling for the confounding variables. A significant inverse relationship was found between TI and perceived social support, such that as TI severity increased perceived social support decreased. The current study was the first of its kind to comprehensively assess how the presence and severity of TI among sexual assault survivors relates to additional posttraumatic outcomes beyond PTSD diagnostic criteria.

The fourth hypothesis that TI would be associated with increased negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping, which in turn would be associated with higher levels of trauma symptomology, was supported. The relation between TI and trauma symptomology was partially mediated by negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping. Partial mediation between TI and trauma symptom severity suggests that the development of trauma symptoms can occur independent of negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping. However, it also suggests that in certain cases, these outcomes are contingent upon the experience of negative posttraumatic cognitions, guilt, self-blame, and maladaptive coping. The finding that guilt partially mediated the relation between TI and PTSD symptom severity is consistent with past research, however, the current study used a more robust measure of guilt to capture the cognitive and affective nature of guilt (Bovin et al., 2014). The current study revealed additional significant mediating factors that help

explain the relationship between TI and trauma symptomology. The results from mediation analysis may aid in refining treatment selection and be used to enhance, modify, or develop treatment procedures for individuals who have experienced TI during sexual assault. Early interventions that address negative cognitions, feelings of guilt and self-blame, and maladaptive coping strategies could reduce the severity of trauma symptomology among this population.

The fifth hypothesis that negative social reactions would moderate the direct and indirect relationship between TI and trauma symptomology was not supported. However, the current study found that TI was strongly associated with negative social reactions and negative social reactions were shown to be a significant predictor of negative posttraumatic cognitions and trauma symptomology. Prior research has shown that negative social reactions contribute to adverse psychological outcomes, including increased self-blame and PTSD, among survivors of sexual assault (Orchowski & Gidycz, 2015; Ullman, 1996a; Ullman, 1996b; Ullman et al., 2007; Ullman & Peter-Hagene, 2014). The results of the current study suggest that TI is an important predictor of negative social reactions and posttraumatic outcomes among survivors of sexual assault. TI, however, has been an overlooked assault characteristic in past research and results from the current study support its inclusion in future studies. Why negative social reactions did not significantly moderate the relationship between TI and trauma symptomology remains unclear. One possible explanation is that negative social reactions may be better conceptualized as a mediator rather than a moderator in explaining the TI-PTSD association. In addition, it is uncertain whether survivors disclosed TI when they received negative social reactions. Feelings of guilt, self-blame, and shame may have prohibited survivors from disclosing to others the detail of having frozen during sexual assault. Therefore, the relationships between TI, disclosure, social reactions, and trauma symptomology require further investigation.

Implications

There are four important implications from this research study. First, the research contributes to the body of knowledge on trauma response theories, particularly as it applies to the theoretical frameworks described in this paper. Most importantly, TI during sexual assault is an important peritraumatic response that has been shown to significantly alter cognition, affect, behavior, and social-relational functioning. TI was associated with negative posttraumatic cognitions, trauma-related guilt cognitions, global feelings of guilt, self-blame, negative social reactions, lower perceived social support, maladaptive coping, and trauma symptomology. Helping professionals, advocates, attorneys, investigators, law enforcement, service providers, policymakers, and laypeople who interact with survivors in any capacity, along with survivors themselves, will benefit from increased knowledge and awareness of the continued impact that TI has in the lives of those who have experienced it.

Second, the findings could assist in the selection and development of effective clinical therapeutic interventions designed specifically to address the adverse sequelae and psychosocial outcomes associated with sexual violence involving TI. To date, there has only been one qualitative case study exploring the therapeutic interventions used by a counseling professional working with a survivor of sexual assault who experienced TI (Stirling & Andrews, 2021). The results of the current study suggest that TI activates maladaptive emotions, cognitions, behaviors, and social reactions from others that also contribute to the association between TI and trauma symptomology. These results highlight the importance of mental health professionals specifically assessing for the presence of TI when working with survivors of sexual assault. Survivors may not voluntarily disclose what feels like a shameful behavioral response but what may be uniquely contributing to their distress and negative posttraumatic outcomes. Normalizing and validating

that TI is a common biological response during heightened fear and threat to bodily integrity may be essential to reduce feelings of shame, guilt, and self-blame, which, in turn, may allow helping professionals to guide survivors more effectively and comprehensively towards a path of recovery and healing.

The results of the current study highlight the importance of educating individuals who have experienced TI about the involuntary nature of TI and that they are not to blame for their body's hardwired biological protective response. Informing survivors that they did not choose how their bodies responded and that many others experience a similar response is critical. As Bovin and colleagues (2014) suggested, "…if clinicians can help their patients understand that the nature of TI dictates that they cannot fight back (vs. choosing not to fight back), it may help these patients reduce self-blaming cognitions and PTSD symptoms" (p. 723). The use of psychoeducation, alongside a therapeutic stance of validating and normalizing the many ways in which people respond to trauma, has been shown to help survivors feel a sense of normalcy in their lives and begin the recovery process (Briere & Scott, 2014; Herman, 1997).

Because of individual differences in response, the results of current or past research should not be assumed to apply to everyone who experiences TI. For example, TeBockhorst (2012) found that some survivors believed their recoveries from sexual assault were made easier because of TI and their awareness that their bodies were not under volitional control at the time of the assault. These survivors reported experiencing less shame and guilt about having been assaulted. The majority of survivors were exactly the opposite and reported markedly greater feelings of shame and guilt as a result of having experienced TI during sexual assault. These survivors blamed themselves for not having been able to escape or do more to prevent the assault (TeBockhorst, 2012). Overall, for those trying to facilitate the recovery of sexual assault

survivors, routine assessment of TI and associated emotions, thoughts, beliefs, coping, and behaviors, appears vital.

In light of the current study's findings, additional treatment considerations include the use of cognitive restructuring to address survivors' cognitions and beliefs about the cause of the sexual trauma. Cognitive Processing Therapy (CPT) is a well-established evidence-based clinical treatment for PTSD and focuses on challenging maladaptive or self-blaming thoughts that may be exacerbating trauma symptoms (Resick et al., 2016). In consideration of TI, thoughts or beliefs related to self may be particularly important to target, for example, "I didn't do enough to prevent the trauma," "I should've done more to fight back," "I can't trust my body," "I'm inadequate," "I can't stop bad things from happening to me," or "I'm to blame." There may be benefit in exploring the adaptive nature of TI among those who have experienced it. Past research has shown that survivors of sexual assault who are verbally and physically immobile during victimization have been shown to be less likely to be seriously injured and have force used against them (de Heer & Jones, 2017). Thoughts and beliefs related to others, such as, "People can't be trusted," or "I feel isolated and set apart from others," and the world, such as, "The world is unsafe," may also be important cognitions to target. Clinicians might consider using the Posttraumatic Cognitions Inventory (PTCI; Foa et al., 1999) to help identify negative posttraumatic cognitions related to a specified traumatic event.

Final treatment considerations include self-compassion and values-based behavioral activation. Self-compassion emphasizes kindness towards one's self, a feeling of connectedness with others, and mindful awareness of distressing experiences (Neff, 2003a; Neff, 2003b). Self-compassion has been shown to be associated with psychological resilience, adaptive coping, and reduced shame and self-blame among survivors of sexual trauma, which have resulted in

decreased symptoms of PTSD and depression among this population (Bhuptani & Messman, 2022; Close, 2015; Hamrick & Owens, 2019; Strickland et al., 2022; Thompson & Waltz, 2008). Additional research has shown that sexual assault survivors report significantly lower levels of self-compassion compared to survivors of non-sexual traumas (Williamson, 2019). Improving self-compassion through fostering self-kindness, mindfulness, and decreased isolation may be a useful approach to reduce the shame, blame, guilt, and lower perceived social support among survivors of sexual assault whose experience involved TI. According to Bhuptani and Messman (2022), "Self-compassion promotes kindness and understanding toward oneself and encourages a more holistic view of where the blame for negative events truly lie. Further, self-compassion fosters a nonjudgmental awareness of negative emotions" (p. 14). These skills may help counteract the distressing emotions, cognitions, negative social reactions, and lower perceived social support associated with TI, thereby reducing trauma symptomology and strengthening post-trauma adjustment and functioning. This possibility awaits empirical testing.

Finally, values-based action, or committed action, is one treatment component of Acceptance and Commitment Therapy (ACT) in which individuals are encouraged to clarify their values and engage in values-consistent activities (Luoma et al., 2017). Such an approach is thought to help break the cycle of avoidance, inactivity, and social withdrawal that may be maintaining adverse symptoms. Given the findings of the current study, survivors of sexual assault involving TI may benefit from a holistic approach to behavioral activation in which values function to strengthen intrinsic motivation and sustain engagement in self-care activities, adaptive coping behaviors, supportive social connection, and community-building opportunities. Past research has shown that survivors of sexual assault involving TI live in a state of fear that their bodies could experience TI again at any moment (TeBockhorst et al., 2015). "Provoked by

sexual contact, and sometimes by situations involving fear, anger, feeling out of control, or being disregarded, the shadow of TI moves over these women and threatens immobility…It feels like a warning that they may not be safe and/or that their bodies could freeze up" (TeBockhorst et al., 2015, p. 174). The immediate and chronic distress of having experienced TI during sexual assault appears to impact both individual and interpersonal functioning and behavior, making coping, vulnerability, and emotional engagement with others difficult. Clinicians and advocates working to facilitate healing for survivors are uniquely positioned to adopt a survivor-centered and empowering practice, which ultimately involves helping survivors have more power over their own lives. Empowerment in tandem with committed action is likely to provide survivors the confidence they need to forge and strengthen supportive social connections with others, as well as foster acceptance of self and acknowledgment of personal strengths. Brown (2017) said it best when she wrote:

> True belonging is the spiritual practice of believing in and belonging to yourself so deeply that you can share your most authentic self with the world and find sacredness in both being a part of something and standing alone in the wilderness. True belonging doesn't require you to change who you are; it requires you to be who you are. (p. 40)

Graduated values-based committed action may help bolster survivors' feelings of self-efficacy over time and allow them to eventually engage more positively and meaningfully in relationship with themselves and supportive others.

A third implication of the current study is its contribution to helping people understand the need for affirmative consent to be codified into both legal and institutional statute and policy. The sociocultural expectation that a victim of assault must or should attempt to flee or actively fight back against a perpetrator to indicate lack of consent continues to be a strongly endorsed

rape myth (Black & Gold, 2008; Bongiorno et al., 2016; Ellison & Munro, 2009a; Ellison & Munro, 2009b; Ellison & Munro, 2010; McKimmie et al., 2014). Historically, criminal law in most state jurisdictions required the perpetrator's use of force and the victim's demonstration of resistance or unwillingness to engage in sexual conduct when defining rape (Tuerkheimer, 2015). State laws and institutional policies that dismissed the occurrence of sexual assault because the victim did not resist failed to hold sexual offenders accountable, affecting a significant proportion of survivors, and also overlooking a normal, expected biological reaction to a feared and overwhelming threat to bodily safety and integrity. The belief that rape did not occur unless a survivor physically or verbally resisted is dangerous and damaging to survivors who may blame themselves for their inability to control their body's responses to trauma and intense fear, or for acquiescing and doing what they felt they had to do in order to survive an assault. Such a belief could also influence the attitudes and verdicts of individuals who may encounter survivors, such as family members and friends, investigators, law enforcement, medical personnel, juries, and advocates. A survivor who is asked why they did not fight back receives the message that they are responsible for what happened to them. This victim-blaming, by self or others, perpetuates a culture in which survivors are discouraged from coming forward and receiving the help they may desperately need.

Because resistance standards set unrealistic expectations on survivors of rape and sexual assault, many states expunged resistance standards from their legal statutes and have moved toward defining consent more clearly and accurately. First implemented on many college campuses, more states are now in consideration of legislation that revises existing rape statutes by no longer requiring that the perpetrator used force against the victim, or that the victim actively resisted or verbalized "no" in response to unwanted sexual activity. Many campuses and

a small minority of states have adopted an affirmative consent standard, a concept also known as "yes means yes" consent. Affirmative consent is a knowing, voluntary, and mutual decision among all participants engaged in sexual activity. Words or actions that clearly give permission to willingly engage in the sexual activity demonstrates affirmative consent. Silence, lack of protest, and lack of resistance does not demonstrate that a person has consented to a sexual act or behavior (Tuerkheimer, 2015). The movement away from consent that can be implied or inferred to a more affirmational model, where yes means yes, is a form of cultural and legal rape reform that removes the ambiguity around the issue of consent, places onus on all parties engaged in sexual behavior, and more accurately reflects our growing awareness of trauma-related responses that may leave a person physically paralyzed during an unwanted sexual advance or attack.

Finally, research from the current study contributes to improving the quality of life of survivors who have struggled with a lack of understanding of TI as part of their victimization. Most people remain dangerously in the dark about the pervasiveness of TI and its powerful effects on survivors of trauma. Increasing our cultural awareness and collective consciousness about TI could prepare and protect people from unnecessary confusion, blame, isolation, and undue harm. Creators and collaborators of educational trainings about sexual assault, such as bystander intervention trainings provided for students and organizational employees or other policy or advocacy initiatives designed to promote positive organizational cultural change, should strongly consider incorporating information about TI and affirmative consent, as well as practical tips about how to positively respond and support survivors in the aftermath of sexual assault. Clinical, counseling, social work, nursing, medical, and law enforcement training programs would likely benefit from increased trauma-informed training and education so that service providers and personnel are well-equipped to respond appropriately and supportively to

survivors who may have experienced TI. Additionally, further research exploring TI is critical. Increased advocacy and awareness efforts surrounding TI, including its physiologic nature and the ways it impacts survivors during and after traumatic events, could create an environment in which survivors' experiences are more widely recognized, acknowledged, and validated.

Limitations and Future Directions

One of the limitations of the current research lies in the retrospective nature of peritraumatic reports. The results may be negatively influenced by participants' recall abilities. In addition, this study's quantitative results relied on cross-sectional, self-report data, making it impossible to establish causality. Another limitation was the study's lack of generalizability to other types of trauma and populations. The recruited sample of the current study consisted of college students who experienced sexual assault. Future studies may extend this work by examining the study questions in a community sample with increased diversity in demographics and across trauma types.

Future work examining TI among survivors of sexual assault may benefit from a longitudinal design that assesses possible interactions among the variables in the current study. It may be possible that the posttraumatic variables in the current study serve as equivalent mediators, which could be assessed using parallel mediation. It may also be possible that the posttraumatic variables form sequential or serial chains, which could be analyzed using time-series methods, such as serial mediation and eventually path analysis. For example, TI could increase feelings of guilt, increased feelings of guilt could influence maladaptive coping, and maladaptive coping could predict trauma symptomology. Though a complete causal chain is unlikely, it is plausible that some of the variables in the current study connect in this way. Serial mediation or path analysis will be important next steps to explore in future studies since

posttraumatic outcomes after TI may be explained by an underlying causal chain. Because psychological processes are inherently influenced by time, the use of time-series techniques would potentially allow for a more complete understanding of the sequential order of posttraumatic outcomes after TI. This line of study could then be used to implement targeted interventions more effectively.

Lastly, research focused on how to help alleviate the lingering impact and distress of TI on survivors would be immensely valuable. Very little is known about which interventions or techniques may be most effective in treating survivors who have experienced TI. Clinical intervention studies might benefit from the inclusion of measures of TI to analyze whether the short and long-term treatment effects of evidence-based trauma treatments differ between individuals based on TI severity. Current trauma treatments may be effective in helping survivors of sexual assault regardless of the presence and severity of TI, however, distinguishing whether current approaches are indeed useful and effective for survivors haunted by TI is an important step for future research.

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Appendix A

Informed Consent for Safe Campus Survey

Thank you for agreeing to participate in this survey! There are four sections contained within the survey:
(1) Tell us about you
(2) Tell us what you know
(3) Tell us what you believe and feel
(4) Tell us your experiences

Who is invited to complete this survey? The survey can be completed by University of Montana students who attend classes at UM- Mountain Campus, Missoula College, and Bitterroot College, either full or part time in the current academic year (2021) and are at least 18 years of age or older. During the questionnaire, we may ask about your experiences on either campus; however, both will be referred to collectively as UM. Please note: this refers to either campus. To ensure the results accurately represent all students at UM, it is important that the survey be completed by ONLY YOU! The survey is completely voluntary and anonymous. If you took this survey previously, you can still take it this year!

How do I complete this survey? The survey can be found on the Moodle home page. The survey will only be available on Moodle until the end of semester in Fall 2021. Generally, you will be asked questions about your experiences on campus and about your beliefs and knowledge of relationship violence issues. The survey contains two types of questions: questions that require you to check a box associated with the response that best describes your experience; and questions where you are asked to type your answers in a text presented beneath the question. For the questions that ask you to type your answers, please be sure to give as complete a response as you can. Please answer as honestly and openly as you can. Remember that this survey is completely anonymous.

How long does it take to complete the survey? Answering the survey should take approximately twenty-five to forty-five (25-45) minutes to complete all the questions. However, the total completion time will vary depending on your individual experiences. Please take your time and answer the questions. To assist us in fully understanding your experiences, feelings, and ideas, we ask that you try and complete as much as much of the survey as you can without skipping sections. Although, please keep in mind that completion of the questionnaires is completely voluntary, and you may discontinue the survey at any time.

What will happen with your survey responses? Your questionnaire responses and the information that you share will be kept confidential. Neither your name nor any other piece of information that might identify you will accompany your survey responses.

Are there any risks associated with taking this survey? We believe that the likely risks of completing this survey are minimal. However, because we are asking about sexual experiences some of the questions may make you uncomfortable or be distressing to you. If you become distressed or desire assistance during or after taking the survey, you should contact either or both

the following numbers:
Counseling Services.....406-243-4711
Student Advocacy Resource Center.....406-243-6559

Please also note that you may exit out of the survey at any time. There will be an option at the end of every page that allows you to discontinue the survey.

Are there any benefits for me in completing this survey? There are no direct benefits anticipated for you from answering questions on this survey. However, this survey will provide the campus with needed information about knowledge, attitudes, program use and satisfaction information, and experiences of our students. This can be very helpful to the campus community, and may help with the development of effective programs, and in creating positive change around sexual and interpersonal violence. The summary findings will also be made available to the Department of Justice and Office of Civil Rights and may help other schools learn from us as well. There are also two potential ways in which you may be compensated for your time. First, students who complete this survey have the opportunity to enter a drawing to win one of two $500 Amazon gift cards, one of three $100 Amazon gift cards, one of two $50 Amazon gift cards, or one of twenty $5 campus coffee cards. If you are interested in being entered into the drawing, please follow the link at the end of this survey. This link will take you to a separate page where you can enter your contact information. Your contact information will in no way be connected to your responses. Second, some faculty members are offering extra credit/research credit to students who complete the survey. Please check with your professor in order to see if this is a possibility in your class. To receive credit, please follow the instructions at the end of the survey. At the end, there will be an option to print off a confirmation of your participation. This confirmation page will in no way be connected to your responses.

To request more information about this questionnaire or the study, please email Christine Fiore at christine.fiore@umontana.edu.

Clicking below and continuing this survey indicates that I have read the description of the study and I agree to participate in this study. I certify that I am 18 years of age or older.

○ I agree

○ I disagree

(If "yes" to a past experience of unwanted sexual contact and/or attempted or completed sexual intercourse without consent)

You qualify to answer a few additional questions. This will take approximately 10-15 minutes of your time and your responses will be kept confidential.

The following questions pertain to some reactions that you may have had during a past experience of unwanted sexual contact. Some questions also ask about how your experiences have impacted your emotional and psychological well-being.

Please take your time and answer the questions. To assist us in fully understanding your experiences and feelings, we ask that you try and complete as much as much of the survey as you can without skipping sections. Although, please keep in mind that completion of the questionnaires is completely voluntary, and you may discontinue the survey at any time.

Please note that you may exit out of the survey at any time. There will be an option at the end of every page that allows you to discontinue the survey.

While there are no anticipated risks in completing these questions, if you become distressed or desire assistance during or after completing the questions, you should contact either or both of the following numbers:

Counseling Services.....406-243-4711
Student Advocacy Resource Center.....406-243-6559

Appendix B

Demographic Questionnaire

Please read the following questions and answer in a manner that best describes you.

1. How many semesters have you attended UM? _____

2. Which campus is your primary registration?
    a. UM Main
    b. Missoula College
    c. Bitterroot

3. What is your current class standing?
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Graduate (Master Degree)
    f. Graduate (Ph.D.)
    g. Graduate (EdD)
    h. UM Law Student
    i. I am not a student

4. How would you describe your gender identity? (Cisgender means that you self-identify with the gender that corresponds with your sex assigned at birth)
    a. Cisgender Man
    b. Cisgender Woman
    c. Transgender Woman
    d. Transgender Man
    e. Non-binary
    f. Gender Fluid
    g. Gender Neutral/Agender
    h. Gender Queer
    i. Gender Non-conforming/Gender Variant
    j. Two-Spirit
    k. Questioning
    l. Other _____

5. How would you describe your sexual orientation?
    a. Straight/Heterosexual
    b. Lesbian
    c. Gay
    d. Bisexual
    e. Pansexual
    f. Queer

g. Asexual
h. Aromantic
i. Skiliosexual
j. Questioning
k. Other _____

6. How old are you? _____

7. How would you describe your racial/ethnic background?
    a. White/non-Hispanic
    b. Black/African-American
    c. Hispanic/Latino
    d. Asian or Pacific Islander
    e. American Indian/Native American/Indigenous/First Nation
    f. Biracial (Please describe in the blank)

    _____
    g. Multiracial (Please describe in the blank)

    _____
    h. Other _____

Appendix C

Abbreviated Sexual Experiences Survey

The following questions concern sexual experiences you may have had while attending UM. Please indicate whether you have experienced any of the following incidents.

1. Has anyone ever made unwelcome sexual advances toward you or unwelcome requests for sexual favors from you?
    a. Yes, in the past year since I've been at UM
    b. Yes, since I've been at UM but not within the past year
    c. Yes, in my lifetime (not at UM)
    d. No

2. Has anyone ever made sexual contact with you (sexual contact meaning kissing, touching, grabbing, fondling of the breasts, buttocks, or genitals) without your consent? Check all that apply.
    a. Yes, in the past year since I've been at UM
    b. Yes, since I've been at UM but not within the past year
    c. Yes, in my lifetime (not at UM)
    d. No

3. Has anyone ever attempted to have sexual intercourse with you (sexual intercourse meaning oral, anal, or vaginal penetration with the penis) without your consent, but penetration did not occur? Check all that apply.
    a. Yes, in the past year since I've been at UM
    b. Yes, since I've been at UM but not within the past year
    c. Yes, in my lifetime (not at UM)
    d. No

4. Has anyone ever had sexual intercourse with you without your consent, and penetration did occur? Check all that apply.
    a. Yes, in the past year since I've been at UM
    b. Yes, since I've been at UM but not within the past year
    c. Yes, in my lifetime (not at UM)
    d. No

5. Has anyone ever attempted to have invasive sexual contact with you (invasive sexual contact meaning penetration of the vagina or anus with a tongue, finger, or object) without your consent, but penetration did not occur? Check all that apply.
    a. Yes, in the past year since I've been at UM
    b. Yes, since I've been at UM but not within the past year
    c. Yes, in my lifetime (not at UM)
    d. No

6. Has anyone ever had invasive sexual contact with you (invasive sexual contact meaning penetration of the vagina or anus with a tongue, finger, or object) without your consent, and penetration did occur? Check all that apply.
    a. Yes, in the past year since I've been at UM
    b. Yes, since I've been at UM but not within the past year
    c. Yes, in my lifetime (not at UM)
    d. No

7. Prior to the age of 18, did you have any experiences with sexual abuse or physical abuse? Child sexual abuse includes any sexual activity with a minor which may include someone having performed any of these behaviors: exposed themselves to you; fondled you; had intercourse (vaginal, oral, or anal) with you; masturbated in the presence of you; forced you to masturbate; made obscene phone calls or text messages; produced/owned/shared pornographic images or movies of children. Physical abuse is defined as a parent, stepparent, or guardian (such as a teacher, sibling, grandparent, etc.) ever throwing something at you that could hurt; push, grab, or shove you; pull your hair; slap or hit you; kick or bite you; strangle or attempt to drown you; hit you with an object; beat you up; threaten you with (or using on you) a gun, a knife, or another object.
    a. Yes, physical abuse only
    b. Yes, sexual abuse only
    c. Yes, both physical and sexual abuse
    d. No

You answered "yes" to one or more of the following items: 1) unwanted sexual contact; 2) sexual intercourse with your consent, but penetration did not occur; 3) sexual intercourse without your consent, and penetration did occur; 4) attempted invasive sexual contact without your consent, but penetration did not occur; and 5) invasive sexual contact without your consent, and penetration did occur.

8. How many times have you experienced any of the above items in your life?
    a. 1 time
    b. 2 times
    c. 3 times
    d. 4 times
    e. 5 times
    f. 6 times
    g. 7 times
    h. 8 times
    i. 9 times
    j. 10+ times

9. How long has it been since your most recent experience of any of the above items?
    a. 0-1 month
    b. 2-3 months
    c. 4-6 months
    d. 7-9 months

e. 10-12 months
f. 1-2 years
g. 3-4 years
h. 5+ years

10. Have you told anyone about the incident?
    a. Yes
    b. No

Appendix D

Tonic Immobility Scale – Adult Form

The following questions pertain to some reactions that you may have had during a past unwanted sexual experience that occurred without your consent. Please answer the following questions by indicating the number that corresponds to the most accurate response about your reactions during an unwanted sexual experience that occurred without your consent.

1. Please rate the degree to which you froze or felt paralyzed during a past experience of unwanted sexual contact.

   0 1 2 3 4 5 6

   not at all frozen or paralyzed ... completely frozen or paralyzed

2. Rate the degree to which you were unable to move even though not restrained during the event.

   0 1 2 3 4 5 6

   could move freely ... could not move at all

3. Rate the degree to which your body was trembling/shaking during the event.

   0 1 2 3 4 5 6

   no shaking at all ... shaking a lot

4. Rate the degree to which you were unable to call out or scream during the event.

   0 1 2 3 4 5 6

   felt able to scream ... could not scream at all

5. Rate the degree to which you felt numb or no pain during the event.

   0 1 2 3 4 5 6

   could not feel any pain ... could feel a lot of pain

6. Rate the degree to which you felt cold during the event.

   0 1 2 3 4 5 6

   did not feel cold at all ... felt extremely cold

7. Rate the extent to which you felt feelings of fear/panic during the event.

   0 1 2 3 4 5 6

   absolute calm ... extreme fear/panic

8. Rate the extent to which you feared for your life or felt as though you were going to die.

0	1	2	3	4	5	6
absolutely no fear for my life						extreme fear for my life

9. Rate the extent to which you felt detached from yourself during the event (e.g., mentally removed from your body).

0	1	2	3	4	5	6
no sense of detachment from self						extreme detachment from self

10. Rate the extent to which you felt detached from what was going on around you during the event.

0	1	2	3	4	5	6
no sense of detachment from my surroundings						extreme detachment from surroundings

Appendix E

Posttraumatic Cognitions Inventory

The following questions ask you about the kind of thoughts you may have had after an unwanted sexual experience that occurred without your consent. Below are a number of statements that may or may not be representative of your thinking. Please read each statement carefully and indicate how much you agree or disagree with each statement. There are no right or wrong answers to these statements.

1. The event happened because of the way I acted.
    0) Totally disagree
    1) Disagree very much
    2) Disagree slightly
    3) Neutral
    4) Agree slightly
    5) Agree very much
    6) Totally agree
2. I can't trust that I will do the right thing.
3. I am a weak person.
4. I will not be able to control my anger and will do something terrible.
5. I can't deal with even the slightest upset.
6. I used to be a happy person but now I am always miserable.
7. People can't be trusted.
8. I have to be on guard all the time.
9. I feel dead inside.
10. You can never know who will harm you.
11. I have to be especially careful because you never know what can happen next.
12. I am inadequate.
13. I will not be able to control my emotions, and something terrible will happen.
14. If I think about the event, I will not be able to handle it.
15. The event happened to me because of the sort of person I am.
16. My reactions since the event mean that I am going crazy.
17. I will never feel normal emotions again.
18. The world is a dangerous place.
19. Somebody else would have stopped the event from happening.
20. I have permanently changed for the worse.
21. I feel like an object, not a person.
22. Somebody else would not have gotten into this situation.
23. I can't rely on other people.
24. I feel isolated and set apart from others.
25. I have no future.
26. I can't stop bad things from happening to me.
27. People are not what they seem.
28. My life has been destroyed by the trauma.
29. There is something wrong with me as a person.

30. My reactions since the event show that I am a lousy coper.
31. There is something about me that made the event happen.
32. I will not be able to tolerate my thoughts about the event, and I will fall apart.
33. I feel like I don't know myself anymore.
34. You never know when something terrible will happen.
35. I can't rely on myself
36. Nothing good can happen to me anymore.

Appendix F

Rape Attribution Questionnaire

Below are statements describing thoughts you may have about why an unwanted sexual experience occurred without your consent. Please indicate how often you have had each of the following thoughts in the past month.

In the past month, how often have you thought: I had an unwanted sexual experience occur without my consent because…

1. Society doesn't do enough to prevent sexual violence.
    0) Never
    1) Rarely
    2) Sometimes
    3) Often
    4) Very Often
2. I used poor judgment.
3. I am just the victim type.
4. It was just bad luck.
5. The person thought they could get away with it.
6. The person was taught not to respect others.
7. I should have resisted more.
8. I am a careless person.
9. I was in the wrong place at the wrong time.
10. The person wanted to feel power over someone.
11. The person was socialized to be violent.
12. I should have been more cautious.
13. Things like this happen to people like me.
14. Things like this happen at random.
15. The person was sick.
16. In our society, women are sex objects.
17. I just put myself in a vulnerable situation.
18. I am unlucky.
19. I was a victim of chance.
20. The person was angry.
21. The media encourages violence.
22. I didn't do enough to protect myself.
23. I am too trusting.
24. Bad things like this are just a part of life.
25. The person wanted to hurt someone.

Appendix G

Trauma-Related Guilt Inventory

Individuals who have experienced traumatic events – such as sexual abuse – vary considerably in their response to these events. Some people think about something they did or did not do, about beliefs or thoughts they had, or for having had certain feelings or lack of feelings. The purpose of these questions is to evaluate your response to an unwanted sexual experience that occurred without your consent.

Please take a few moments to think about your unwanted sexual experience(s) and indicate the answer that best describes how you feel about each statement. If you've experienced multiple unwanted sexual experiences, please focus on the single event that you consider to be the **most significant.**

1. I could have prevented what happened.

Extremely true Very true Somewhat true Slightly true Not at all true

2. I am still distressed about what happened.

Always true Frequently true Somewhat true Rarely true Never true

3. I had some feelings that I should not have had.

Extremely true Very true Somewhat true Slightly true Not at all true

4. What I did was completely justified.

Extremely true Very true Somewhat true Slightly true Not at all true

5. I was responsible for causing what happened.

Extremely true Very true Somewhat true Slightly true Not at all true

6. What happened causes me emotional pain.

Always true Frequently true Somewhat true Rarely true Never true

7. I did something that went against my values.

Extremely true Very true Somewhat true Slightly true Not at all true

8. What I did made sense.

Extremely true Very true Somewhat true Slightly true Not at all true

9. I knew better than to do what I did.

Extremely true Very true Somewhat true Slightly true Not at all true

10. I feel sorrow or grief about the outcome.

Always true Frequently true Somewhat true Rarely true Never true

11. What I did was inconsistent with my beliefs.

Extremely true Very true Somewhat true Slightly true Not at all true

12. If I knew today – only what I knew when the event occurred – I would do exactly the same thing.

Extremely true Very true Somewhat true Slightly true Not at all true

13. I experience intense guilt that relates to what happened.

Always true Frequently true Somewhat true Rarely true Never true

14. I should have known better.

Extremely true Very true Somewhat true Slightly true Not at all true

15. I experience severe emotional distress when I think about what happened.

Always true Frequently true Somewhat true Rarely true Never true

16. I had some thoughts or beliefs that I should not have had.

Extremely true Very true Somewhat true Slightly true Not at all true

17. I had good reasons for doing what I did.

Extremely true Very true Somewhat true Slightly true Not at all true

18. Indicate how frequently you experience guilt that relates to what happened.

Never Seldom Occasionally Often Always

19. I blame myself for what happened.

Extremely true Very true Somewhat true Slightly true Not at all true

20. What happened causes a lot of pain and suffering.

Extremely true Very true Somewhat true Slightly true Not at all true

21. I should have had certain feelings that I did not have.

Extremely true Very true Somewhat true Slightly true Not at all true

22. Indicate the intensity or severity of guilt that you typically experience about the event.

None Slight Moderate Considerable Extreme

23. I blame myself for something I did, thought, or felt.

Extremely true Very true Somewhat true Slightly true Not at all true

24. When I am reminded of the event, I have strong physical reactions such as sweating, tense muscles, dry mouth, etc.

Always true Frequently true Somewhat true Rarely true Never true

25. Overall, how guilty do you feel about the event?

Not guilty at all Slightly guilty Moderately guilty Very guilty Extremely guilty

26. I hold myself responsible for what happened.

Extremely true Very true Somewhat true Slightly true Not at all true

27. What I did was not justified in any way.

Extremely true Very true Somewhat true Slightly true Not at all true

28. I violated personal standards of right and wrong.

Extremely true Very true Somewhat true Slightly true Not at all true

29. I did something that I should not have done.

Extremely true Very true Somewhat true Slightly true Not at all true

30. I should have done something that I did not do.

Extremely true Very true Somewhat true Slightly true Not at all true

31. What I did or didn't do was unforgivable.

Extremely true Very true Somewhat true Slightly true Not at all true

32. I didn't do anything wrong.

Extremely true Very true Somewhat true Slightly true Not at all true

Appendix H

Social Reactions Questionnaire – Shortened

The following is a list of reactions that other people sometimes have when responding to a person who has experienced an unwanted sexual experience that occurred without their consent. Please indicate how often you experienced each of the listed responses from other people.

1. Told you that you were irresponsible or not cautious enough.
    0) Never
    1) Rarely
    2) Sometimes
    3) Often
    4) Very Often
2. Reassured you that you are a good person.
3. Treated you differently in some way than before you told them that made you uncomfortable.
4. Told you to go on with your life.
5. Comforted you by telling you it would be all right or by holding you.
6. Tried to take control of what you did/decisions you made.
7. Has been so upset that they needed reassurance from you.
8. Made decisions or did things for you.
9. Told you that you could have done more to prevent this experience from occurring.
10. Provided information and discussed options.
11. Told you to stop thinking about it.
12. Expressed so much anger at the perpetrator that you had to calm them down.
13. Avoided talking to you or spending time with you.
14. Treated you as if you were a child or somehow incompetent.
15. Helped you get information of any kind about coping with the experience.
16. Made you feel like you didn't know how to take care of yourself.

Appendix I

Multidimensional Scale of Perceived Social Support

Please read each statement carefully and indicate how you feel about each statement.

1. There is a special person who is around when I am in need.
    0) Very strongly disagree
    1) Strongly disagree
    2) Mildly disagree
    3) Neutral
    4) Mildly agree
    5) Strongly agree
    6) Very strongly agree
2. There is a special person with whom I can share joys and sorrows.
3. My family really tries to help me.
4. I get the emotional help and support I need from my family.
5. I have a special person who is a real source of comfort to me.
6. My friends really try to help me.
7. I can count on my friends when things go wrong.
8. I can talk about my problems with my family.
9. I have friends with whom I can share my joys and sorrows.
10. There is a special person in my life who cares about my feelings.
11. My family is willing to help me make decisions.
12. I can talk about my problems with my friends.

Appendix J

Brief COPE

The following questions ask how you have sought to cope with a hardship in your life. Read the statements and indicate how much you have been using each coping style to cope with your past unwanted sexual experience that occurred without your consent.

1. I've been turning to work or other activities to take my mind off things.
    0) I haven't been doing this at all
    1) A little bit
    2) A medium amount
    3) I've been doing this a lot
2. I've been concentrating my efforts on doing something about the situation I'm in.
3. I've been saying to myself "this isn't real."
4. I've been using alcohol or other drugs to make myself feel better.
5. I've been getting emotional support from others.
6. I've been giving up trying to deal with it.
7. I've been taking action to try to make the situation better.
8. I've been refusing to believe that it has happened.
9. I've been saying things to let my unpleasant feelings escape.
10. I've been getting help and advice from other people.
11. I've been using alcohol or other drugs to help me get through.
12. I've been trying to see it in a different light, to make it seem more positive.
13. I've been criticizing myself.
14. I've been trying to come up with a strategy about what to do.
15. I've been getting comfort and understanding from someone.
16. I've been giving up the attempt to cope.
17. I've been looking for something good in what is happening.
18. I've been making jokes about it.
19. I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.
20. I've been accepting the reality of the fact that is has happened.
21. I've been expressing my negative feelings.
22. I've been trying to find comfort in my religion or spiritual beliefs.
23. I've been trying to get advice or help from other people about what to do.
24. I've been learning to live with it.
25. I've been thinking hard about what steps to take.
26. I've been blaming myself for things that happened.
27. I've been praying or meditating.
28. I've been making fun of the situation.

Appendix K

Posttraumatic Symptom Disorder Checklist for DSM-5

Instructions: Below is a list of problems that people sometimes have in response to a very stressful experience, such as an unwanted sexual experience. Please read each problem carefully and then select how much you have been bothered by that problem in the past month.

In the past month, how much were you bothered by:

1. Repeated, disturbing, and unwanted memories of the stressful experience?
    0) Not at all
    1) A little bit
    2) Moderately
    3) Quite a bit
    4) Extremely
2. Repeated, disturbing dreams of the stressful experience?
3. Suddenly feeling or acting as if the stressful experience were actually happening again (as if you were actually back there reliving it)?
4. Feeling very upset when something reminded you of the stressful experience?
5. Having strong physical reactions when something reminded you of the stressful experience (for example, heart pounding, trouble breathing, sweating)?
6. Avoiding memories, thoughts, or feelings related to the stressful experience?
7. Avoiding external reminders of the stressful experience (for example, people, places, conversations, activities, objects, or situations)?
8. Trouble remembering important parts of the stressful experience?
9. Having strong negative beliefs about yourself, other people, or the world (for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?
10. Blaming yourself or someone else for the stressful experience or what happened after it?
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?
12. Loss of interest in activities that you used to enjoy?
13. Feeling distant or cut off from other people?
14. Trouble experiencing positive feelings (for example, being unable to feel happiness or have loving feelings for people close to you)?
15. Irritable behavior, angry outbursts, or acting aggressively?
16. Taking too many risks or doing things that could cause you harm?
17. Being "superalert" or watchful or on guard?
18. Feeling jumpy or easily startled?
19. Having difficulty concentrating?
20. Trouble falling or staying asleep?